Fugro

Viking Link Cable Route Survey
Benthic Report: The Netherlands EEZ

Survey Period 4 May to 25 July 2016
Fugro Document No.: J35045-R-RESE.2(01)

National Grid Interconnector Holdings Limited And
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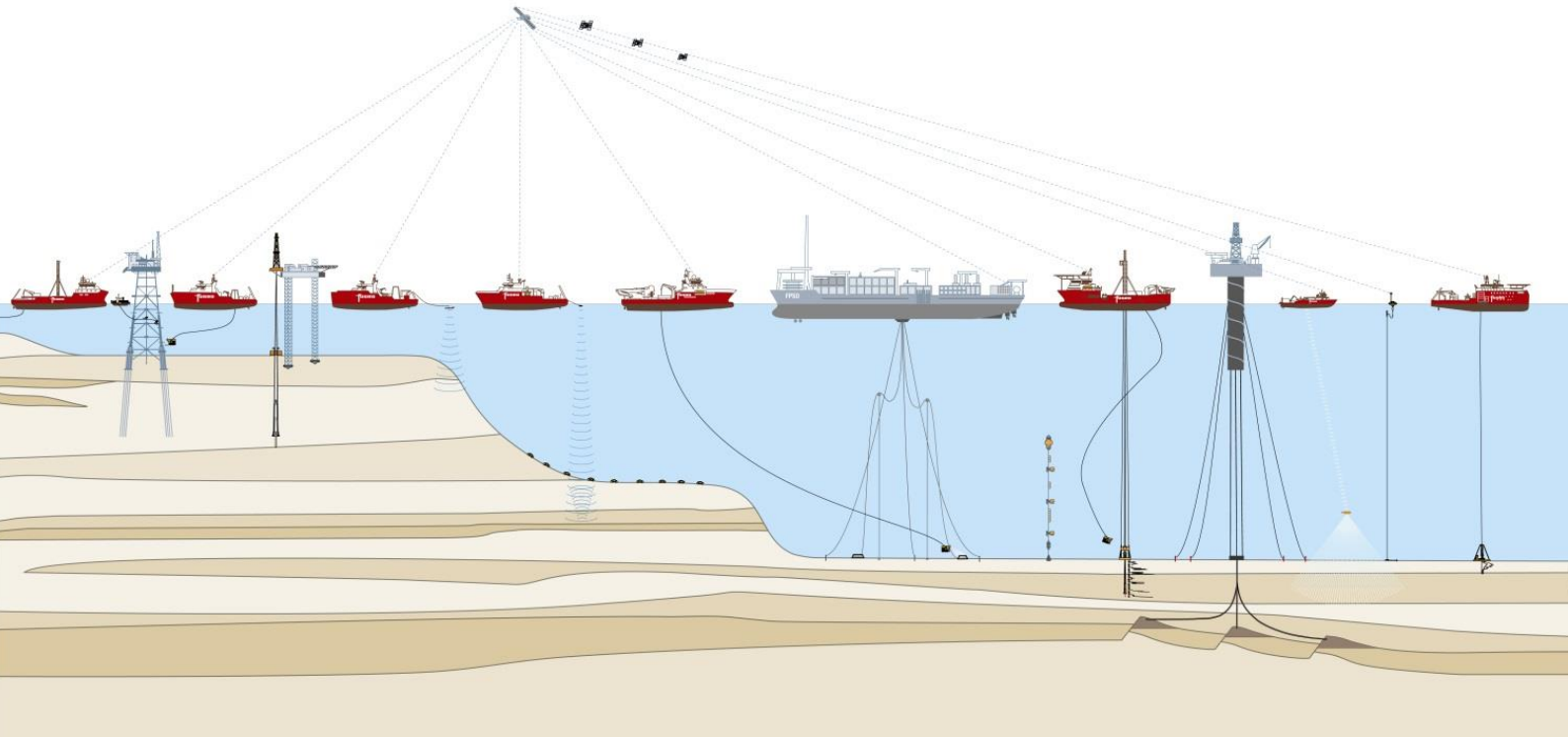
Co-financed by the European Union
Connecting Europe Facility

Draft



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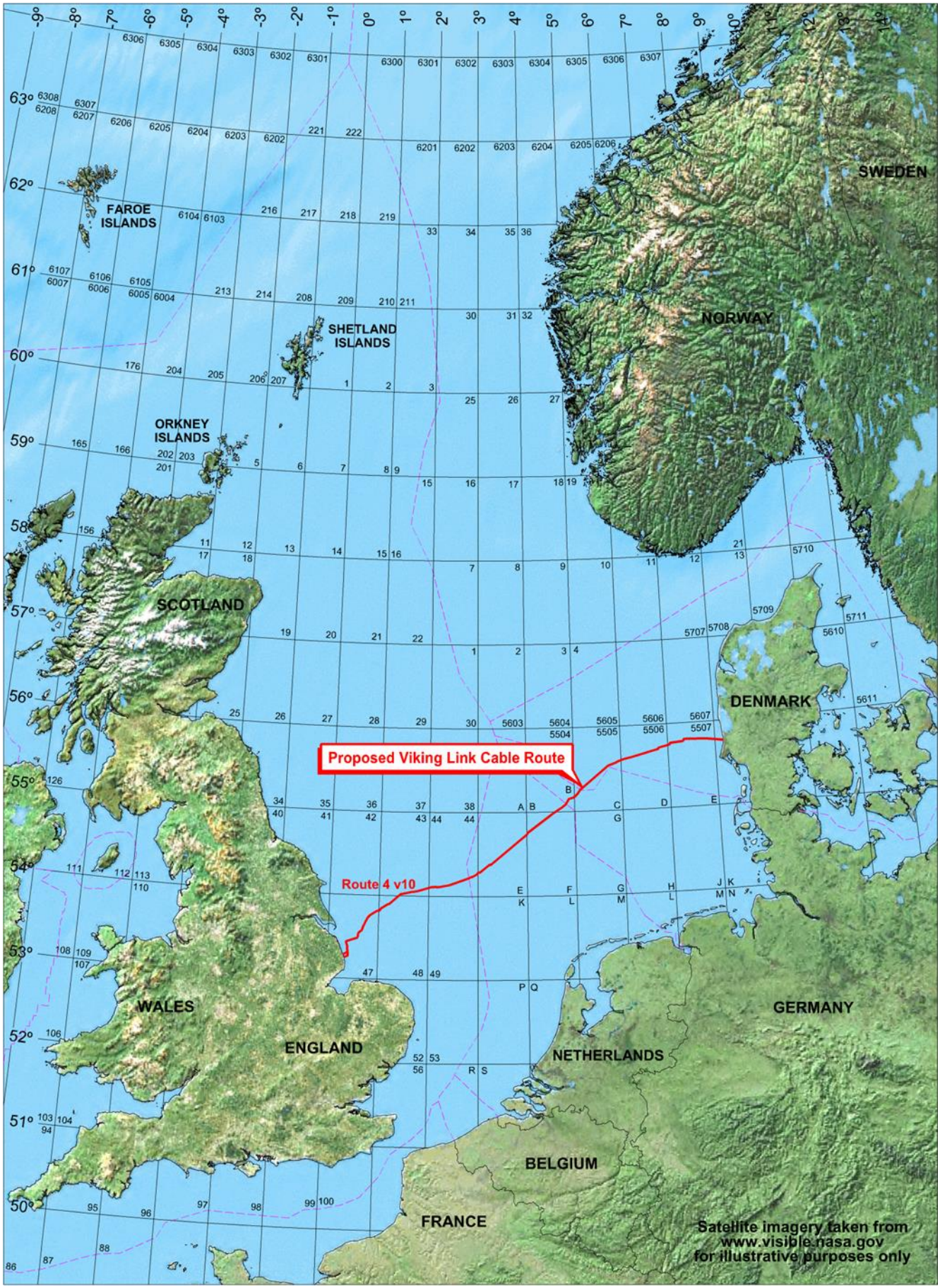
EXECUTIVE SUMMARY

- A survey was conducted along the proposed cable route in order to characterise the benthic ecological conditions and inform Environmental Impact Assessment (EIA) in supporting the consent application.
- The benthic survey included seabed video surveillance, water column profiling, sediment sampling and laboratory analyses for macrofaunal content, particle size distribution and determination of sediment contaminants.
- The results of the sampling and analyses and the subsequent benthic community interpretation for sampling stations within the Netherlands Exclusive Economic Zone (EEZ) are presented in this report. Three other volumes accompany this report for the Denmark, Germany and the United Kingdom sections of the cable route.
- The benthic ecology survey within the Netherlands EEZ was conducted onboard the vessels MV Fugro Frontier and MV Fugro Pioneer between 4 and 16 May 2016. Additional water profiling was conducted onboard the MV Meridian on 25 July 2016 at four sites.
- Data and samples were successfully collected from the 36 proposed sampling stations and video transects within the Netherlands EEZ.
- Sediments within the Netherlands EEZ were dominated by the sand fraction, with some variation in the finer sand and mud fractions present at each station. Coarser material was only observed in three patches along transects 10PTR06, 10PTR08 and 10PTR09.
- Annelida dominated the infauna in terms of taxa throughout the Netherlands EEZ. However, the brittlestar *Amphiura filiformis* abundance meant that the phyla Echinodermata dominated in terms of abundance and biomass. Seven communities were identified, with the most distinct community split being found between the faunal communities identified at the three areas of coarser material (10PST06, 10PST08 and 10PST09) and the remaining faunal communities.
- Combining the video, stills and grab analysis identified three biotopes within the Netherlands EEZ. The biotopes were Circalittoral mixed sediment (A5.44), Circalittoral muddy sand (A5.26) and *Amiphiura filiformis*, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud (A5.351).
- Water profiles throughout the Netherlands EEZ were generally comparable. Stratification of the water column was observed at the majority of stations, although the stratification varied in strength and the depth it occurred to. Warmer, more oxygen saturated and often more saline water was observed at the sea surface.
- Four species included on the IUCN red list were identified; three species of fish (plaice, solenette and whiting) and the Norway lobster. One OSPAR listed, juvenile Ocean quahog was observed. The Central Oyster Grounds were investigated, although no species of conservation interest were observed within this area and biodiversity and biomass remained similar to the surrounding seabed. Several patches of coarse material did not meet the criteria for Annex I, stony reefs. No other sensitive species or habitats were observed within the Netherlands EEZ.
- Under the current nature conservation legislation, two protected species were recorded, the ocean quahog *Arctica islandica* and sandeels Ammodytidae. No sites met the criteria for ‘stony reef’ as outlined in JNCC guidelines.



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PROJECT DOCUMENT ARRANGEMENT

Type	Deliverable		
Summary	**NGIHL / ENDK – MARINE SURVEY ENGLAND – DENMARK HV CABLE ROUTE EXECUTIVE SUMMARY REPORT Report No. J35045-R-EXEC**		
Integrated	CABLE ROUTE SURVEY REPORT Report No. J35045-R-IDRFi (INTERIM)	CABLE ROUTE SURVEY REPORT Report No. J35045-R-IDRF	
Factual	UTILITY CROSSING REPORT Report No. J35045-R-RESD	BENTHIC REPORT Report No. J35045-R-RESE	GEOTECHNICAL LABORATORY REPORT Report No. J35045-R-RESF
Field Reports - Operations	**OPERATIONS REPORTS**		
	Work Package A Onshore and Intertidal Surveys Operations Report Report No. J35045-R-OPSA	Work Package B Offshore Geophysical Survey Operations Report Report No. J35045-R-OPSB	Work Package C Geotechnical Investigations Operations Report Report No. J35045-R-OPSC
	Work Package D Offshore ROV Survey Operations Report Report No. J35045-R-OPSD	Work Package E Offshore Benthic Survey Operations Report Report No. J35045-R-OPSE	
Field Report - Results	**FIELD/RESULTS REPORTS**		
	Work Package A Onshore and Intertidal Surveys Field Results Report Report No. J35045-R-RESA	Work Package A Onshore UK Geophysical Survey Field Results Report Report No. J35045-R-RESA1	Work Package B Offshore Geophysical Survey Field Results Report Report No. J35045-R-RESB
	Work Package C Geotechnical Investigations Field Results Report Report No. J35045-R-RESC	Work Package E Marine Mammal Observation Field Report Report No. J35045-R-MMO	
Pre-Survey Report	Work Package D Utility Crossings Desktop Study J35045-R-DTSD		
Execution	**PROJECT EXECUTION PLAN Report No. J35045-PEP1**		
	Part A Operations Plan Report No. J35045-PEP2-A	**Part B** Quality Plan Report No. J35045-PEP2-B	**Part C** HSSE Plan Report No. J35045-PEP2-C	**Part D** Emergency Response Plan Report No. J35045-PEP2-D

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ABBREVIATIONS

A	Abundant
AFDW	Ash Free Dry Weight
Al	Aluminium
As	Arsenic
BGS	British Geological Society
BSI	British Standards Institution
C	Common
Cd	Cadmium
CM	Central Meridian
CTD	Conductivity, Temperature and Depth
Cr	Chromium
Cu	Copper
CV - AFS	Cold Vapour Atomic Fluorescence Spectroscopy
D	Margalef's Index of Richness
DE	Germany
DK	Denmark
DO	Dissolved Oxygen
DVR90	Dansk Vertikal Reference 1990
EEA	European Environment Agency
EEZ	Exclusive Economic Zone
ENDK	Energinet.dk SOV
EPSG	European Petroleum Survey Group
ETRS	European Terrestrial Reference System
EUNIS	European Nature Information System
F	Frequent
FEED	Front End Engineering and Design
GC - MS	Gas Chromatography - Mass Spectrometry
(g)S	gravelly Sand
(g)mS	gravelly muddy Sand
GRS 1980	Geodetic Reference System 1980
GNSS	Global Navigation Satellite System
H'	Shannon-Wiener Diversity Index
Hg	Mercury
HVDC	High Voltage Direct Current
ICP - MS	Inductively Coupled Plasma Mass Spectrometry
IDA	Industrial Denatured Alcohol
ISO	International Organization for Standardization
ITRF	International Terrestrial Reference Frame
IUCN	International Union for Conservation of Nature
J'	Pielou's Evenness
JNCC	Joint Nature Conservation Committee
KP	Kilometre Post
LAT	Lowest Astronomical Tide
LED	Light-emitting Diode
MDS	Multidimensional Scaling
MNCR	Marine Nature Conservation Review
mS	muddy Sand

msG	muddy sandy Gravel
MSL	Mean Sea Level
MV	Motor Vessel
N	Total Individuals
n	Number of stations
NGIHL	National Grid Interconnector Holdings Limited
Ni	Nickel
NL	Netherlands
NMBAQC	National Marine Biological Analytical Quality Control
O	Occasional
ODN	Ordnance Datum Newlyn
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
OpCo	Operating Company
P	Present
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
PCA	Principal Component Analysis
PEP	Project Execution Plan
ppt	Parts per Thousand
PRIMER	Plymouth Routines in Multivariate Ecological Research
PSD	Particle Size Distribution
QC	Quality Control
R	Rare
ROV	Remotely Operated Vehicle
RPL	Route Position Listing
S	Superabundant, Sand or Total Species
SACFOR	Scale of Abundance
SCI	Site of Community Importance
SDC	Species Directory Code
SIMPER	Similarity Percentage Analysis
SIMPROF	Similarity Profile Analysis
Sn	Tin
ST	Station
TOC	Total Organic Carbon
TOM	Total Organic Matter
TR	Transect
UK	United Kingdom
UKAS	United Kingdom Accreditation Service
UK BAP	UK Biodiversity Action Plan
UTM	Universal Transverse Mercator
WoRMS	World Register of Marine Species
WP	Work Package
Zn	Zinc
λ	Simpson's Dominance Index

1. INTRODUCTION

1.1 General Project Description

The Viking Link project concerns a planned High Voltage Direct Current (HVDC) electricity transmission interconnector, composed of a pair of buried submarine cables extending approximately 615 km between England and Denmark across the North Sea.

The project is being jointly developed by National Grid Interconnector Holdings Limited (NGIHL) and Energinet.dk SOV (ENDK). NGIHL/ENDK contracted Fugro to perform a Marine Survey for the submarine and underground landfall sections of the proposed interconnector. This includes defined Work Packages (WPs) covering Landfall, Nearshore and Offshore scopes of work. These sub-scopes, within the overall Marine Survey contract, will be carried out by a number of Fugro Operating Companies (OpCo), as detailed in the Project Execution Plan (J35045-PEP1).

1.2 Background

The purpose of the Viking Link project is to construct a submarine HVDC electricity transmission interconnector between England and Denmark. The planned cable layout is for a Danish landfall (KP 0) at Blaabjerg Strand, approximately 30 km north of Esbjerg and four English landfall options, north of Anderby Creek, close to Skegness. These comprise a northern and southern offshore survey corridor each of which encompass two landfall options. From south to north these landfall options are named Alpha, Charlie, Delta and Echo. Offshore the main route is named Route 4. The survey route corridor is approximately 615 km long and 450 m wide.

The Route 4 survey plan is sub-divided into 15 survey blocks. Figure 1.1 shows the survey blocks for the selected survey route. Block lengths vary from 32 km to 54 km, with most blocks between 45 km and 48 km long.

Figure 1.1: Viking Link Cable Route Overview

1.3 Project Objectives

The Viking Link cable route survey data consists of high-resolution topographic, bathymetric, seabed imagery and sub-seabed data (geophysical, geological, geotechnical and environmental) to support routeing, FEED design and provide the basis for input to the construction tender process. The final results of the project will detail physical and environmental conditions from the seabed (or land surface) to a depth limit related to the available data.

Fugro was contracted to acquire survey data and to deliver a comprehensive integrated geophysical, geotechnical and environmental report. Four principal services are required to provide the range of information needed to inform routing, engineering and complete the consenting process. The headline objectives of the individual surveys are summarised in Table 1.1 and described in Sections 1.4 to 1.8.

Table 1.1: Headline Survey Objectives

GEOPHYSICAL
Undertake geophysical surveys along the route and in defined survey areas to determine: ■ **Bathymetry** ■ **Seabed features and obstructions** ■ **Shallow geology**
ENVIRONMENTAL (BENTHIC)
■ **Environmental survey along the route** ■ **Map distribution and extent of marine benthic habitats** ■ **Benthic sampling for visual and chemical analysis**
GEOTECHNICAL
■ **Undertake a sampling and testing programme along proposed cable route** ■ **Evaluate the nature and mechanical properties of seabed and intertidal sediments**
UTILITY CROSSINGS
■ **Position intersection of Route Position Listing (RPL) and utility cable/pipeline** ■ **Status of utility (including depth of burial or height of exposure) and seabed at crossing**

1.4 Survey Work Packages

The survey operations are structured into Work Packages (WP) as designated in Table 1.2:

Table 1.2: Work Package Designations

Work Package	Survey Operation
A	Onshore and Intertidal Activities
B	Geophysical Seabed Survey
C	Geotechnical Investigations (Nearshore and Offshore)
D	ROV Investigations of Crossing Cables and Pipelines
E	Benthic Investigations
F	Reporting and Data Delivery

WPA and B form the primary survey phases, the results of which provide planning input to WPC, D and E. WPF constitutes the reporting for all previously acquired Work Packages and laboratory testing, and the integration of the results from all Work Packages.

1.5 Geophysical Survey Objectives

The geophysical survey areas are split between WPA (onshore and intertidal survey area) and WPB (offshore survey area). The objectives of the geophysical surveys are to:

- Measure intertidal topography, bathymetry and surface morphology and identify the nature of the seabed sediments – in particular the height, length and slopes of sand waves;
- Identify the nature and thickness of superficial sediments and depth to bedrock, to a sub-seabed depth of 10 m where possible;
- Identify the distribution of subsea geological features such as areas of exposed bedrock or older formations;
- Identify the location, extent and nature of any impediments to the lay or burial of the proposed Viking Link cables such as wrecks, debris, rock outcrop, existing cables or pipelines, etc.;
- Determine geotechnical and benthic (environmental) sample locations.

1.6 Environmental (Benthic) Survey Objectives

The objectives of WPE, the environmental (benthic) investigation are to:

- Obtain environmental grab samples to correlate with potential marine habitats identified during the geophysical survey;
- Provide additional sampling conforming to German Exclusive Economic Zone (EEZ) requirements (for example, beam trawls);
- Recover samples for onboard and subsequent laboratory testing.

1.7 Geotechnical Investigation Objectives

The objectives of WPC, the geotechnical investigation are to:

- Obtain and describe targeted samples of seabed materials to correlate with interpreted seismic reflectors;
- Recover targeted samples for onboard and subsequent laboratory testing;
- Test in-situ sediment properties at targeted locations.
- Obtain most tests and samples to a target depth of 3 m sub-seabed, and the remainder to a target depth of 6 m sub-seabed.

1.8 ROV Utility Crossing Investigation Objectives

The objectives of WPD, the ROV utility crossing investigation are to:

- Confirm the position and crossing angle of route/utility intersections across the 450 m survey corridor, and an additional 200 m to either side;
- Determine the burial status and depth of existing utilities;
- Determine the seabed features and conditions at each crossing.

1.9 Route Position Listing

The route position listing (RPL) details for the Viking Link cable route survey were supplied by Intertek in Excel spreadsheet and an ESRI shapefile format on 9 March 2016, prior to the start of the survey acquisition (file "20160309_DK_to_UK_Route_Rev3_ETRS89_UTM31N_RPL"). These formed the basis for the geophysical site and route surveys, from the Landfall in Denmark to the Netherlands/UK EEZ boundary (Point A). Subsequent revisions to the route led to "20160603_Route_4_Rev9_ETRS89_UTM31N" becoming the basis for later survey work and the crossing surveys. A further revision to the RPL "20160623_Route_4_Rev10_ETRS89_UTM31N_RPL" will be used for Integrated Reporting. Appendix A contains this latest revision of the proposed route.

1.10 Geodetic and Projection Parameters and Vertical Datum

1.10.1 Project Geodetic Parameters

The Viking Link project data are presented on the geodetic datum and map projection as defined in Table 1.3.

Table 1.3: Project Geodetic and Projection Parameters

ETRS89 (3D) [ETRS89-ITRF08]		
Global Navigation Satellite System (GNSS) Geodetic Parameters		
Datum:	International Terrestrial Reference Frame (ITRF) 2008 EPSG Code: 1061	
Ellipsoid:	GRS 1980	
Semi major axis:	a=6 378 137.000 m	
Inverse Flattening:	1/f=298.257222101	
Local Geodetic Datum Parameters		
Datum:	European Terrestrial Reference System (ETRS) 1989 EPSG Code: 6258	
Ellipsoid:	GRS 1980	
Semi major axis:	a=6 378 137.000 m	
Inverse Flattening:	1/f=298.257222101	
Datum Transformation Parameters from ITRF08 to ETRS89 (Coordinate Frame Rotation Convention)		
Shift dX 0.05373 m	Rotation rX -0.002214 arcsec	Scale difference 0.00264645 ppm
Shift dY 0.05093 m	Rotation rY -0.013392 arcsec	
Shift dZ 0.08790 m	Rotation rZ 0.021646 arcsec	EPSG Code: 41258
Project Projection Parameters		
Map Projection:	Transverse Mercator	
Grid System:	UTM Zone 31 N	
Central Meridian:	3° East	
Latitude of Origin:	0° North	
False Easting:	500 000 m	
False Northing:	0 m	
Scale Factor on Central Meridian:	0.9996	
Units:	Metre	
Note: The geodetic datum of Fugro's global GNSS correction data is ITRF2008, epoch 2016.331		

1.10.2 Vertical Datum

The vertical datum for this project is Lowest Astronomical Tide (LAT). All water depths; topographic mapping, factual results and charting are referenced to LAT and quoted in metres.

The land vertical datum for the UK is Ordnance Datum Newlyn (ODN) and for Denmark is Dansk Vertikal Reference 1990 (DVR90).

Table 1.4 lists UK vertical datum levels for selected Viking Link cable route locations, including the tie-in to ODN.

Table 1.4: Vertical Datum Levels for Selected Viking Link Cable Route Locations

Location	LAT [m]	MSL [m]	ODN [m]	Notes	MSL/LAT Separation [m]
UK N5 Landing	+0.1	+4.0	+3.8	Height above chart datum. Source: VORF (contains UKHO data © Crown copyright and database rights)	+3.9
UK N4 Landing	0.0	+3.8	+3.7		+3.8
UK/NL EEZ Route 5	0.0	+1.2	N/A		+1.2
Note: MSL = Mean Sea Level					

Table 1.5 lists Danish, German and Netherlands vertical datum levels for selected Viking Link cable route locations, including the tie-in to DVR90.

Table 1.5: Other Levels Relative to Chart Datum

Location	LAT [m]	MSL [m]	DVR90 [m]	Notes	MSL/LAT Separation [m]
Esbjerg	-0.2	+1.1	+0.584	Height above chart datum. Source: Admiralty Tide Tables (UKHO) and http://www.gst.dk/media/gst/65263/Vejledning om højdesystemet.pdf	+1.3
DK Block 2/3 Interface	+40.3	+40.9	-	Height above ellipsoid in metres. Source: DTU13/ DTU13 + NL LAT Computation	+0.6
DE/DK EEZ Interface	+40.6	+40.9	-		+0.3
UK/NL EEZ Route 5	+40.3	+41.5	-		+1.2

2. METHODS

The benthic survey was undertaken to map the distribution and extent of marine benthic habitats for the proposed cable corridor within Denmark, Germany, the Netherlands and the United Kingdom Exclusive Economic Zones (EEZs).

The results of the benthic survey are split into four volumes. This volume (J35045-R-RESE.2(01)) presents the findings from the proposed cable corridor within the Netherlands EEZ.

The following sections present a summary of the sampling methodologies. Full survey methodology details, including positional data and data quality, can be found in the Operations Report (J35045-R-OPSE).

2.1 Survey Design

Geophysical data were reviewed on site to select sampling stations in order to investigate the representative habitats along the cable route, nominally spaced at a distance of 5 km apart. Within the Netherlands EEZ, a total of 36 stations were selected and approved by the client. The survey array is presented in Figure 2.1.

Survey operations were undertaken in accordance with the procedural guidelines contained within the marine monitoring handbook (Davies et al, 2001). The benthic survey tasks included:

- Acquisition of benthic grab sampling for macrofauna and physico-chemical analysis;
- Acquisition of seabed video footage and stills images;
- Conductivity, temperature and depth (CTD) and dissolved oxygen profiling.

2.2 Benthic Survey

The benthic operations within the Netherlands EEZ were undertaken onboard the MV Fugro Frontier and MV Fugro Pioneer between 4 and 16 May 2016. Additional water column profiling was conducted onboard the MV Meridian on 25 July 2016, at four stations (7FST46 to 7FST49 inclusive).

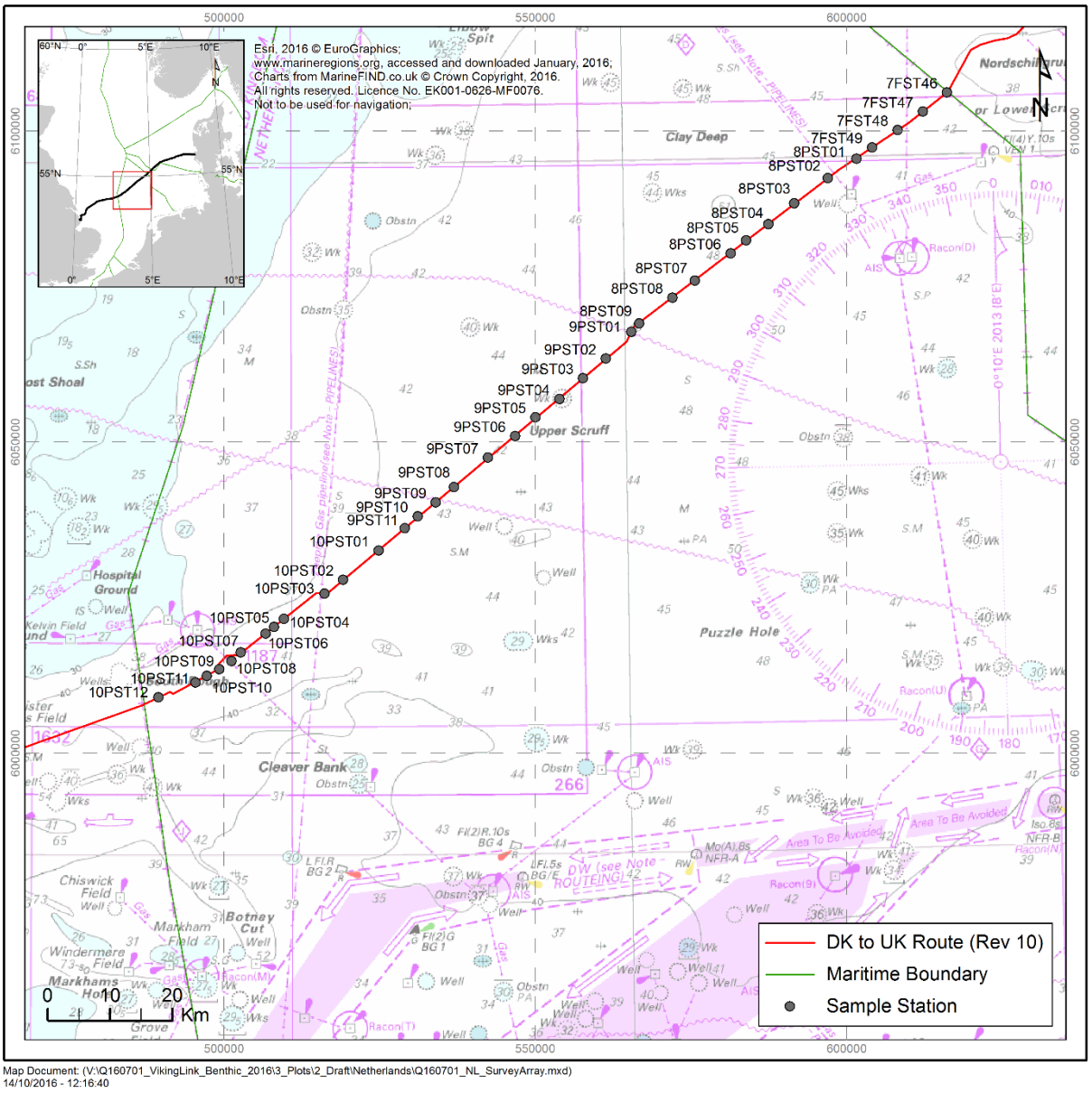

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Figure 2.1: Benthic survey sampling locations

2.2.1 Videographic and Photographic Data Collection

Prior to grab sampling, seabed video footage and stills images were collected. Seabed photography was acquired using a Kongsberg OE 14-208 underwater camera system mounted within a purpose-built camera frame complete with a separate strobe and two LED or Halogen lights.

Where the video passed over sediment boundaries, additional seabed video was collected, as appropriate, to provide sufficient coverage of all sediment types. Observer records were taken throughout each deployment and included; substrate type and conspicuous epifauna. Review of the video data also allowed assessment of the sites prior to grab deployment.

Positions for the video survey were logged at the beginning and the end of each drop, and at each static image location. Positional data was also overlaid on the video footage to ensure accurate geo-referencing.

2.2.2 Sediment Sampling

Seabed sediment samples were collected using a 0.1 m^2 dual van Veen grab. The position of each sample was taken at the time when the winch wire went slack, indicating that the grab was on the seabed. Upon retrieval of the grab sample, the sediment within the grab bucket was viewed in order to assess whether the sample was acceptable (i.e. had not been subject to partial washout during retrieval, had sealed correctly, and was of sufficient volume relating to depth of bite).

Photographs of the sediment surface were taken prior to any sample processing. A description of the sediment, including any sediment features (e.g. apparent anoxia) and conspicuous species were recorded.

One 0.1 m^2 sample at each station was processed for macrofauna. The sediment was gently washed over a 1 mm sieve with seawater. The material retained on the sieve was photographed and then transferred into a pre-labelled bucket with lid, and fixed using 10 % buffered formal saline solution (4 % formaldehyde).

The second grab sample was used for physico-chemical samples, subsamples from this grab sample were taken as follows:

- A sub-sample (of approximately 300 ml) was collected for particle size distribution (PSD) and total organic matter (TOM) analyses. The sample was collected using a plastic scoop to a nominal depth of 5 cm. The sample was placed in pre-labelled heavy duty plastic bag, and sealed to ensure no loss of fines;
- Hydrocarbon samples were collected using an acetone cleaned metal scoop to a nominal depth of 2 cm, and stored in a pre-labelled glass jar;
- Samples for heavy metals and total organic carbon (TOC) were collected using a plastic scoop to a nominal depth of 2 cm and placed in a pre-labelled plastic bag.

All physico-chemical samples were frozen and stored on the vessel until demobilisation and transfer to the analysis laboratory.

Fugro EMU is accredited by the United Kingdom Accreditation Service (UKAS) for sediment grab sampling and processing.

2.2.3 Water Quality Profiling

At each sampling station, environmental water quality profiling was conducted to provide data on the oceanographic structure of the water column. A multi parameter sonde was utilised to record the following parameters from the surface to the seabed:

- Conductivity (to derive salinity);
- Temperature;
- Pressure (to derive depth);
- Dissolved oxygen (DO).

2.3 Videographic and Photographic Data Analyses

At each station, video footage was initially reviewed rapidly (at approximately four times the normal speed) in order to section it into different substrates/habitats. Brief changes in substrate type are considered part of the overall habitat, and were not logged separately. Where habitat/substrate changes were found, and the video divided into sections, each section was analysed separately. The video footage was then viewed at normal speed, whilst also utilising the slow playback feature of the software to enable identification of species, as required.

Each underwater photograph was also analysed to supplement the video data. The underwater photographs also enabled higher resolution information to be obtained than the video footage.

A 0.1 m^2 grid overlay was used in order to establish abundances for selected smaller species (e.g. the polychaete worm, *Spirobranchus* sp.). A larger overlay grid was used for estimating percentage cover of certain species (e.g. barnacles, Cirripedia). The grid was also used for calculating percentage cover of cobbles and boulders, where appropriate.

Records of substrate composition were made using the Wentworth Scale (presented in Table 2.1 below).

Table 2.1: Wentworth Scale

Particle Size	Wentworth (1922) Classification
>256 mm	Boulder
>64 to 256 mm	Cobble
>2 to 64 mm	Gravel/Pebble
>62.5 µm to 2 mm	Sand
>4 to 62.5 µm	Silt
>1 to 4 µm	Clay

Identification of species was to the lowest taxonomic level possible. It should be noted that many species cannot be identified from video footage alone and, as such, higher taxonomic levels were used. Species abundance was calculated using the industry standard SACFOR abundance scale

(Hiscock, 1996); the SACFOR classification uses the average species size and abundance to classify the population (Table 2.2). Where the abundance of taxa could not be estimated, these were recorded as Present (P) only.

Table 2.2: Marine Nature Conservation Review (MNCR) SACFOR Abundance Scale

Growth Form			Size of individuals/colonies				Density
% cover	Crust /Meadow	Massive /Turf	< 1 cm	1 - 3 cm	3 - 15 cm	> 15 cm	
>80 %	S		S				> 1/0.001 m^2
40 – 79 %	A	S	A	S			1 - 9/0.001 m^2
20 – 39 %	C	A	C	A	S		1 - 9/0.01 m^2
10 – 19 %	F	C	F	C	A	S	1 - 9/0.1 m^2
5 – 9 %	O	F	O	F	C	A	1 - 9/1 m^2
1 – 5 % or density	R	O	R	O	F	C	1 - 9/10 m^2
< 1 % or density	R	R		R	O	F	1 - 9/100 m^2
					R	O	1 - 9/1000 m^2
						R	< 1/1000 m^2

Notes:
S=Superabundant, A=Abundant, C=Common, F=Frequent, O=Occasional, R=Rare

If potential sensitive habitats were found, additional analysis was undertaken to establish the status of the habitat. The following section describes the method for assessment of stony reefs.

2.3.1 Geogenic (Stony) Reef

Clarification of 'stony reef' under the Habitats Directive was attempted during an inter-agency workshop and subsequent discussions in 2008 (Irving, 2009). Several key parameters of 'reefiness' were proposed including:

- Physical composition – > 10 % of the seabed substratum should be composed of particles greater than 64 mm across, i.e. cobbles and boulders. The remaining supporting 'matrix' could be of smaller sized material;
- Biological cover – greater the dominance of epifaunal species indicating greater likelihood of an area of habitat being categorised as stony reef;
- Elevation – revert to the Habitats Directive's interpretation manual to include areas that 'arise from the seafloor' (i.e. are topographically distinct from the surrounding sea floor);
- Extent – minimum area which could be considered as stony reef is 25 m^2;
- Quality – including its structure and function e.g. as a refuge or shelter for mobile fauna such as crustaceans and fish.

In conclusion, the workshop developed a table summarising the main characterising features of the stony reef (Table 2.3). Using these criteria, current survey data was compared for assessment of the presence of no, low, medium and high resemblance to a stony reef.

Table 2.3: Measure of Geogenic (Stony) Reefiness

Measure of 'reefiness'	NOT A REEF	LOW	MEDIUM	HIGH
Composition diameter of cobbles/boulders being greater than 64 mm * Percentage cover relates to a minimum area of 25 m^2 (%)	< 10	10 - 40 Matrix supported	40 - 95	> 95 Clast supported
Elevation † Minimum height (64 mm) relates to minimum size of constituent cobbles	Flat seabed	< 64 mm	64 mm – 5 m ‡	> 5 m
Extent (m^2)	< 25	> 25		
Biota	Dominated by infaunal species			> 80 % of species present composed of epifaunal species

Notes:
* = This 'composition' characteristic also includes 'patchiness'
† = This characteristic could also include 'distinctness' from the surrounding seabed
‡ = Note that two units (mm and m) are used here

2.4 Laboratory Analyses

2.4.1 Sediment Particle Size Distribution (PSD)

Particle size analysis was undertaken in accordance with Fugro's in house methods based on BS1377: 2016 Parts 1 to 2 and National Marine Biological Analytical Quality Control (NMBAQC) best practice guidance. Fugro EMU is UKAS accredited for dry sieve analysis. Laser Diffraction is not UKAS accredited.

Representative material > 1 mm was split from the bulk sub-sample and oven dried at 105 ± 5°C to constant weight before sieving through a series of sieves with apertures corresponding to 1 Phi intervals between 64,000 to 1 mm as described by the Wentworth scale. The weight of the sediment fraction retained on each mesh was measured and recorded.

Where required, representative material < 1 mm was removed from the bulk sub-sample for laser analysis; a minimum of three triplicate analyses (mixed samples) or one triplicate analyses (sands) were analysed using the laser sizer at 1 Phi intervals between < 1 mm and < 3.9 µm. Laser diffraction was carried out using a Malvern Mastersizer 2000 using a Hydro 2000G dispersion unit.

2.4.2 Sediment Chemistry

Samples for hydrocarbon analysis were undertaken by Fugro's UKAS accredited chemistry laboratory. All other chemical analyses were sub-contracted to an experienced UKAS accredited chemistry laboratory. Summaries of the methodologies used are detailed in Table 2.4 to Table 2.8.

Table 2.4: Sediment Chemistry Analysis – Total Organic Matter

Total Organic Matter	
Method Description	Loss on ignition at 500 C
Minimum Reporting Value (mg/kg)	0.5 %
UKAS Accreditation	Y

Table 2.5: Sediment Chemistry Analysis – Total Organic Carbon

Total Organic Carbon	
Method Description	Carbonate removal acidification/combustion
Minimum Reporting Value (mg/kg)	0.5 %
UKAS Accreditation	N

Table 2.6: Sediment Chemistry Analysis – Total Hydrocarbons

Total Hydrocarbons	
Method Description	Ultrasonic extract of wet sediment, column chromatography clean-up, analysis by Gas Chromatography - Mass Spectrometry (GC – MS)
Minimum Reporting Value (mg/kg)	0.5
UKAS Accreditation	Y

Table 2.7: Sediment Chemistry Analysis – Polycyclic Aromatic Hydrocarbons (PAHs)

Polycyclic Aromatic Hydrocarbons	
Method Description	Ultrasonic extract of wet sediment, column chromatography clean-up, analysis by GC - MS
Minimum Reporting Value (mg/kg)	Individual PAHs – 0.0001
	Alkylated PAHs – 0.001
UKAS Accreditation	N

Table 2.8: Sediment Chemistry Analysis – Trace Metals

Metals (aqua regia digest)	
Method Description	Samples dried, sieved, digested and analysed by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) Mercury is determined by Cold Vapour Atomic Fluorescence Spectroscopy (CV - AFS)
Method Reference	Subcontracted to a UKAS (ISO 17025) accredited laboratory

Metals (aqua regia digest)	
Fugro Minimum Reporting Value (mg/kg)	Selected metals: Al – 90 As – 0.04 Cd – 0.005 Cr – 0.2 Cu – 0.7 Pb – 0.2 Hg – 0.0005 Ni – 0.4 Sn – 1 Zn – 2
UKAS Accreditation	Y

2.4.3 Grab Macrofauna

Grab samples were returned to Fugro's benthic laboratory for analysis. The laboratory is a full participant in the National Marine Biological Analytical Quality Control (NMBAQC) scheme. Fugro's in-house procedures for benthic macro-invertebrate analyses are in line with procedures recommended by the NMBAQC scheme (Worsfold et al., 2010) and BSi 16665:2013. Fugro EMU is UKAS accredited for macrofaunal analysis.

Macrofaunal grab samples were sieved over a 1 mm mesh to remove all fine sediment and fixative. Fauna were sorted from the sieved sample under a dissecting microscope and subsequently identified to the lowest possible taxonomic level and enumerated. Colonial, encrusting epifaunal species were identified to species level, where possible, and allocated a P (present) value.

All biological faunal material retained were stored in 70 % industrial denatured alcohol (IDA). A reference collection was prepared with a minimum of one individual of all species identified retained.

Fugro 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.

2.4.4 Grab Biomass

Within the Netherlands EEZ, biomass analysis was undertaken on the infauna from grab samples, following identification and enumeration. The infauna from each sample were sorted into six groups, to include Annelida, Crustacea, Mollusca, Echinodermata, Cnidaria (including only burrowing species) and "Other Taxa", and biomass undertaken using the wet blot method. Subsequently, the appropriate standard corrections were applied to these data to provide equivalent dry weight biomass (as outlined in Eleftheriou and Basford, 1989):

- Annelida 15.5 %
- Crustacea 22.5 %
- Mollusca 8.5 %
- Echinodermata 8.0 %
- Cnidaria 15.5 %
- Others 15.5 %

Within the Netherlands EEZ, eight stations (8PST03 to 8PST08 and 9PST01) were sampled within an area known as the Central Oyster Grounds. These samples were submitted for species level biomass.

2.5 Data Analyses

Data analyses were undertaken using Microsoft Excel 2010 and the statistical package PRIMER v6 (Clarke and Gorley, 2006; Clarke and Warwick, 2001). Laboratory result values below the analytical detection/reporting limit were treated as being equal to half of that of the analytical/reporting limit for data analysis purposes only (Croghan, 2003).

2.5.1 Particle Size Distribution (PSD) Data Analysis

Sieve and laser data were subsequently merged and entered into the software GRADISTAT v8.0 (Blott and Pye, 2001) to derive statistics including percentage of each particle greater than each phi aperture size, mean and median grain size, bulk sediment classes (percentage silt, sand & gravel), skewness, sorting coefficients and Folk classification (Folk, 1954). These statistics are summarised in Table 2.9.

Table 2.9: Sediment Particle Size Distribution Statistics

Distributional Statistic Measure	Description
Phi scale	A logarithmic scale which allows grain size data to be expressed in units of equal value for the purpose of graphical plotting and statistical calculations. The scale is based on the following relationship: $phi = -log_2 d$ where *d* is the grain size diameter in mm
Mode	Peak of the frequency distribution. The mode represents the particle size (or size range) most commonly found in the distribution
Sorting	A measure of the range of grain size present and the magnitude of the spread or scatter of these around the mean
Skewness	A degree of symmetry – skewness reflects sorting in the tails of a grain size data set. Data set that have a tail of excess fines particles are said to positively skewed or fine skewed; data sets with a tail of excess coarse particles are negatively skewed or coarse skewed

Data for the percentage composition retained within each sieve size classes were analysed using the Euclidean distance measure as recommended by Clarke and Gorley (2006). Data were fourth root transformed in order to bring the data set as close as possible to normal distribution and allow optimal performance of the multivariate analysis, in line with the recommendations of Clarke and Gorley (2006).

The Principal Component Analysis (PCA) was undertaken on the main sediment fractions data set in order to identify spatial patterns and relationships between variables. The PCA is a method of identifying multidimensional patterns in data sets; once these multidimensional patterns have been found the data are compressed by reducing the number of dimensions without loss of information. The results of a PCA are graphically represented by the principal component axes, which are linear combination of the values for each variable, and represent the perpendicular distance in a multidimensional space along which the variance is maximised. The degree to which a two-dimensional PCA succeed in representing the full multidimensional information is seen in the

percentage of the total variance expressed by the first two principal components. In general, a picture which accounts for as much as 70 – 75 % of the original variation is likely to describe the overall structure rather well (Clarke and Warwick, 2001).

2.5.2 Correlations

Correlation analysis provides an effective way of revealing the relationships between multiple variables. Correlation analysis between environmental variables was undertaken using the Spearman's correlation coefficient. This correlation analysis, based on ranks, allows characterising of the strength of relationships among a set of variables, without making assumption of linearity between variables (Hauke and Kossowski, 2011).

The correlation matrix was generated in Primer v6. Significance levels were taken from tabulated values for a two-tail test at 5 % and 1 % (Fowler et al., 2000).

2.5.3 Macrofauna

The macrofaunal data set was imported into Primer v6 and analysed by means of univariate and multivariate analyses.

2.5.3.1 Univariate Analysis

Univariate analyses are used to extract features of communities which are not the function of specific taxa, i.e. these methods are species independent. They are not sensitive to spatio-temporal variations in species composition, so that assemblages with no species in common can theoretically have equal diversities. Univariate analyses included the primary variables: number of taxa (S) and abundance (N), together with the Margalef's index of Richness (d), Pielou's index of Evenness *(J)*, Shannon-Wiener index of Diversity ($H'\text{Log}_2$) and the Simpson's index of Dominance (λ).

Margalef's index of richness incorporates the total number of individuals and is a measure of the number of species present for a given number of individuals. Unlike the total number of species, this index is less dependent from sample size.

Pielou's index of evenness expresses how evenly distributed the individuals are among the different species. In general, the higher the evenness, the more balanced the sample is, as it indicates that the individuals are evenly distributed between the species recorded.

The Shannon-Wiener index of diversity incorporates richness and evenness as it is expresses the number of species within a sample and the distribution of abundance across these species.

The Simpson's index has a number of forms, λ representing the probability that any two individuals from the sample, chosen at random, are from the same species. As such the index is a dominance index in the sense that its largest value correspond to assemblages the total abundance of which is dominated by one or very few of the species present.

Assessment of benthic faunal diversity, calculated using Shannon-Wiener Index, ($H'\text{Log}_2$) followed the threshold values outlined in Dauvin et al., (2012), whereby values of H' (Log_2) greater than four indicate high diversity; values between three and four indicate good diversity; values between three

and two indicate moderate diversity; values between one and two indicate poor diversity; and valued less than one indicate bad diversity (Dauvin et al., 2012).

2.5.3.2 Multivariate Analysis

Transformation of data may be employed at the initial stage multivariate analysis, particularly when the fauna data set is numerically dominated by a few species which may mask the underlying community composition. Transformation reduces the influence of these more dominant species allowing the whole faunal assemblages to be assessed. The data set in the current study was fourth root transformed.

The transformed data were then analysed, employing the hierarchical agglomerative clustering analysis, where samples are grouped on the basis of nearest neighbour sorting of a matrix of sample similarities, using the Bray-Curtis similarity measure. The results are then displayed in a dendrogram. The Multi-Dimensional Scaling (MDS) ordination analysis was undertaken in conjunction with the cluster analysis. The MDS analysis uses the same similarity matrix as that of the cluster analysis to produce a multidimensional ordination of samples. This attempts to construct a map of the samples, in which the more similar two samples are, the closer they appear on the map. The extent to which these relations can be adequately represented in a two-dimensional map is expressed as the stress coefficient statistic, low values (< 0.1) indicating a good ordination with no real prospect of misleading interpretation. The combination of clustering and ordination analysis allows checking the adequacy and mutual consistency of both representations (Clarke and Warwick, 2001).

The Similarity Profile (SIMPROF) test was run in conjunction with the cluster analysis in order to identify station groupings that are significantly different in statistical terms. Results are displayed by colour convention, with samples connected by red lines indicating a difference which is not statistically significant. It is noteworthy however, that samples which may be considered statistically different, based on the SIMPROF output, may host similar faunal communities which differ e.g., in terms of abundance rather than species composition. In such case, the samples may be interpreted as being not significantly different, from an ecological point of view. The SIMPROF output was therefore always considered in terms of statistical and ecological significance, in line with Clarke et al., (2008), who indicate that creating coarser groupings is entirely appropriate, provided that the resulting clusters are always supersets of the SIMPROF groups.

The Similarity Percentage Analysis (SIMPER) was undertaken following the clustering analysis, in order to gauge the faunal distinctiveness of each of the identified group of samples. SIMPER provides a ranked list of taxa which contributes most to the similarity/dissimilarity within/between groups of samples.

2.5.4 Biotope Classifications

Biotope code allocations were made using the European Nature Information Service (EUNIS) (2016) habitat codes. The task was carried out by an experienced ecologist practised in matching biotopes to field survey data with codes applied through experienced judgment and knowledge of the biotope classification system. All survey data were used to inform the biotope allocation process including macrobenthic data, PSD analysis results and the videographic and photographic analysis data.

2.5.5 Water Quality Profiling Analyses

A check was undertaken on the vessel to ensure the data had been collected successfully. The data were returned to the office where they were analysed using Fugro's Ocean V3 software.

3. RESULTS

All data and samples were successfully collected at each of the 36 sampling stations.

3.1 Sediment Particle Size Distribution (PSD)

Full results of the PSD analyses are provided in Appendix C. The Folk (1954) sediment classification system was used to categorise the sediments. Folk (1954) defines 15 major textural groups based on the relative proportions of three principal constituents:

- Gravel (material coarser than 2 mm);
- Sand (material between 0.0624 mm and 2 mm);
- Mud (defined as all material finer than 0.0625 mm, i.e. silt and clay).

3.1.1 Descriptive Account

Figure 3.2 presents a summary of the Folk sediment classification encountered in the survey area, as well as the principal constituents comprising each station and the corresponding sediment textural classification across the survey area.

Sediments across the Netherlands EEZ comprised a mix of Folk (1954) classes, including: slightly gravelly sand (33 % of stations), slightly gravelly muddy sand (28 %), muddy sand (17 %), sand (14 %) and muddy sandy gravel (8 %) (Table 3.1 and Figure 3.1).

Sorting is a measure of the spread of the grain sizes around the average and may be used as a proxy measure of the energy of the environment (Blott and Pye, 2001; Garrison, 2009). Medium and fine sands tend to exhibit better sorting (low sorting index values) than muds and gravels (Blott and Pye, 2001). Well sorted sediments can indicate a consistent input of energy with little fluctuation (Garrison, 2009). Poorly sorted sediments can indicate an inconsistent energy input and, as a consequence, a wide fluctuation in grain size about the mean (Garrison, 2009).

The sediment samples sorting coefficients ranged from ‘extremely poorly sorted’ to ‘moderately well sorted’, with half the stations designated as ‘poorly sorted’. The majority of samples were ‘fine skewed’ (53 % of stations), with 33 % recorded as ‘very fine skewed’, four samples were ‘symmetrical’ (11 %) and one was ‘coarse skewed’ (3 %) (Table 3.1).

Sand represented over 75 % of the sediment fraction at all of the Netherlands EEZ stations, except 10PST06, 10PST08 and 10PST09. Of the 33 stations with over 75 % sand fraction, 17 of them had a sand fraction of greater than 90 %. The remaining sediment comprised the mud fraction, which ranged from 1.7 % at 8PST01 to 24.8 % at 8PST05. Except at 10PST06, 10PST08 and 10PST09, the gravel content ranged from 0 to 0.2 %. At 10PST06, the gravel content was 65.1 %, followed by 45.4 % at 10PST09 and 34.6 % at 10PST08 (Table 3.2).

Investigation of the particle size model distribution showed that all but the three stations with coarser sediments (10PST06, 10PST08 and 10PST09) had a unimodal distribution. 10PST06 had a bimodal distribution, whilst 10PST08 and 10PST09 had a polymodal distribution. With unimodal distribution 23 samples (69.7 %) peaked in the very fine sand region (3.5 phi), with the remaining stations peaking in

the fine sand region (2.5 phi). 10PST06 with bimodal distribution and 10PST08 and 10PST09 with polymodal distribution peaked in the pebble region (−4.5 phi). Additionally, 10PST06 and 10PST09 peaked in Mode 2 at very fine sand (3.5 phi) and 10PST08 in the medium sand (1.5 phi) region. 10PST08 and 10PST09 also peaked in the Mode 3 in the granule region (−2.5 phi).

Organic content, in the form of TOM, ranged between < 0.5 % at 10PST10 to 5.03 % at 10PST09, with an average of 1.75 % across the Netherlands EEZ stations. The three stations with coarser sediment (10PST06, 10PST08 and 10PST09) had the three highest concentrations of TOM (Table 3.2).

Total organic carbon (TOC) was measured only at selected stations; 7FST46, 8PST02, 8PST08, 9PST04, 9PST09, 10PST03 and 10PST11 (Table 3.2). For all these stations except 10PST11 and 8PST08, TOC content was < 0.2 %. Station 8PST08 had a TOC content of 0.288 % and 10PST10 a content of 0.404 %.

Depth influenced the distribution of sediment along the Netherlands EEZ survey route. Depth was significantly correlated to the fraction of mud and the percentage of TOM ($p < 0.01$) and negatively correlated to the sand fraction and phi Mode 3 ($p < 0.01$).

Table 3.1: Sediment Classification, Sorting and Skewness

Station	Sediment Classification		Sorting	Skewness
	Folk	Wentworth		
7FST46	Slightly Gravelly Sand	Fine Sand	Moderately Sorted	Very Fine Skewed
7FST47	Slightly Gravelly Sand	Fine Sand	Moderately Sorted	Fine Skewed
7FST48	Slightly Gravelly Sand	Fine Sand	Moderately Well Sorted	Fine Skewed
7FST49	Slightly Gravelly Sand	Fine Sand	Moderately Sorted	Very Fine Skewed
8PST01	Slightly Gravelly Sand	Fine Sand	Moderately Well Sorted	Symmetrical
8PST02	Slightly Gravelly Sand	Fine Sand	Moderately Well Sorted	Fine Skewed
8PST03	Slightly Gravelly Muddy Sand	Very Fine Sand	Poorly Sorted	Very Fine Skewed
8PST04	Muddy Sand	Very Fine Sand	Poorly Sorted	Very Fine Skewed
8PST05	Slightly Gravelly Muddy Sand	Very Fine Sand	Poorly Sorted	Very Fine Skewed
8PST06	Slightly Gravelly Muddy Sand	Very Fine Sand	Poorly Sorted	Very Fine Skewed
8PST07	Muddy Sand	Very Fine Sand	Poorly Sorted	Very Fine Skewed
8PST08	Muddy Sand	Very Fine Sand	Poorly Sorted	Very Fine Skewed
8PST09	Slightly Gravelly Muddy Sand	Very Fine Sand	Poorly Sorted	Very Fine Skewed
9PST01	Slightly Gravelly Muddy Sand	Very Fine Sand	Poorly Sorted	Fine Skewed
9PST02	Slightly Gravelly Muddy Sand	Very Fine Sand	Poorly Sorted	Fine Skewed
9PST03	Slightly Gravelly Sand	Very Fine Sand	Moderately Sorted	Fine Skewed
9PST04	Sand	Very Fine Sand	Moderately Well Sorted	Coarse Skewed
9PST05	Slightly Gravelly Sand	Very Fine Sand	Moderately Sorted	Symmetrical
9PST06	Sand	Very Fine Sand	Moderately Sorted	Fine Skewed
9PST07	Slightly Gravelly Sand	Very Fine Sand	Moderately Sorted	Fine Skewed
9PST08	Slightly Gravelly Sand	Very Fine Sand	Moderately Sorted	Fine Skewed
9PST09	Slightly Gravelly Muddy Sand	Very Fine Sand	Poorly Sorted	Fine Skewed
9PST10	Sand	Fine Sand	Moderately Sorted	Fine Skewed

Station	Sediment Classification		Sorting	Skewness
	Folk	Wentworth		
9PST11	Sand	Very Fine Sand	Moderately Sorted	Fine Skewed
10PST01	Slightly Gravelly Sand	Very Fine Sand	Poorly Sorted	Fine Skewed
10PST02	Slightly Gravelly Sand	Fine Sand	Poorly Sorted	Fine Skewed
10PST03	Sand	Very Fine Sand	Poorly Sorted	Fine Skewed
10PST04	Slightly Gravelly Muddy Sand	Very Fine Sand	Poorly Sorted	Fine Skewed
10PST05	Slightly Gravelly Muddy Sand	Very Fine Sand	Poorly Sorted	Very Fine Skewed
10PST06	Muddy Sandy Gravel	Very Fine Gravel	Very Poorly Sorted	Very Fine Skewed
10PST07	Muddy Sand	Very Fine Sand	Poorly Sorted	Fine Skewed
10PST08	Muddy Sandy Gravel	Coarse Sand	Extremely Poorly Sorted	Symmetrical
10PST09	Muddy Sandy Gravel	Very Coarse Sand	Very Poorly Sorted	Symmetrical
10PST10	Slightly Gravelly Muddy Sand	Very Fine Sand	Poorly Sorted	Fine Skewed
10PST11	Muddy Sand	Very Coarse Silt	Very Poorly Sorted	Very Fine Skewed
10PST12	Muddy Sand	Very Fine Sand	Poorly Sorted	Fine Skewed

Table 3.2: Particle Size Distribution and Organic Content

Station	Water Depth [m LAT]	Median [µm]	Mode 1	Mode 2*	Mode 3*	Fractional Composition			Organic Content	
			Phi	Phi	Phi	Mud [%]	Sand [%]	Gravel [%]	TOM [%]	TOC† [%]
7FST46	41.7	152.0	2.50	-	-	5.8	94.1	0.1	0.766	<0.2
7FST47	41.4	154.2	2.50	-	-	5.1	94.9	0.0	0.704	-
7FST48	42.2	153.3	2.50	-	-	4.5	95.4	0.0	0.707	-
7FST49	42.8	155.8	2.50	-	-	6.2	93.8	0.0	0.944	-
8PST01	42.8	166.1	2.50	-	-	1.7	98.3	0.0	0.781	-
8PST02	43.7	156.9	2.50	-	-	3.1	96.9	0.0	0.779	<0.2
8PST03	48.2	111.5	3.50	-	-	15.6	84.3	0.1	1.72	-
8PST04	49.5	79.3	3.50	-	-	22.8	77.2	0.0	1.86	-
8PST05	49.7	71.2	3.50	-	-	24.8	75.2	0.0	1.98	-
8PST06	49.6	75.1	3.50	-	-	22.7	77.1	0.1	1.9	-
8PST07	49.0	73.4	3.50	-	-	23.2	76.8	0.0	1.79	-
8PST08	48.6	71.1	3.50	-	-	23.9	76.1	0.0	2.34	0.288
8PST09	47.7	85.5	3.50	-	-	21.9	78.1	0.0	2.17	-
9PST01	47.5	92.5	3.50	-	-	16.9	83.1	0.0	2.13	-
9PST02	46.5	99.0	3.50	-	-	13.0	86.9	0.0	1.68	-
9PST03	45.5	100.6	3.50	-	-	9.3	90.7	0.0	1.75	-
9PST04	44.3	110.6	3.50	-	-	2.8	97.2	0.0	1.47	<0.2
9PST05	43.6	113.4	3.50	-	-	5.4	94.6	0.0	1.46	-
9PST06	43.2	118.1	3.50	-	-	6.2	93.8	0.0	1.38	-
9PST07	43.1	121.5	2.50	-	-	6.5	93.5	0.0	1.09	-
9PST08	43.3	118.3	3.50	-	-	6.2	93.8	0.0	1.38	-
9PST09	43.0	121.2	2.50	-	-	12.3	87.7	0.0	1.13	<0.2
9PST10	43.3	129.9	2.50	-	-	7.3	92.7	0.0	1.15	-
9PST11	43.5	109.1	3.50	-	-	8.0	92.0	0.0	1.33	-

Station	Water Depth [m LAT]	Median [µm]	Mode 1	Mode 2*	Mode 3*	Fractional Composition			Organic Content	
			Phi	Phi	Phi	Mud [%]	Sand [%]	Gravel [%]	TOM [%]	TOC† [%]
10PST01	43.3	108.0	3.50	-	-	8.4	91.4	0.2	1.44	-
10PST02	42.5	131.2	2.50	-	-	8.9	91.1	0.0	1.37	-
10PST03	43.2	115.2	3.50	-	-	8.3	91.7	0.0	1.47	<0.2
10PST04	44.4	111.5	3.50	-	-	10.7	89.3	0.0	1.63	-
10PST05	45.6	114.3	3.50	-	-	11.0	88.9	0.1	1.63	-
10PST06	45.5	3226.4	-4.49	3.50	-	11.7	23.2	65.1	3.12	-
10PST07	50.8	109.2	3.50	-	-	12.4	87.6	0.0	1.99	-
10PST08	48.2	536.1	-4.49	1.50	-2.50	20.9	44.5	34.6	3.89	-
10PST09	50.0	1056.1	-4.49	3.50	-2.50	15.4	39.2	45.4	5.03	-
10PST10	52.5	108.5	3.50	-	-	15.5	84.5	0.0	<0.5	-
10PST11	54.3	60.5	3.50	-	-	23.6	76.4	0.0	3.11	0.404
10PST12	55.2	101.1	3.50	-	-	16.2	83.8	0.0	2.29	-
Summary Statistics										
Mean	46.1	236.6	2.56	2.83	-2.50	12.2	83.8	4.1	1.75	0.35
SD	3.6	540.8	2.20	1.15	0.00	7.0	16.4	14.1	0.91	0.08
Min	41.4	60.5	-4.49	1.50	-2.50	1.7	23.2	0.0	0.70	0.29
Max	55.2	3226.4	3.50	3.50	-2.50	24.8	98.3	65.1	5.03	0.40
Median	45.0	112.5	3.50	3.50	-2.50	10.9	89.1	0.0	1.63	0.35

Notes:
* = Mode 2 and Mode 3 means were not calculable for all stations
† = TOC was analysed at seven stations within the Netherlands EEZ

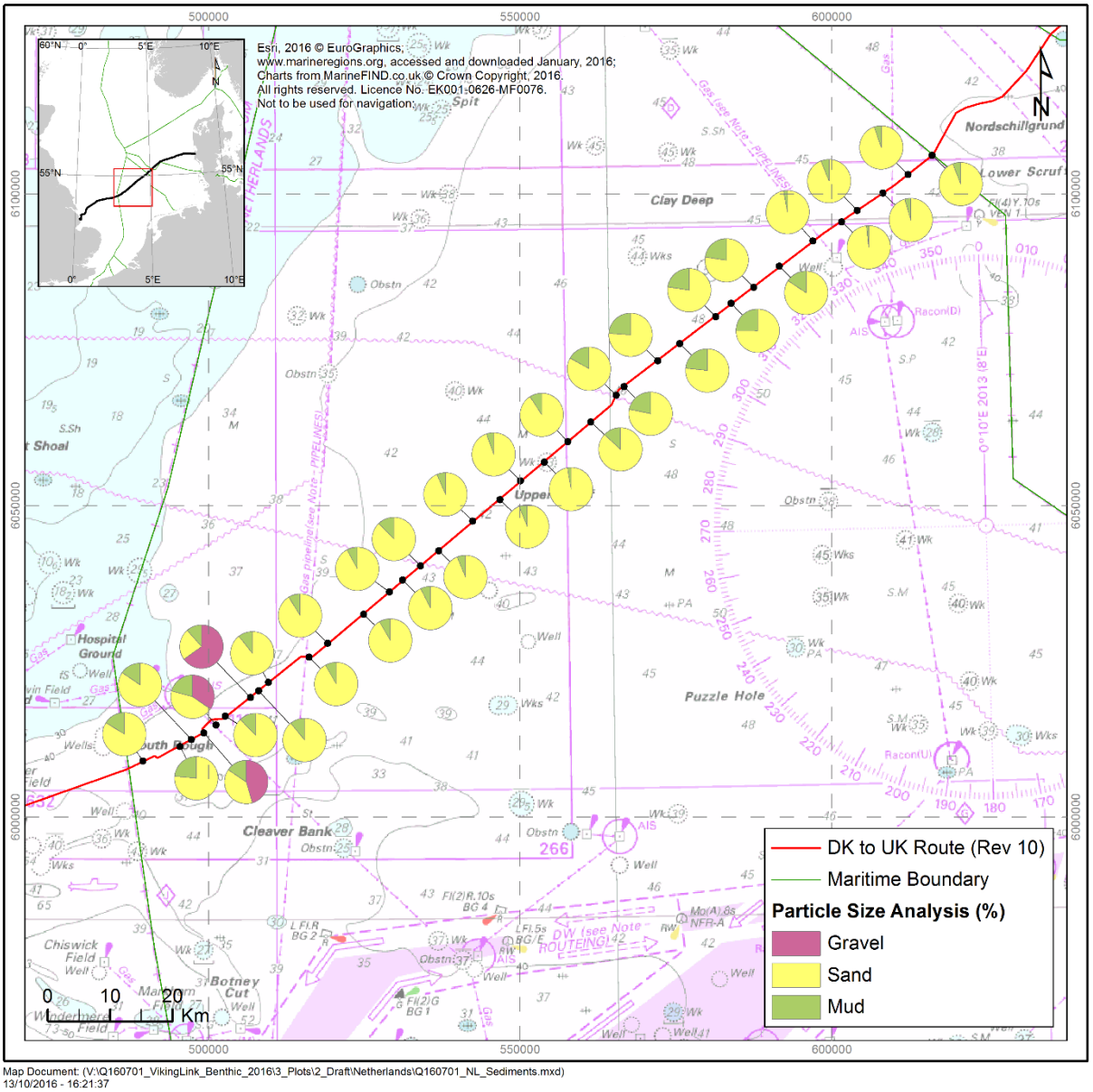


Figure 3.1: Distribution of sediments along the cable route (from PSD Analysis)

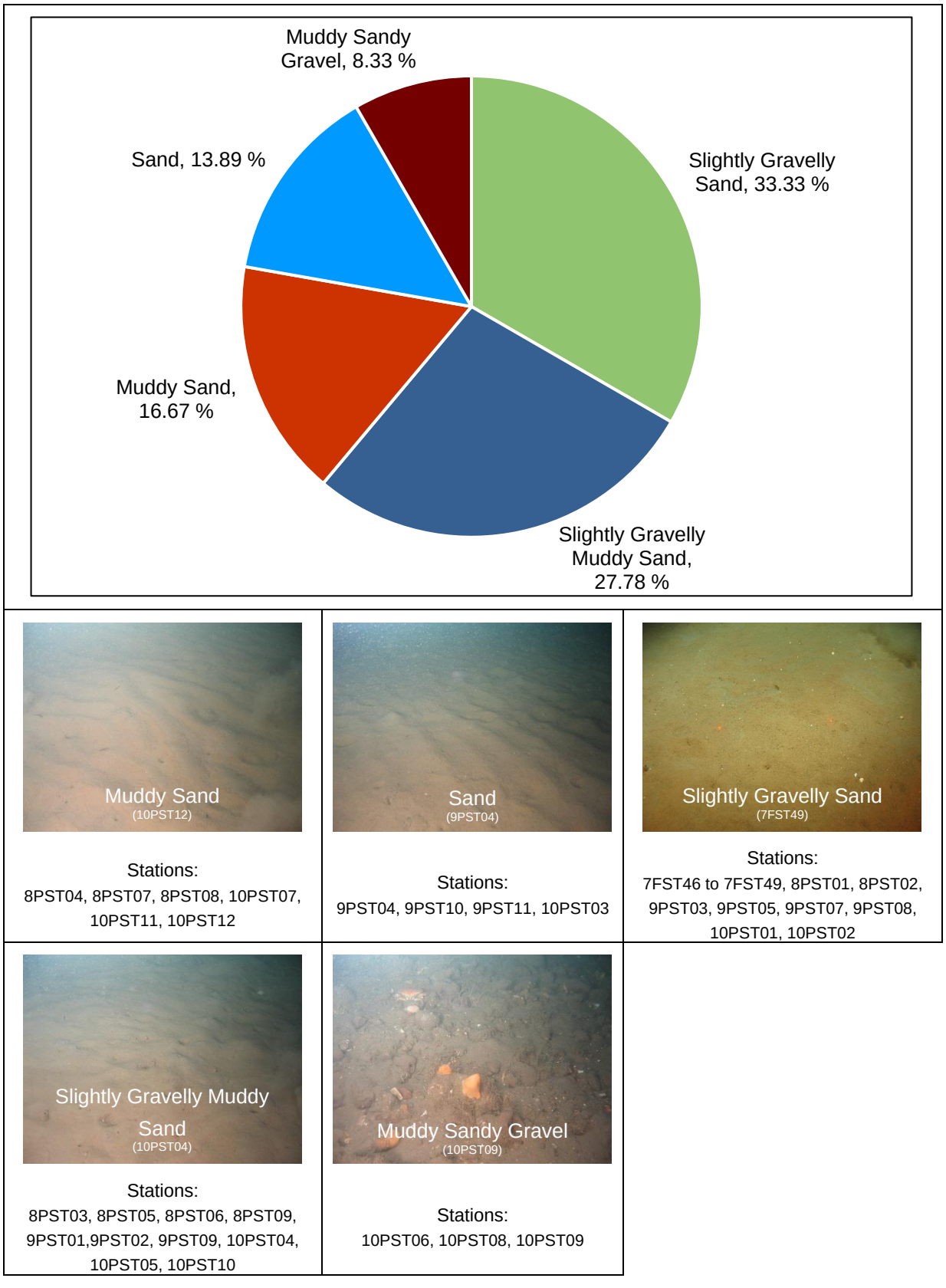


Figure 3.2: The proportions of Folk (1954) textural groups identified from the PSD analysis

3.1.2 Multivariate Analysis

Multivariate analysis was undertaken on the particle size data set in order to identify spatial patterns of distribution in the sediment composition. Analysis included hierarchical agglomerative clustering employing Euclidean distance resemblance matrix and the principle component analysis (PCA). Data were fourth root transformed prior to analyses being undertaken.

3.1.2.1 Hierarchical agglomerative clustering analysis

Results of the hierarchical agglomerative clustering analysis are presented in Figure 3.3, Figure 3.4 and Table 3.3.

Figure 3.3 presents ordinations of percent fractional weight sediment data, based on Euclidean distance resemblance matrix. The grouping of sites based on their sediment characteristics was obtained by cutting a slice through the dendrogram at a chosen level (2.5 %), identified after applying SIMPROF routine to set a significance level of 5 %. This process of defining coarser groups is appropriate provided that the resulting clusters are always supersets of the SIMPROF groups (Clarke et al, 2008).

The survey area shows a relatively uniform sediment distribution with several variations (see details below), however, SIMPROF fails to reject the ‘no structure’ hypothesis and therefore may tend to group at an impractical level of detail (Clarke et al., 2008).

The distribution of the sediment characteristics at the stations is presented in Table 3.9 and overlain by the Folk modified sediment groupings (Figure 3.4). Cluster analysis returned three main groups; one was represented by a single station (Group b), one by three stations (Group a) and one by the remaining 32 stations (Group c).

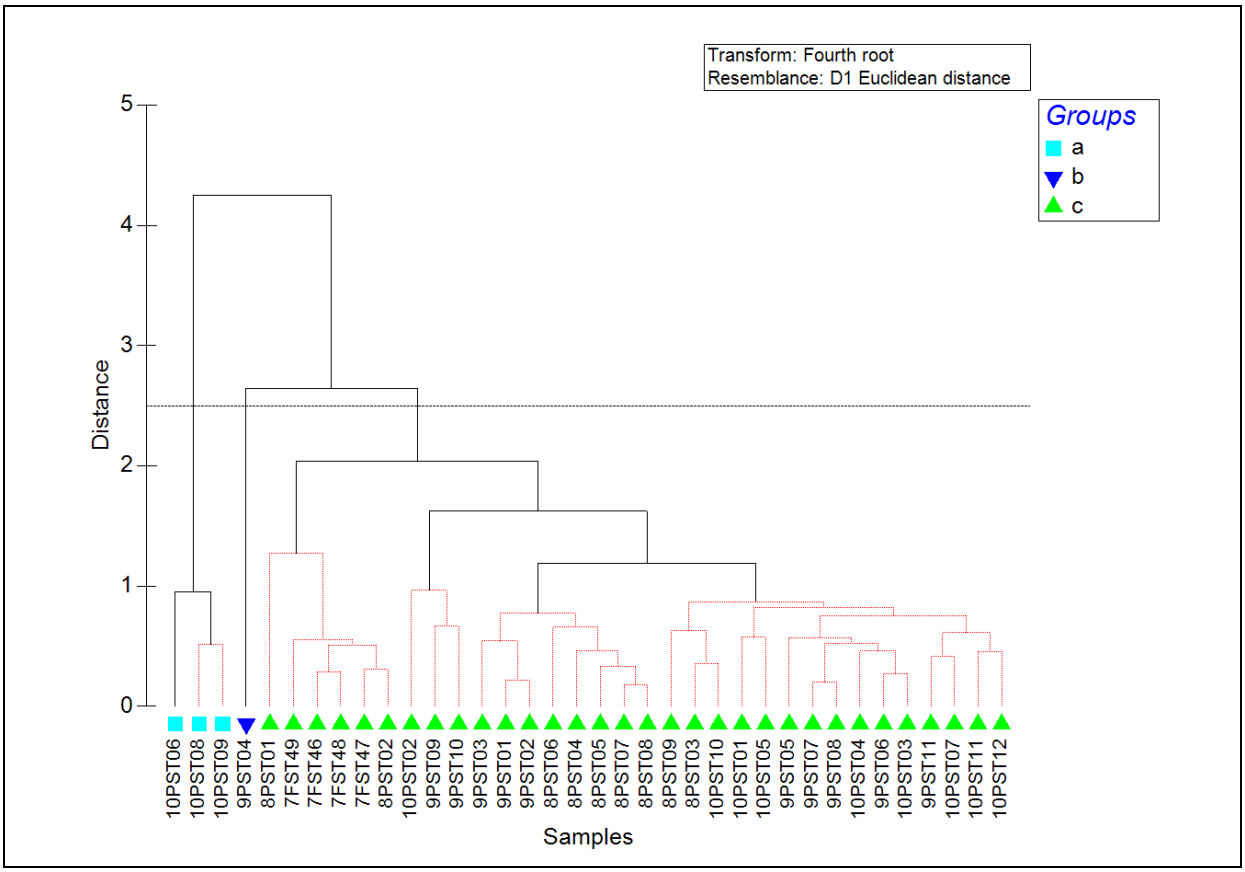
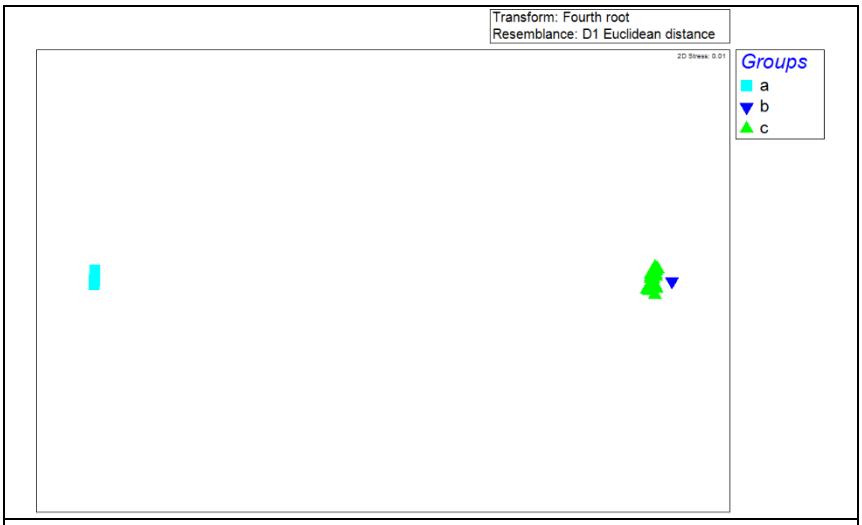
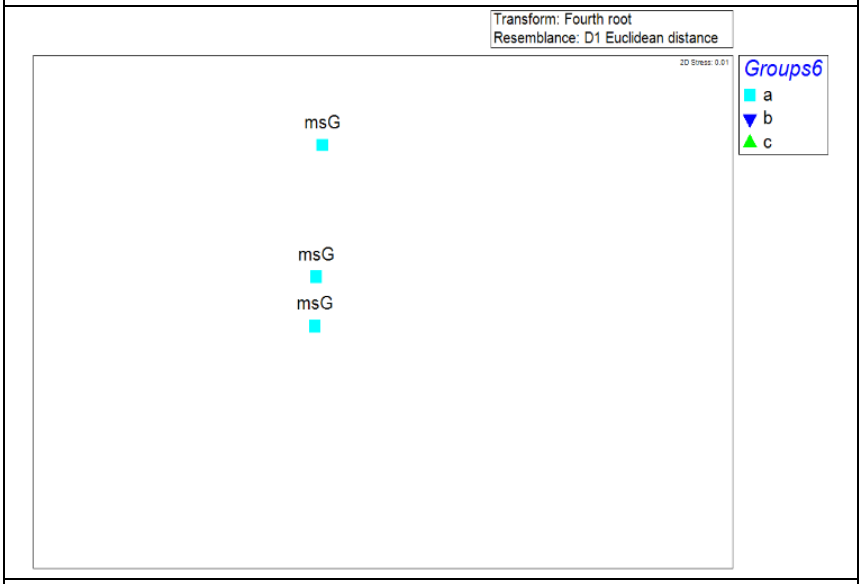


Figure 3.3: Dendrogram showing the statistically significant sediment clusters by slice (2.5 %) groups



A



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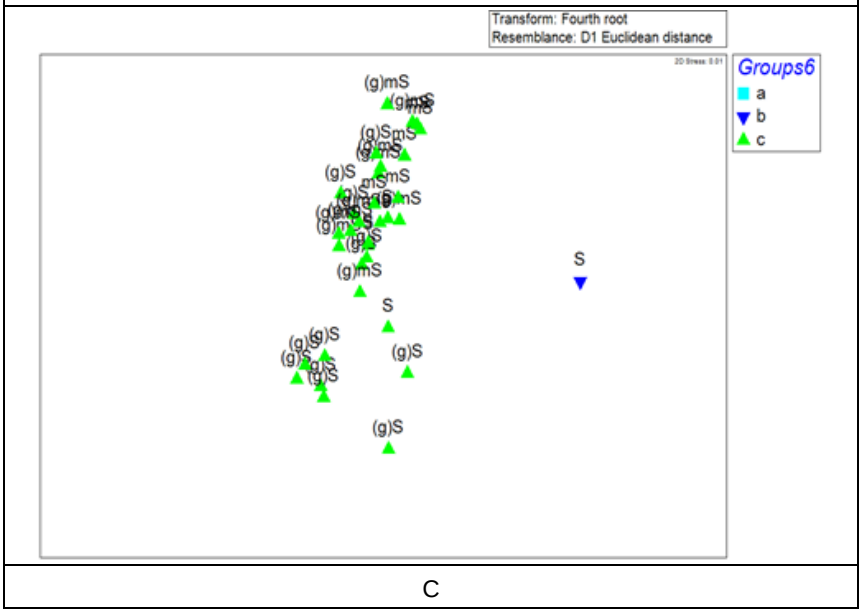
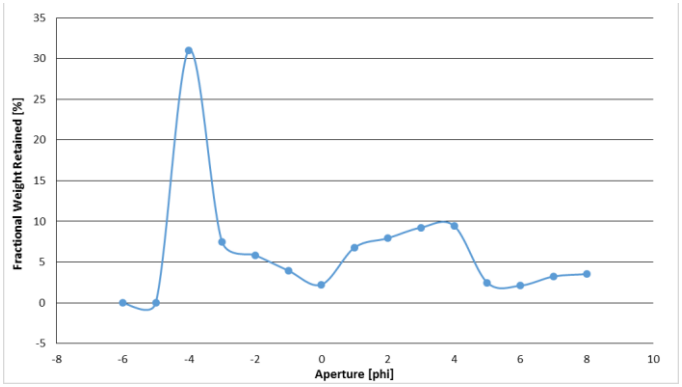
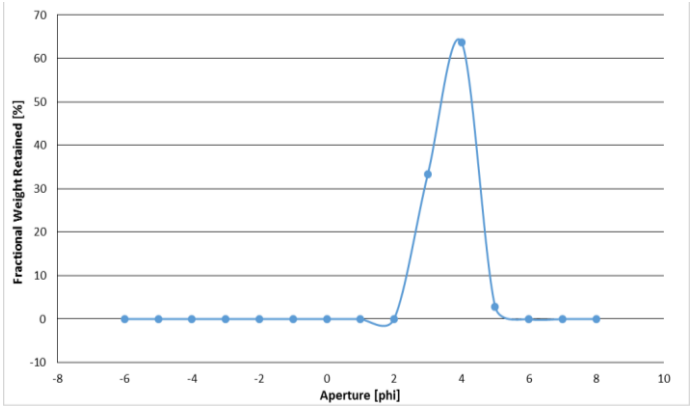
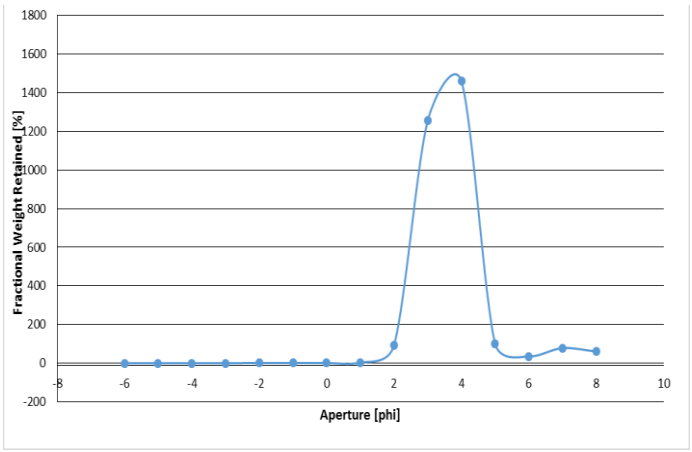


C

Figure 3.4: MDS ordination of the fractional weight data with grouping by slice (2.5 %) (A). Zoomed in and overlaid by the Folk 1954 classification (B, C)

Table 3.3: Average Sediment Characteristics within the Multivariate Sediment Clusters

Group	Stations	Main Sediment Fraction [%]			Description (Folk)
		Gravel	Sand	Mud	
a ■ Depth [m] 48.9 ± 3.8	10PST06, 10PST08, 10PST09	48.4 ± 15.5	35.6 ± 11.1	16 ± 4.6	Muddy Sandy Gravel, Very Poorly Sorted to Extremely Poorly Sorted, Symmetrical to Very Fine Skewed
					
b ▼ Depth [m] 46.1	9PST04	0	97.2	2.8	Sand, Moderately Well Sorted, Coarse skewed
					
c ▲ Depth [m] 46.5 ± 4.0	7FST46 to 7FST39, 8PST01 to 8PST09, 9PST01 to 9PST03, 9PST05 to 9PST11, 10PST01 to 10PST05, 10PST07, 10PST11, 10PST12	0.02 ± 0.05	85 ± 17	12.1 ± 7.1	Sand, Muddy Sand, Slightly Gravelly Sand, Slightly Gravelly Muddy Sand, Symmetrical to Very Fine Skewed
					

The seabed was characterised by sand, with some differences in the content of certain grain sizes (Table 3.3). Group C was the largest group, containing 32 stations dominated by sand fraction (85 %) followed by the mud fraction (12.1 %) (2 to 5 phi). The absence of any phi classes greater than 5 (silt) at 9PST04 identified this station as its own group (Group b). Whilst the presence of granule to pebble phi classes (-2 to -4 phi) (48.4 % gravel) separated 10PST06, 10PST08 and 10PST09 as Group a. Depth varied little between the groups, although Group a was slightly deeper (48.9 m) than Group b and c (46.1 m and 46.5 m respectively).

3.1.2.2 Principal Component Analysis

To highlight the grain sizes which are guiding the sediment characterisation principal component analysis was undertaken. Figure 3.5 presents a PCA plot for the sediment phi data used to identify the sediment phi fractions driving the variability of the sediment composition across the Netherlands EEZ. The principle component axis (PC1) is positively correlated with the phi classes between 3 and 5 (very fine sand to silt), which caused 54.2 % of the variability between the sediment groups. The second principle component axis (PC2) is negatively correlated to the phi class -4 (pebbles), which caused 27.5 % of the variability. The 2D dimensional PCA can be considered a good description of the higher multi-dimensional space with PC1, PC2 and PC3 together accounted for 90.1 % of the variability. The importance of the -4 phi fraction in structuring the multivariate patterns seen is visible from the bubble plots. The absence of -4 phi in all stations classified as Group b and c clearly separates the Netherlands EEZ stations.

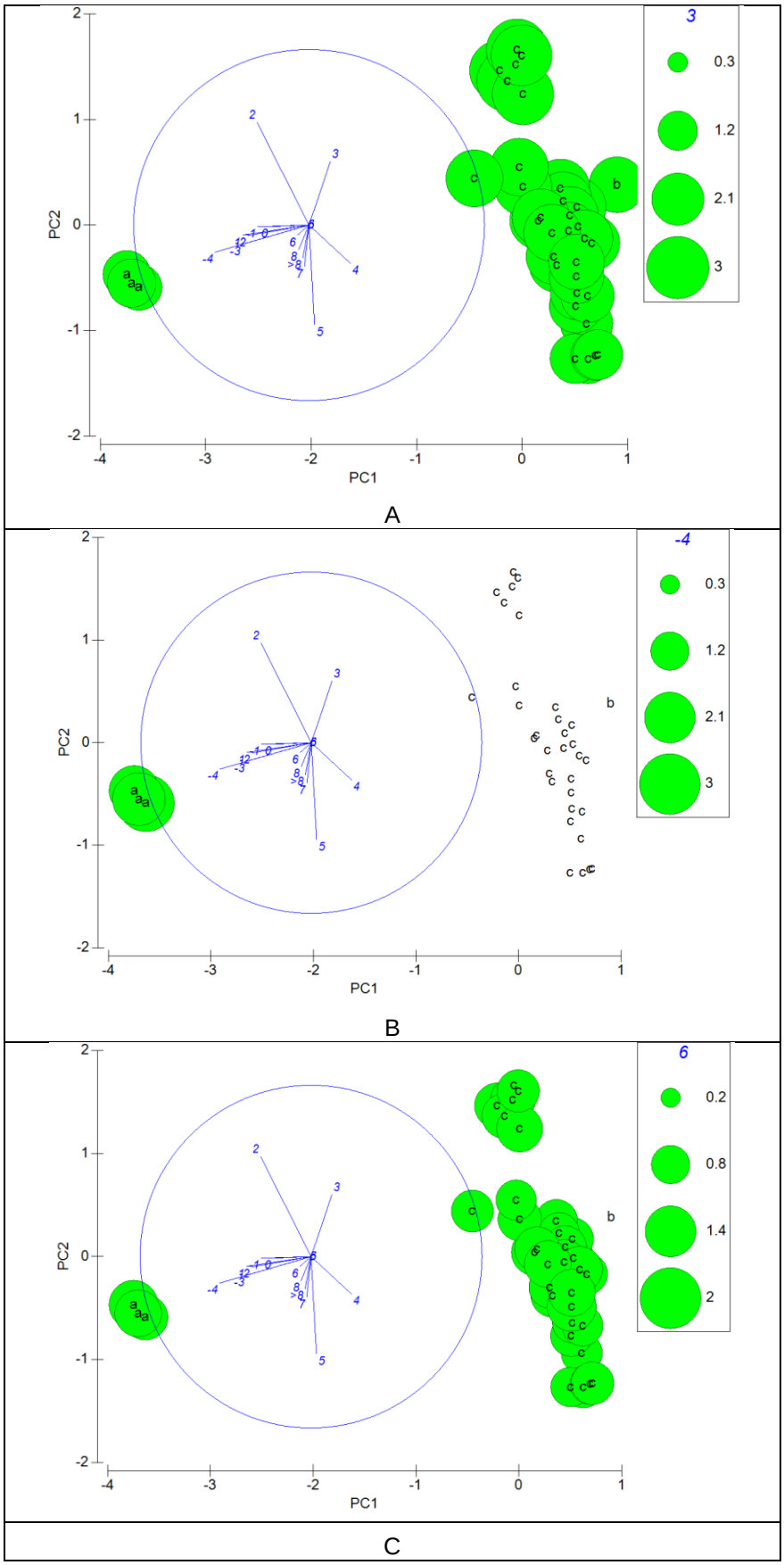


Figure 3.5: PCA ordination of particle size phi 3 (very fine sand), -4 (pebble) and 6 (silt) across groups

3.2 Macrofaunal Grab Sample Data

The invertebrate fauna from the grab samples included infauna and epifauna, the latter comprising of sessile solitary and colonial organisms. Sessile solitary epifauna were identified to the lowest taxonomic level and enumerated. Sessile colonial epifauna were equally identified to the lowest taxonomic level and recorded as present only. The species data from each grab sample are presented in Appendix E.

Species data are presented with the relevant AphiaID included as a reference to names currently accepted by the World Register of Marine Species (WoRMS) (Appeltans et al., 2012).

For analytical purposes, the infauna and the sessile solitary epifauna were combined and assessed together as enumerated fauna in terms of species diversity and abundance, whereas the colonial epifauna were assessed separately.

3.2.1 Fauna Abundance

Prior to analysis been undertaken, the faunal data set was subject to a degree of rationalisation. Specifically, any damaged or fragmented taxa and any juvenile taxa were removed. Juveniles were assessed for their influence on the faunal species pattern and subsequently removed, prior to further analyses of the species matrix (see Section3.2.5).

Following the rationalisation process, the enumerated fauna from grab samples comprised 172 taxa, represented by 3,542 individuals. These excluded juveniles (28 taxa and 623 individuals) and infauna and epifauna which were only identified as present (8 taxa). Of the 172 taxa, one was a solitary epifauna species, the barnacle *Verruca stromeia*, which comprised four individuals.

In the current study, juveniles represented 15 % of the total faunal abundance recorded across the survey area. Of these, juvenile barnacles (Sessilia) and one juvenile brittlestar taxon (Amphiuridae) accounted for a combined 70 % of the juvenile abundance (11 % of the total faunal abundance). Abundances of 220 juvenile Sessilia and 218 juvenile Amphiuridae respectively ranked them second and third most abundant taxa across the Netherlands EEZ. All the other juvenile species accounted for 4 % of the total abundance. Of the other species, one individual juvenile *Arctica islandica* was observed at station 9PST05.

3.2.1.1 Phyletic Composition

The phyletic composition of the enumerated benthic fauna is summarised in Table 3.4 and graphically represented in Figure 3.6.

Annelida were dominant in terms of taxa composition, accounting for 46 % of the infaunal diversity. Crustacea followed (24 %), then Mollusca (18 %), then Echinodermata (8 %) and finally other taxa (3 %). The taxa grouped into the ‘other’ category were Sipuncula, Cephalorhyncha, Nermertea, Platyhelminthes, Cnidaria and Foraminifera.

In terms of abundance, Echinodermata were dominant, accounting for 45 % of the infaunal abundance. This was accounted for by one brittlestar species, *Amphiura filiformis*, with a recorded

abundance of 1,398 individuals within the Netherlands EEZ stations. Annelida followed with 24 % of the total taxa abundance, Mollusca with 22 %, then Crustacea (8 %) and other taxa (2 %).

Table 3.4: Phyletic Composition of Enumerated Fauna from Grab Samples

Taxonomic Group	Number of Taxa	Abundance [number of individuals]
Annelida (Polychaete (bristle worms) and Oligochaetes	79	865
Crustacea (shrimps, prawns, crabs)	42	274
Mollusca (bivalves, gastropods, chitons)	31	766
Echinodermata (sea urchins, brittlestars, starfish)	14	1578
Other taxa (including flatworms, peanut worms, sea spiders)	6	59
TOTAL	**172**	**3542**
Notes: Other taxa included: Foraminifera, Cnidaria, Platyhelminthes, Nemertea, Cephalorhyncha and Sipuncula		

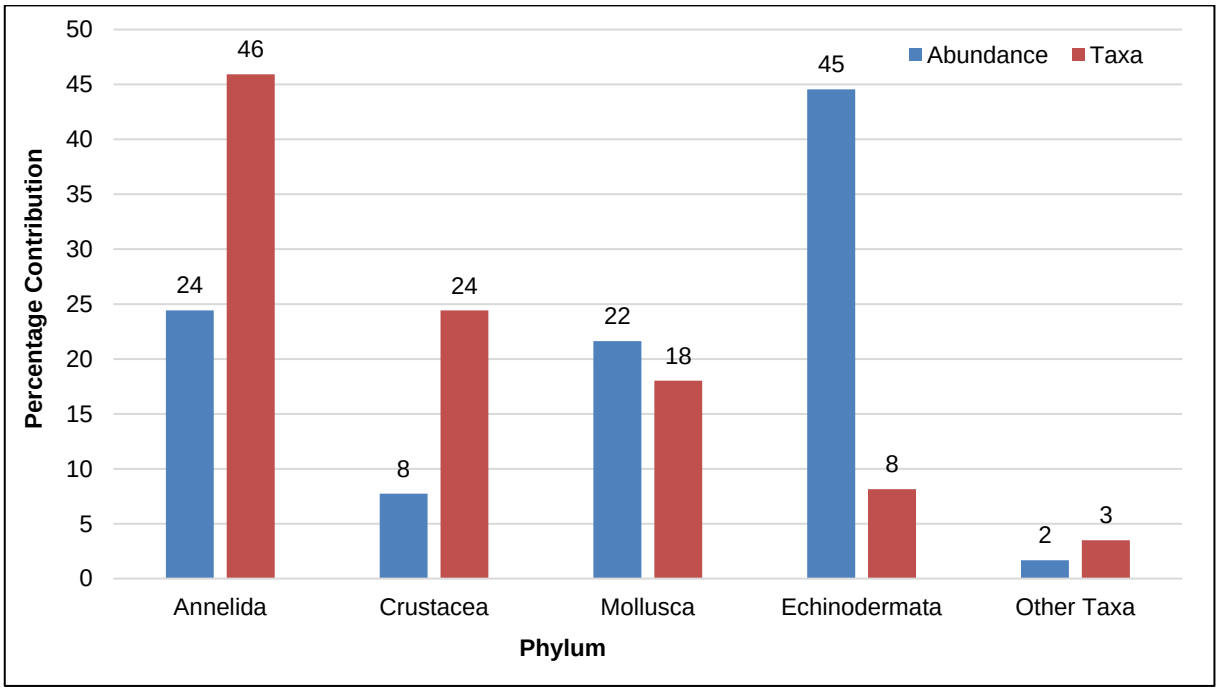


Figure 3.6: Percentage contribution to abundance of major taxonomic groups

When ranked by total abundance and frequency of occurrence across the Netherlands EEZ (Table 3.5), the brittlestar *Amphiura filiformis* was the most abundant (1,398 individuals) and occurred in 86 % (31 of 36) of the stations. The bivalves, *Corbula gibba* and *Kurtiella bidentata* followed in terms of abundance and frequency, with 204 and 182 individuals respectively, corresponding to 78 % and 75 % occurrence at stations respectively. The remaining seven species occurring in the highest abundances comprised four polychaetes (*Pholoe baltica*, *Diplocirrus glaucus*, *Amphictene auricoma* and *Lumbrineris cingulate*), one crustacean (*Harpinia antennaria*), one echinoderm (*Ophiothrix fragilis*)

and one bivalve (*Cylichna cylindracea*). In terms of frequency of occurrence across the Netherlands EEZ stations, *H. antennaria*, *D. glaucus*, *C. cylindracea* and *A. auricoma* all featured in the top ten, with occurrence at 61 % to 72 % of the stations. Three polychaetes (*Nephtys hombergii*, *Chaetozone setosa* and *Goniada maculata*) were also in the top ten for frequency of occurrence across stations, with 64 %, 64 % and 56 % occurrence respectively.

Table 3.5: Top Ten Most Abundant and Frequently Recorded Taxa in Grab Samples

Most abundant species		**Most frequently occurring species [n=36]**	
Scientific Name	**Total**	**Scientific Name**	**%**
Amphiura filiformis	1398	*Amphiura filiformis*	86
Corbula gibba	204	*Corbula gibba*	78
Kurtiella bidentata	182	*Kurtiella bidentata*	75
Amphictene auricoma	151	*Harpinia antennaria*	72
Harpinia antennaria	107	*Nephtys hombergii*	64
Ophiothrix fragilis	98	*Chaetozone setosa*	64
Cylichna cylindracea	88	*Diplocirrus glaucus*	64
Lumbrineris cingulata	86	*Cylichna cylindracea*	64
Pholoe baltica	67	*Amphictene auricoma*	61
Diplocirrus glaucus	67	*Goniada maculata*	56

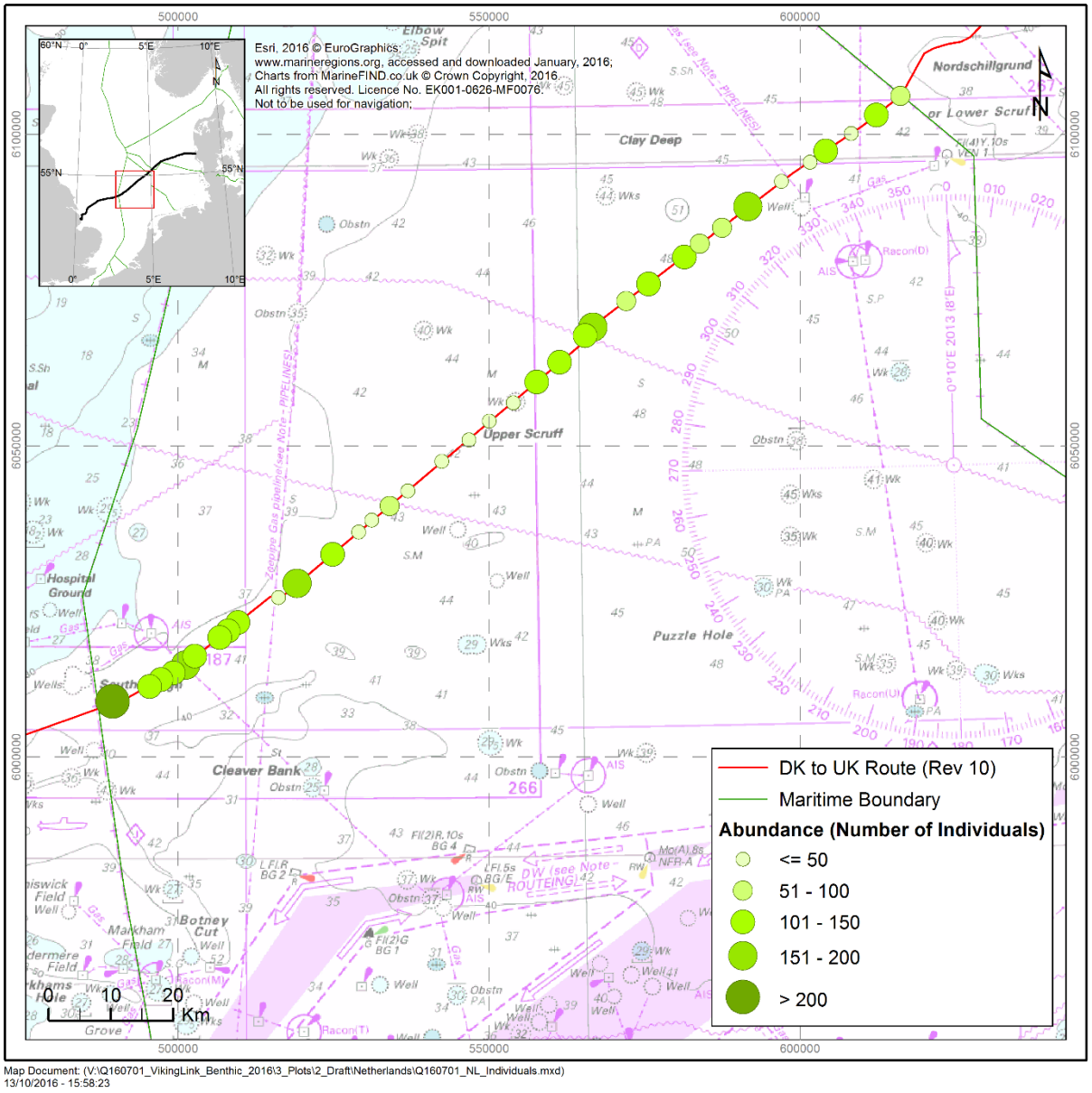


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Figure 3.7: Taxonomic abundance within the Netherlands EEZ faunal samples

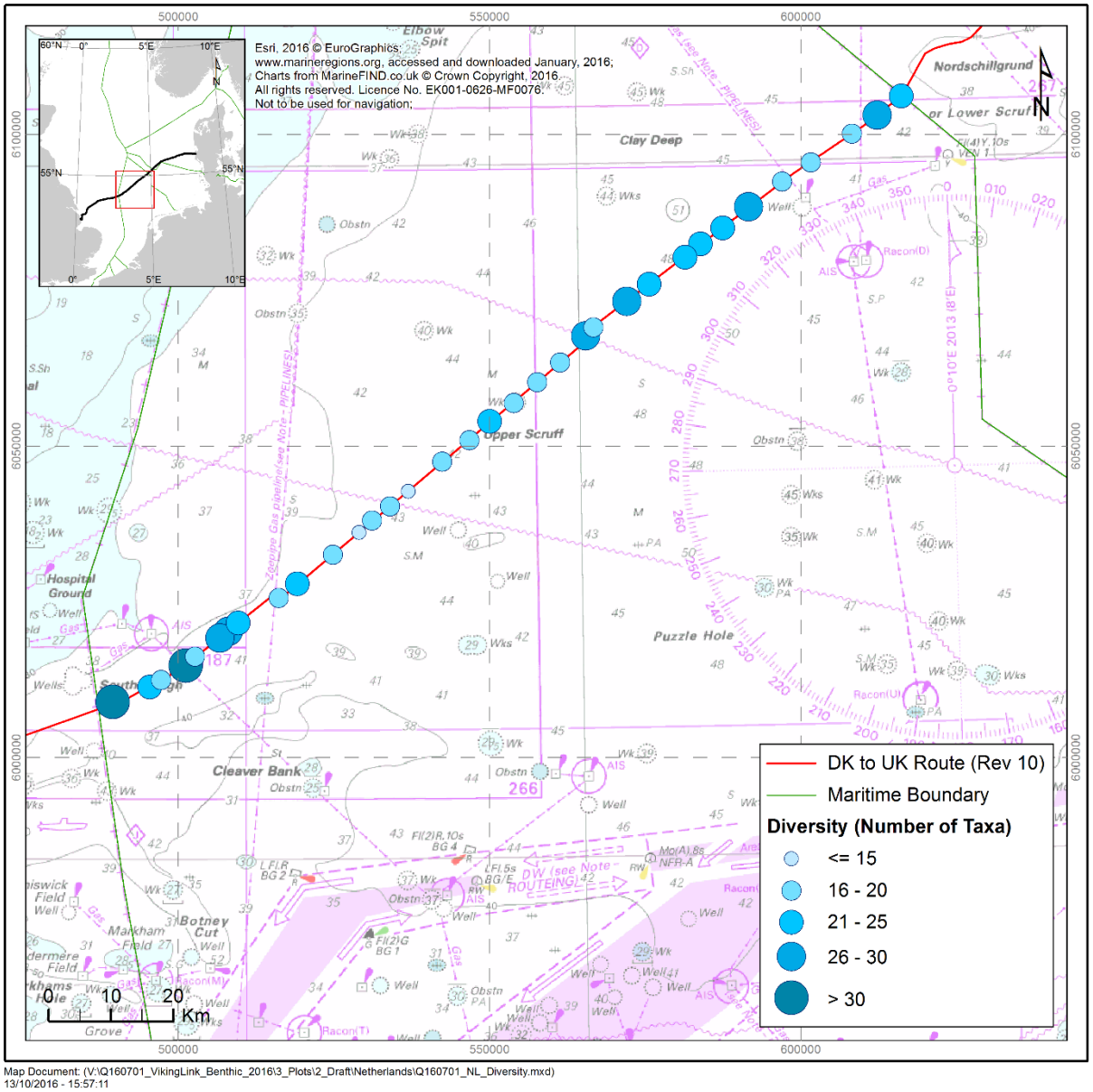


Figure 3.8: Taxonomic diversity within the Netherlands EEZ faunal samples

Cnidaria dominated the colonial epifaunal taxa recorded from the Netherlands EEZ stations, both in terms of number of taxa recorded (4 taxa equating to 67 %) and the frequency of occurrence across stations (19 %) (Figure 3.9). The other phylum recorded was Bryozoa.

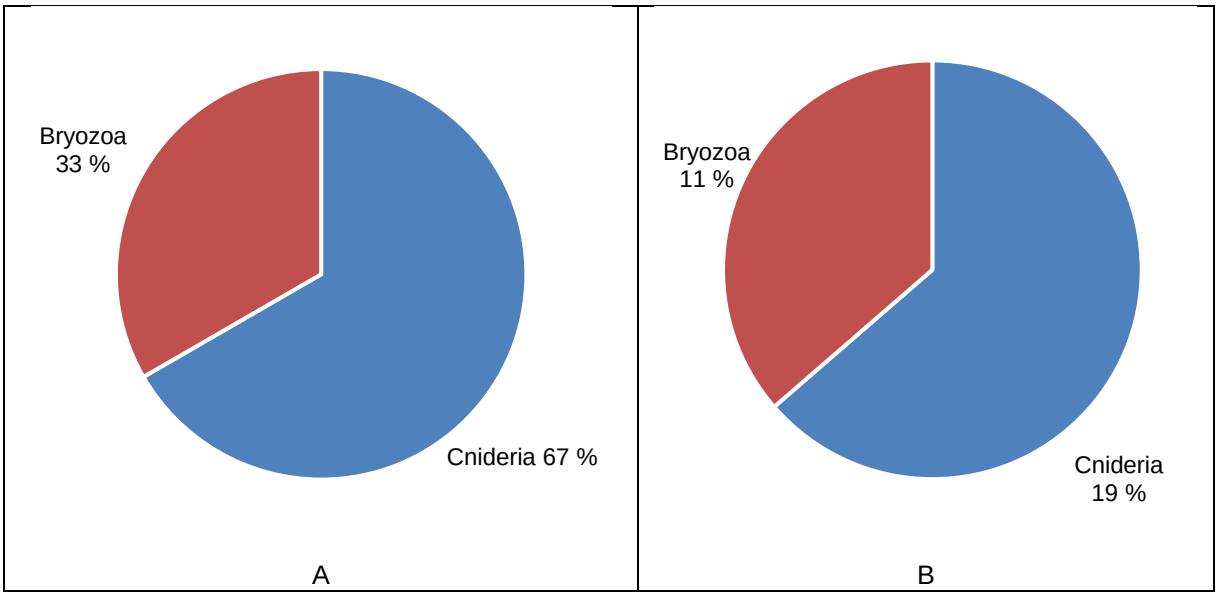


Figure 3.9: Summary of the percentage number of taxa (A) and instances of recorded presence (B) for each of the colonial epifauna phyla within the faunal samples

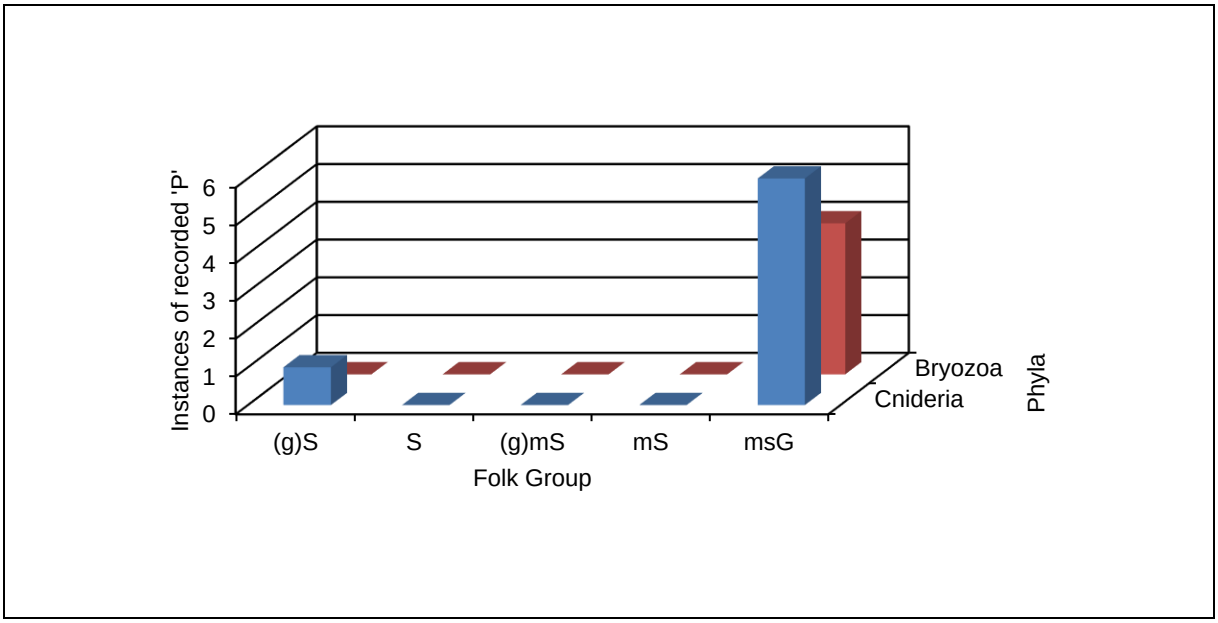


Figure 3.10: Epifaunal records for five phyla across five Folk (1954) groups within the faunal samples

The gravel content of the Netherlands EEZ stations influenced the colonial epifauna recorded, as higher gravel content provides a variety of surfaces to colonise. At the three stations identified within Section 3.1 with high gravel content including pebbles and occasional cobbles and boulders (10PST06, 10PST08 and 10PST09), the highest presence of Cnidaria and Bryozoa were recorded (Figure 3.10). Station 10PST06, which had the highest gravel content (65.1 %), had three Cnidaria taxa and one Bryozoa taxa. Station 10PST09 with 45.4 % gravel had one Cnidaria and one Bryozoa. Finally, 10PST08, with 34.6 % gravel content, had two Cnidaria taxa and two Bryozoa taxa recorded as present. All three stations had dead man's fingers *Alcyonium digitatum* present and the bryozoan

Escharella immerse. One hydroid, Bougainvilliidae, was noted as present at 7FST48, which had no gravel content. The other two Cnideria recorded were *Abietinaria abietina* and *Clytia* sp. and the remaining taxon was a bryozoan Tubuliporidae.

3.2.2 Biomass

The results of the blotted wet weight biomass and the converted data (Eleftheriou and Basford, 1989) to ash free dry weight (AFDW) are presented in Appendix E.5. The dominant phylum with respect to the biomass, measured from the grab samples for the whole of the Netherlands EEZ stations, was Echinodermata, which accounted for 85.95 % of the total weight (Figure 3.11). The highest biomass of Echinodermata was observed within muddy sand (15.61 g), followed by slightly gravelly muddy sand (13.98 g), then gravelly sand (8.51 g), muddy sandy gravel (5.42 g) and finally sand (0.16 g). Highest biomass of Polychaetes were recorded within slightly gravelly muddy sand (5.22 g), whilst the highest biomass of molluscs were recorded in gravelly sand (1.86 g).

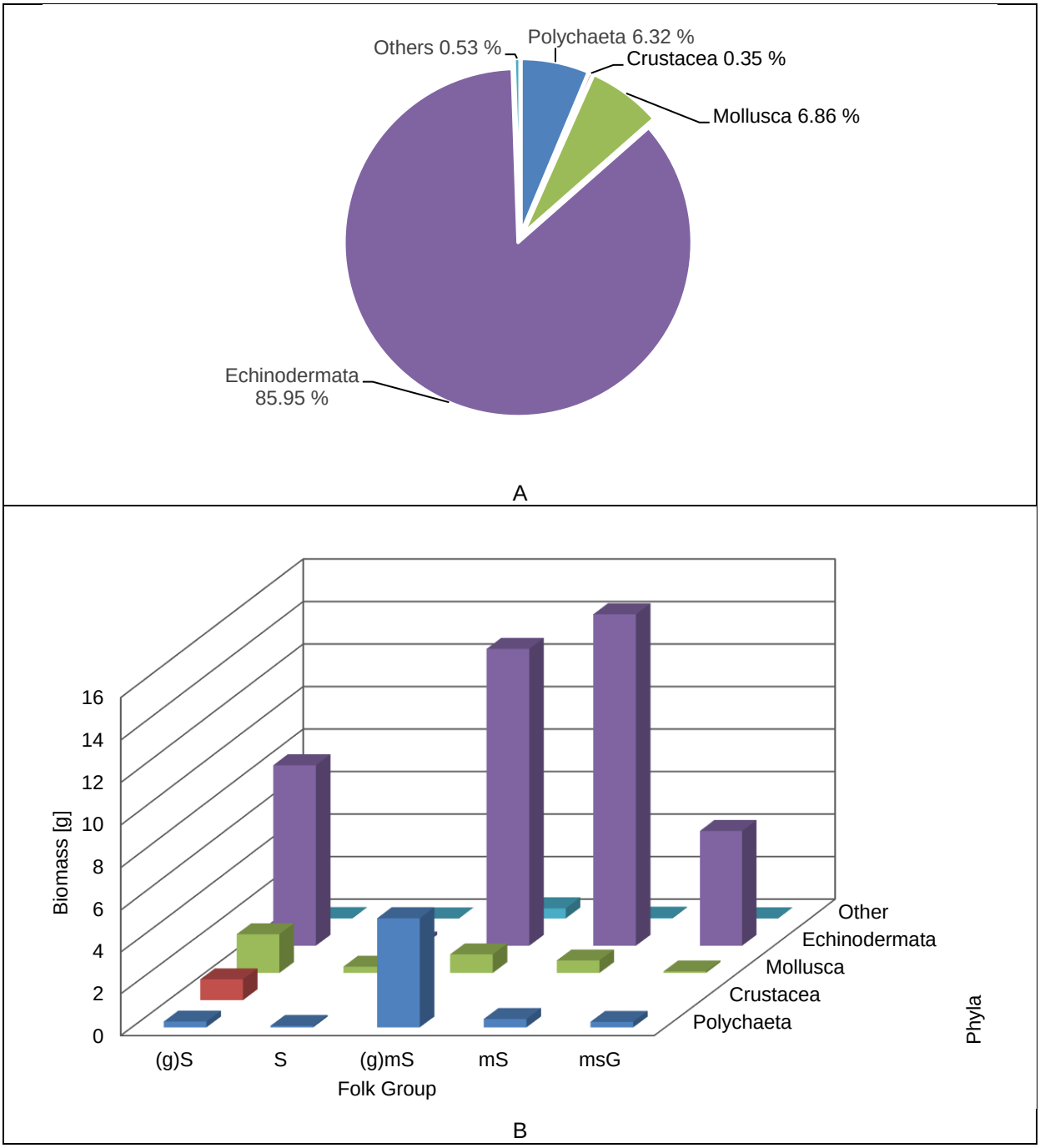


Figure 3.11: Total AFDW biomass (g) from the Netherlands EEZ stations by phyla (A); sample biomass against Folk sediment classifications (B)

Nine stations (8PST03 to 8PST09 and 9PST01) were positioned within the Netherlands Central Oyster Grounds. The grounds are known as an area of high biodiversity and high macrobenthic biomass. For this reason, species level biomass was undertaken for these nine stations. Total biomass by phyla was similar within the nine stations to the overall trend observed within the Netherlands EEZ stations (Figure 3.12). Echinodermata dominated in terms of biomass, with 62.1 % of the total, followed by Mollusca (24.5 %), Polychaeta (9.5 %), other taxa (3.1 %) and finally Crustacea (0.9 %). 'Other taxa' was made up of Cnidaria, Platyhelminthes, Nemertea, Cephalorhyncha and Sipuncula.

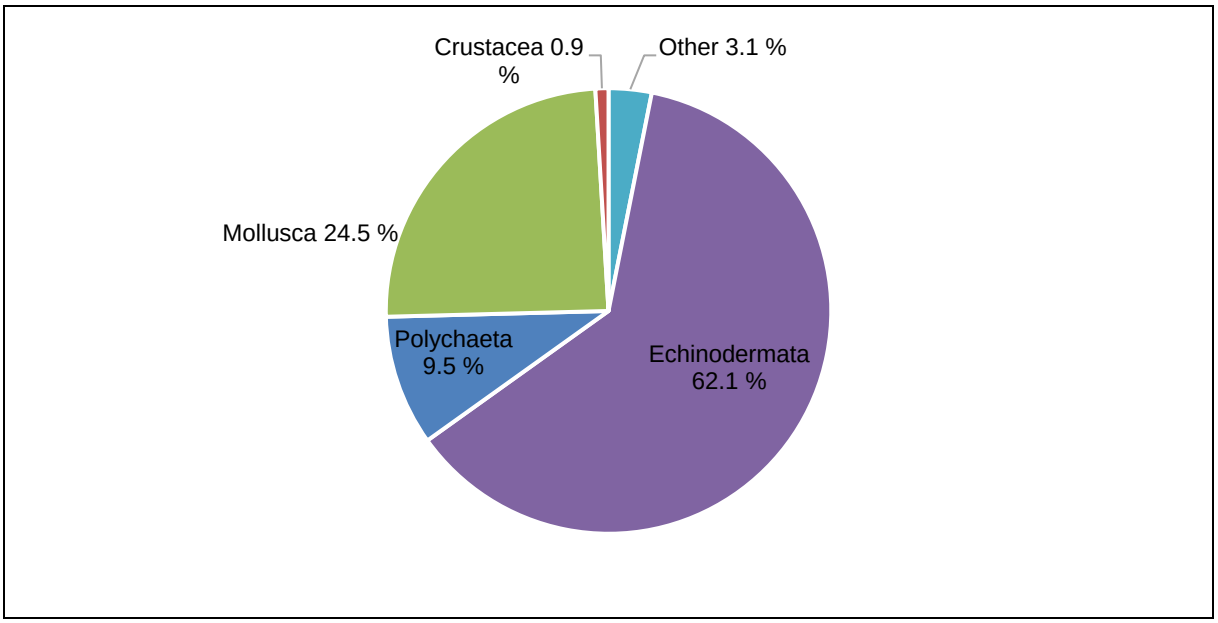


Figure 3.12: Total AFDW biomass (g) from the Central Oyster Grounds stations by phyla

The dominance of the phylum Echinodermata in the total biomass, was driven by the high biomass of the brittlestar *Amphiura filiformis*, which was the most abundant species across the entire Netherlands EEZ, and the sea urchins *Brissopsis lyrifera*, *Echinocardium flavescens* and Spatangoida (Table 3.6). In terms of biomass, the other species within the top ten were three molluscs, the bivalves *Dosinia lupines* and *Chamelea striatula*, and gastropod *Turritella communis*. Two polychaete species completed the top ten, these were *Amphictene auricoma* and *Glycera unicornis*.

Table 3.6: Top Ten Biomass Weights (g) per Species for the Central Oyster Grounds Stations

Scientific Name	AFDW Biomass [g]
Amphiura filiformis	0.54
Brissopsis lyrifera	0.47
Dosinia lupinus	0.44
Echinocardium flavescens	0.36
SPATANGOIDA	0.26
Amphictene auricoma	0.23
Turritella communis	0.07
NEMERTEA	0.14
Glycera unicornis	0.12
Chamelea striatula	0.07

The distribution of biomass across the cable route is presented within Figure 3.13 below.

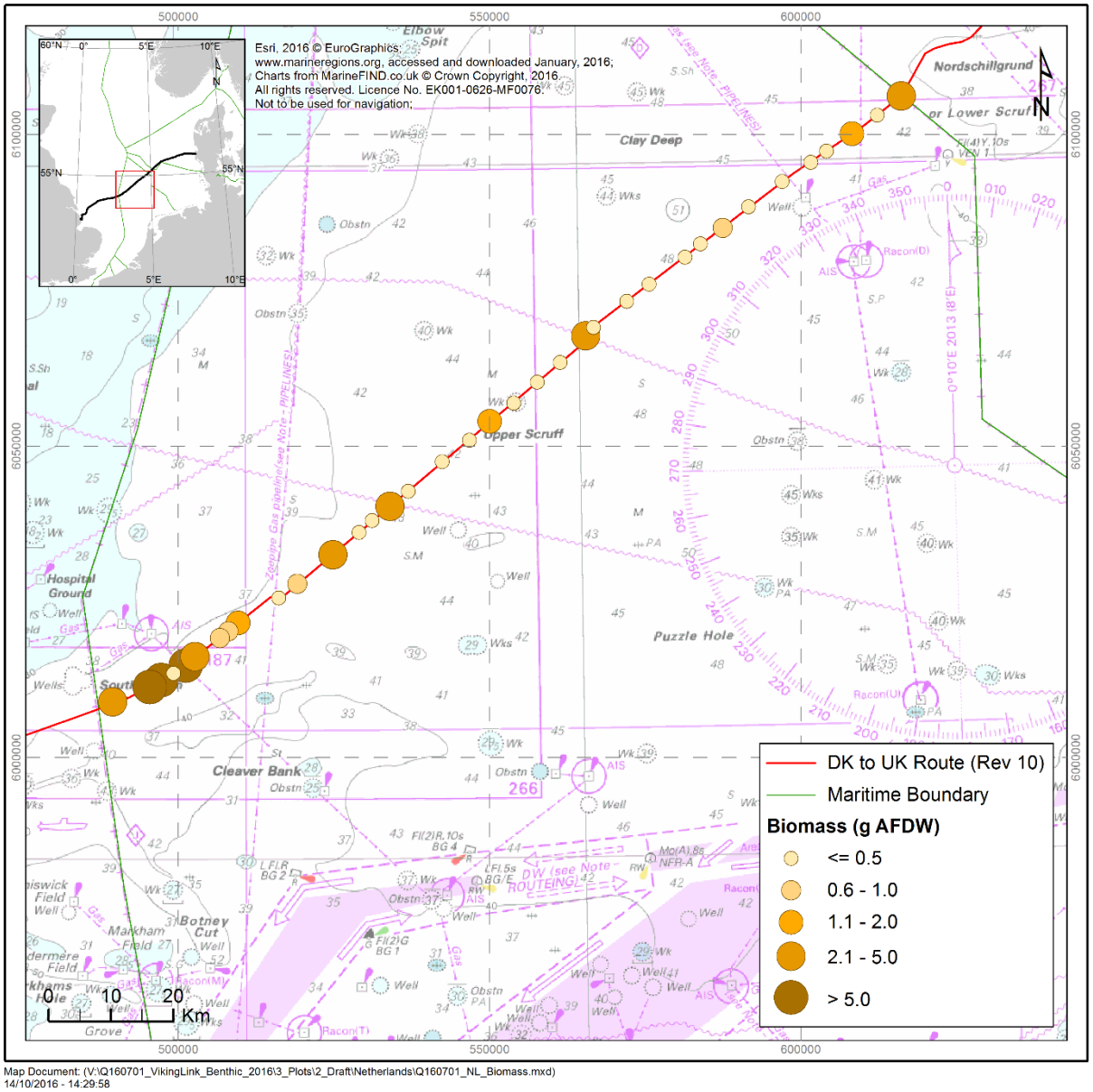


Figure 3.13: AFDW biomass from grab samples

3.2.3 Diversity Indices

Diversity indices including total species (S), total individuals (N), Pielou's evenness (J'), Shannon-Wiener diversity index (H') and Simpson's dominance index (ʎ) were generated for each site from the PRIMER (v6) package of statistical routines. Figure 3.14 plots Pielou's Evenness score against the Simpson's dominance index and the Shannon-Weiner diversity. Pielou's evenness was generally high, with a range of dominance as illustrated by the relationships between evenness and Simpson's dominance index. Low to medium Shannon-Weiner diversity scores indicate an uneven distribution of species and that one or more species may be dominant across the community. As discussed in Section 3.2.1 and 3.2.2, the brittlestar *Amphiura filiformis* dominated many of the stations in terms of abundance and biomass. Full results of the diversity indices are available in Appendix F.1.

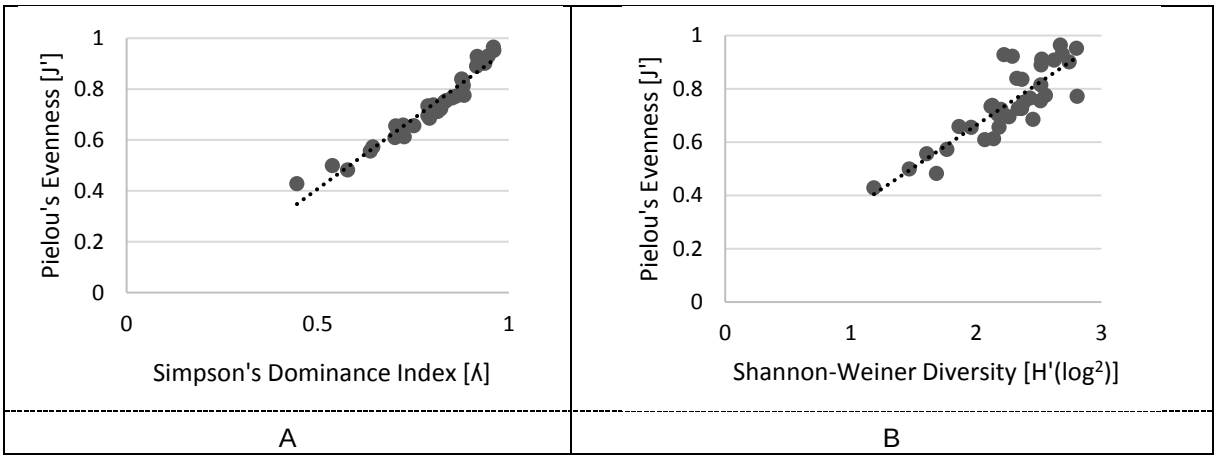


Figure 3.14: Pielou's evenness score plotted against Simpson's dominance index (A) and the Shannon-Weiner diversity H'(log^2) (B) within the Netherlands EEZ faunal samples

3.2.4 Multivariate Analysis

Community structure was investigated using the multivariate analysis techniques available in PRIMER (v6).

A hierarchical dendrogram of the faunal data was produced (Figure 3.15) from PRIMER analysis of the species abundance data matrix. Using a SIMPROF test at 5 % significance, seven groups were identified. In order to map sample similarity the resemblance matrix was further analysed using the ordination technique of non-metric MDS (Figure 3.15). Table 3.7 presents a summary of some of the attributes of the faunal sample grouping and includes the associated characteristics identified by PRIMER SIMPER routine, the full faunal SIMPER results can be found in Appendix F.

PRIMER analysis of sediment fractions used a Euclidean Distance sliced at 2.5 identified two groups and one ungrouped stations (Section 3.1). The presence or absence of the gravel fraction separated the two groups, whilst the lone station had minimal mud fraction, separating it from the other stations.

SIMPER identified seven groups for the faunal data, which in part reflected the identified separation during the multivariate sediment analysis. Group a (10PST06, 10PST08 and 10PST09) was identified for both fauna and sediment multivariate analyses. Group a had high gravel content (48.8 % on average compared to 0 and 0.02 % in Groups b and c), which allowed a different faunal community to exist compared to the other groups. Two polychaetes, *Lumbrineris cingulate* and *Spirobranchus* sp. were the most dominant species within group a.

The remaining identified faunal groups split sediment group c and incorporated the ungrouped sediment station (9PST04). Faunal groups d, e, f (single sample), and g have *Amphiura filiformis* as the most dominant species, explaining their relative close grouped locations on the MDS plot. All four groups then vary in terms of the other significantly contributing species and the number of taxa present (number of taxa per groups ranged from 18 to 388), explaining why these stations were separated during the multivariate analysis. Group b (ungrouped) did not contain *A. filiformis* within its faunal community and group c, had *A. filiformis* as its ninth most dominant species within the SIMPER

group, thus in part explaining the separation from groups d, e, f and g. Both groups b and c were dominated by the amphipod crustacean (*Harpinia antennaria*).

Proportional circles representing abundance of species (Appendix F.1) were superimposed on the MDS plot to help identify which characteristics of faunal composition influenced the observed multivariate station distribution pattern (Figure 3.16).

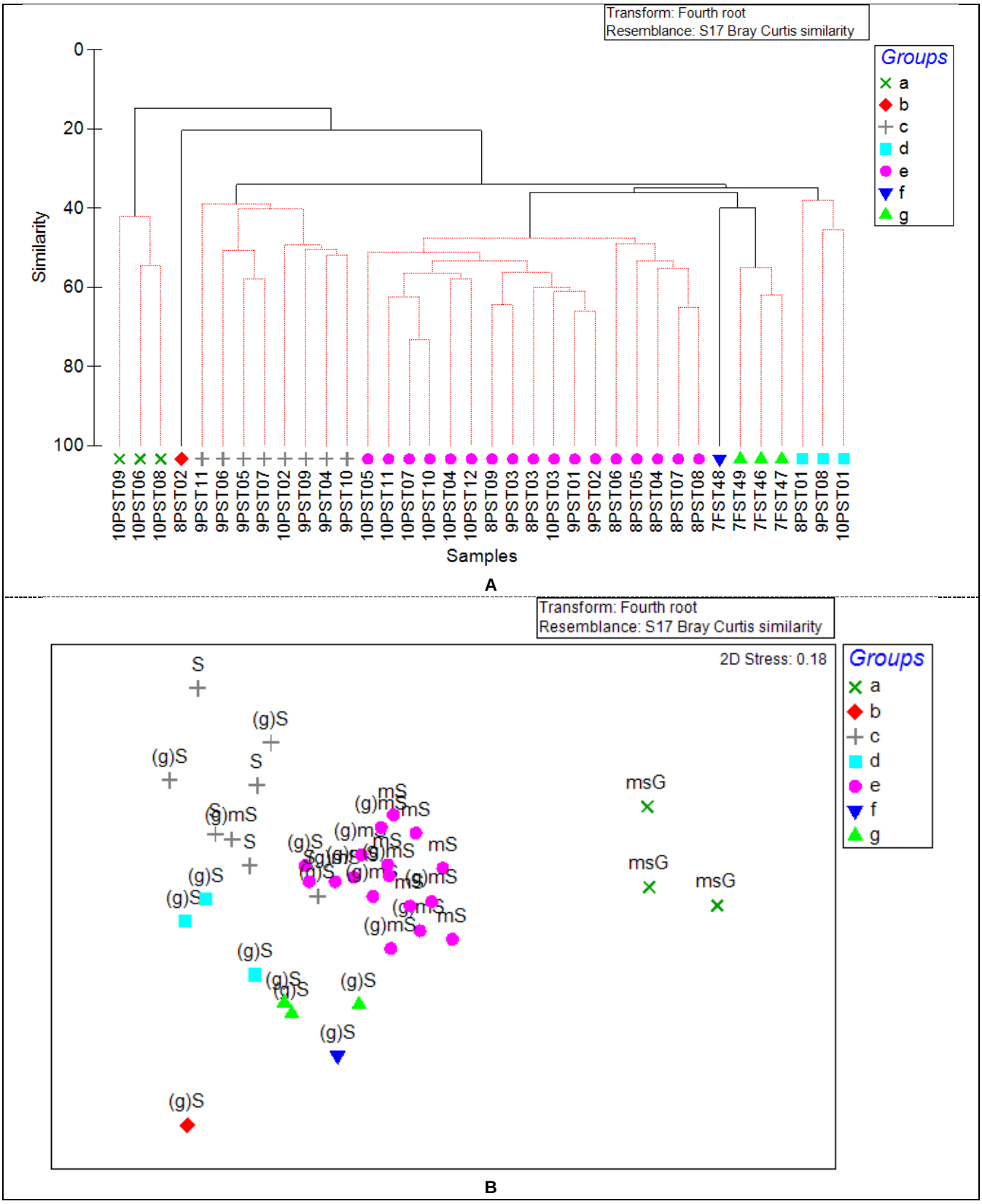


Figure 3.15: Dendrogram showing the statistically significant faunal clusters with similarity profile (SIMPROF) (5%) groups, Folk class labels and derived faunal clusters A-G, plus multi-dimensional scaling (MDS) ordination (B) within the Netherlands EEZ faunal samples

Table 3.7: Summary Attributes of the Faunal Group Derived from Multivariate Sample Sorting

Faunal Group *	Station composition & Folk class	Total Species/ Individuals	Species (SIMPER)	Average Abundance †	Cumulative % Abundance
A Average similarity: 46.24	10PST06, 10PST08 and 10PST09 msG	98 / 382	*Lumbrineris cingulata*	27	11.46
			Spirobranchus	3	18.28
			Amphiura filiformis	7	25.08
			Spirobranchus lamarcki	8	31.38
			Harmothoe	2	37.27
			Glycera alba	2	43.17
			Euspira nitida	2	49.07
			NEMERTEA	1	54.6
			Goniada maculata	1	60.13
			Amphictene auricoma	2	65.66
			Hydroides norvegica	1	71.19
			*Gnathia (*Type I)	1	76.72
			Ophiothrix fragilis	33	80.63
			Sphaerodorum gracilis	3	83.2
			Ebalia cranchii	3	85.4
			Pholoe baltica	1	87.36
			Magelona alleni	1	89.31
			Verruca stroemia	1	91.26
B Single sample	8PST02 (g)S	16 / 27	*Harpinia antennaria*	3	11.11
			Turritella communis	3	22.22
			Phaxas pellucidus	3	33.33
			Goniada maculata	2	40.74
			Magelona filiformis	2	48.14
			Hippomedon denticulatus	2	55.55
			Bathyporeia elegans	2	62.96
			Nucula nitidosa	2	70.37
			Nephtys longosetosa	1	74.07
			Ophelina modesta	1	77.77
			Amphictene auricoma	1	81.48
			Perioculodes longimanus	1	85.18
			Eudorellopsis deformis	1	88.89
			Diastylis laevis	1	92.59
			Chamelea striatula	1	96.29
			Astropecten irregularis	1	100.00
C Average similarity: 43.47	9PST04 to 9ST07, 9PST09 to 9PST11, 10PST02 S, (g)S, (g)mS	143 / 427	*Harpinia antennaria*	5	13.97
			Chaetozone setosa	2	25.82
			Thyasira flexuosa	3	36.52
			Corbula gibba	4	46.36
			Scoloplos armiger	2	56.15
			Nephtys hombergii	2	62.65
			Eudorella truncatula	1	68.74
			Chamelea striatula	2	73.20
			Diplocirrus glaucus	1	77.16
			Amphiura filiformis	13	79.99
			Sthenelais	1	82.58
			Phaxas pellucidus	1	84.98
			Abra nitida	1	87.2
			Glycinde nordmanni	1	89.38
			Ampelisca tenuicornis	1	91.47

Faunal Group *	Station composition & Folk class	Total Species/ Individuals	Species (SIMPER)	Average Abundance †	Cumulative % Abundance
D Average similarity: 40.54	8PST01, 9PST08 and 10PST01 (g)S	43 / 172	*Amphiura filiformis* *Harpinia antennaria* *Scoloplos armiger* *Nephtys hombergii* *Kurtiella bidentata* *Ampelisca tenuicornis* *Sthenelais*	33 4 2 1 3 1 1	22.45 39.43 55.01 69.77 84.53 89.90 94.95
E Average similarity: 51.66	8PST03 to 8PST09, 9PST01 to 9PST03, 10PST03 to 10PST05, 10PST07, 10PST10 to 10PST12 (g)mS, mS, (g)S	388 / 1933	*Amphiura filiformis* *Corbula gibba* *Kurtiella bidentata* *Amphictene auricoma* *Diplocirrus glaucus* *Cylichna cylindracea* *Chaetozone setosa* *Nephtys hombergii* *Pholoe baltica* *NEMERTEA* *Chamelea striatula* *Goniada maculata* *Harpinia antennaria* *Ampelisca tenuicornis* *Eudorella truncatula* *Scoloplos armiger* *Glycinde nordmanni* *Abra nitida*	59 9 8 8 3 4 2 1 3 2 2 1 2 1 1 1 1 1	15.93 25.69 35.14 43.70 52.01 59.51 63.75 67.79 71.40 74.90 78.00 80.83 83.57 85.72 87.50 88.64 89.68 90.70
F Single sample	7FST48 (g)S	18 / 49	*Amphiura filiformis* *Nephtys* *Sorgenfreispira brachystoma* *Kurtiella bidentata* *Nucula nitidosa* *Edwardsiidae* *Pholoe baltica* *Sthenelais limicola* *Glycera* *Glyphohesione klatti* *Nephtys hombergii* *Scoloplos armiger* *Terebellides stroemii* *Lanice conchilega* *Mendicula ferruginosa* *Kurtiella tumidula* *Abra nitida* *Echinocardium*	20 9 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1	40.82 59.19 65.31 71.43 73.47 75.51 77.55 79.60 81.64 83.68 85.72 87.76 89.80 91.84 93.88 95.92 97.96 100.00

Faunal Group *	Station composition & Folk class	Total Species/ Individuals	Species (SIMPER)	Average Abundance †	Cumulative % Abundance
G Average similarity: 57.35	7FST46, 7FST47, 7FST49 (g)S	88 / 392	*Amphiura filiformis*	53	12.17
			Spiophanes bombyx	10	20.50
			Mactra stultorum	7	28.07
			Pholoe baltica	4	34.81
			Kurtiella bidentata	7	41.44
			Cylichna cylindracea	3	47.33
			Harpinia antennaria	5	52.82
			Phoronis	4	58.30
			Nucula nitidosa	3	63.62
			Phaxas pellucidus	2	68.94
			Scoloplos armiger	2	73.98
			Corbula gibba	5	79.02
			Magelona filiformis	2	83.79
			Bathyporeia tenuipes	1	88.55
			Chamelea striatula	3	90.62

Notes:
* = As faunal group B and F were a single station the species selected were identified by ranked abundance, not SIMPER
† = Abundance refers to untransformed data and is expressed as mean value within the multivariate groups
(g)S = slightly gravelly Sand
msG = muddy sandy Gravel
S = Sand
mS = muddy Sand
(g)mS -= slightly gravelly muddy Sand

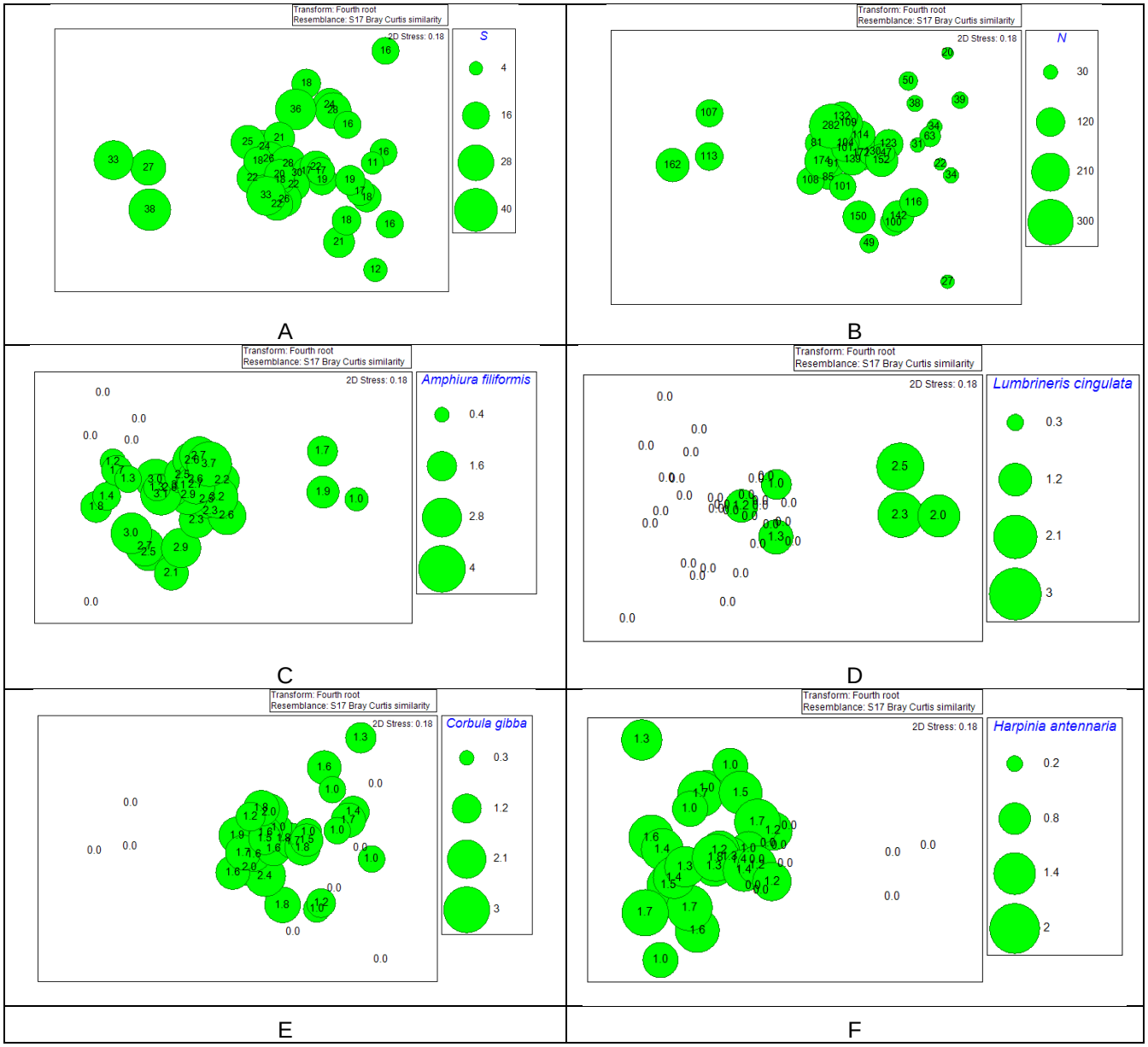


Figure 3.16: Total number of species (A) and individuals (B) and selected characteristic species super-imposed on the faunal Multi-Dimensional Scaling (MDS) ordination (C-F)

3.2.5 Alternative Multivariate Analyses

In general, mortality of juvenile species is high in the natural environment and therefore large abundances may be considered transitory and as such not reflective of, 'prevailing bottom conditions' (OSPAR, 2004). For some faunal groups identified from the survey, juvenile species were recorded in the top ten dominant taxa (Thyasira, Amphiuridae and Ophiuridae juveniles). To evaluate the influence of juveniles on the observed multivariate pattern the data was re-run through PRIMER with juvenile taxa excluded. In all cases, observed changes were slight and did not aid data interpretation. These analyses have therefore not been included in this report.

3.3 Videographic and Photographic Data

Digital photographic stills and video footage were successfully acquired along all the proposed transects. Two video transects were conducted at station 10PTR10, due to equipment failure during the first attempt. Full analysis results are presented within Appendix B.

Underwater visibility was good during the majority of the video transects.

The majority of the seabed consisted of silty/muddy sand with shell fragments and burrows. Coarser material (gravel, pebbles and small cobbles), interspersed with silty/muddy sand was observed along transects 10PTR06, 10PTR08 and 10PTR09.

Observed epifauna was generally sparse throughout the Netherlands EEZ. Two species of starfish (sand star *Astropecten irregularis* and common starfish *Asterias rubens)*, and hermit crab Paguridae, were the most commonly observed epifauna and were encountered throughout all the observed seabed habitats. The masked crab *Corystes cassivelanus*, sea potatoes *Echinocardium cordatum*, brittlestars Ophiuridae, dead man's fingers *Alcyonium digitatum*, hydroid/bryozoan turf and unidentified flat fish Pleuronectiformes, made up the other taxa within the top ten encountered species (Table 3.8). The areas of seabed with coarser material hosted much higher abundances of several species than the areas of silty/muddy sand. Those species included dead man's fingers, brittlestars, sea anemones Actiniaridae and hydroid/bryozoan turf. Polychaete tubes were also observed along many of the transects. However, it was unclear from the video footage and stills alone whether polychaetes were present within these tubes.

Table 3.8: Top Ten Most Frequently Encountered Species from the Video Analysis

Taxa	No. of Habitats *	Frequency [%]
Astropecten irregularis	14	75
Asterias rubens	12	60
Paguridae	12	58
Corystes cassivelaunus	10	55
Echinocardium cordatum	8	53
Pagurus bernhardus	7	43
Pleuronectiformes	7	43
Hydroid/bryozoan turf †	6	35
Polychaeta	6	23
Alcyonium digitatum	6	20

Notes:
*** =** Numbers and frequency were calculated to include splits of habitat along the transects
† = Faunal turf species which are either hydroids and or bryozoans

3.3.1 Anthropogenic Features

Faint linear features were observed in areas along transects 8PTR01, 8PTR02, 8PTR03 and 8PTR04. It is not clear whether these features are old trawl marks which have been gradually filled in, or whether they are natural features. A piece of metal (pole) was observed lying on the seabed at 8PTR03. A vehicle tyre was recorded from video footage at 10PTR04. Blue plastic sheeting was found along transect 10PTR05. Example photographs are provided in Figure 3.17 below.

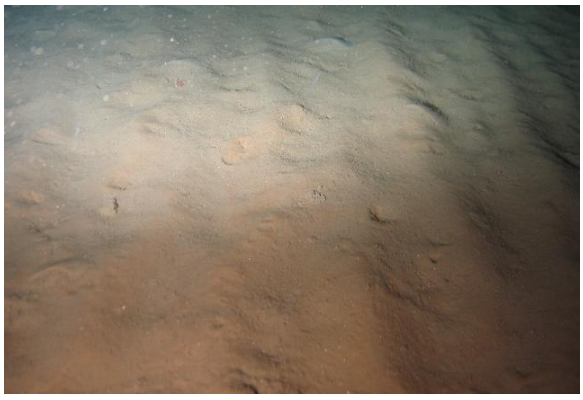


Image of a linear features at 8PTR02

Piece of metal observed at 8PTR03

Vehicle tyre observed at 10PTR04

Blue plastic sheeting observed at 10PTR05

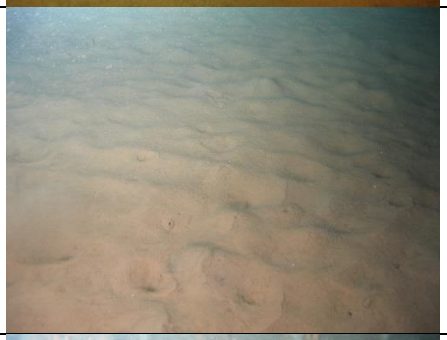
Figure 3.17: Photographs of Anthropogenic Features

3.4 Biotopes

Further to analysis of the video data, macrofaunal species abundance data was reviewed in conjunction with the results of the sediment particle size distribution analysis, seabed imagery and depth. The list of species for a particular station was run through BioScribe, the biotope decision support tool, to cross-check whole community data against the reference samples used by the JNCC to originally describe the habitats in the marine classification system (Hooper et al., 2011).

Based upon results from the interrogative and iterative process, a biotope was allocated to each station. A total of three biotopes (one full Level 5 biotopes and two Level 4 biotope complexes), consistent with EUNIS habitat classification 2016, were identified for the survey (Table 3.9 and Figure 3.18).

Table 3.9: Biotopes Recorded from the Survey within the Netherlands EEZ

Biotope	EUNIS Code	Stations	Faunal Group	Representative Image
Amphiura filiformis, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud	A5.351	7FST46, 7FST47, 7FST48, 7FST49, 8PST03, 8PST04, 8PST05, 8PST06. 8PST07, 8PST08, 8PST09, 9PST01, 9PST02, 9PST03	g, f, d, e	
Circalittoral muddy sand	A5.26	8PST02, 8PST04, 9PST05, 9PST06, 9PST07, 9PST09, 9PST10, 9PST11, 10PST02	b	
Circalittoral mixed sediment	A5.44	10PST06, 10PST08, 10PST09	a	

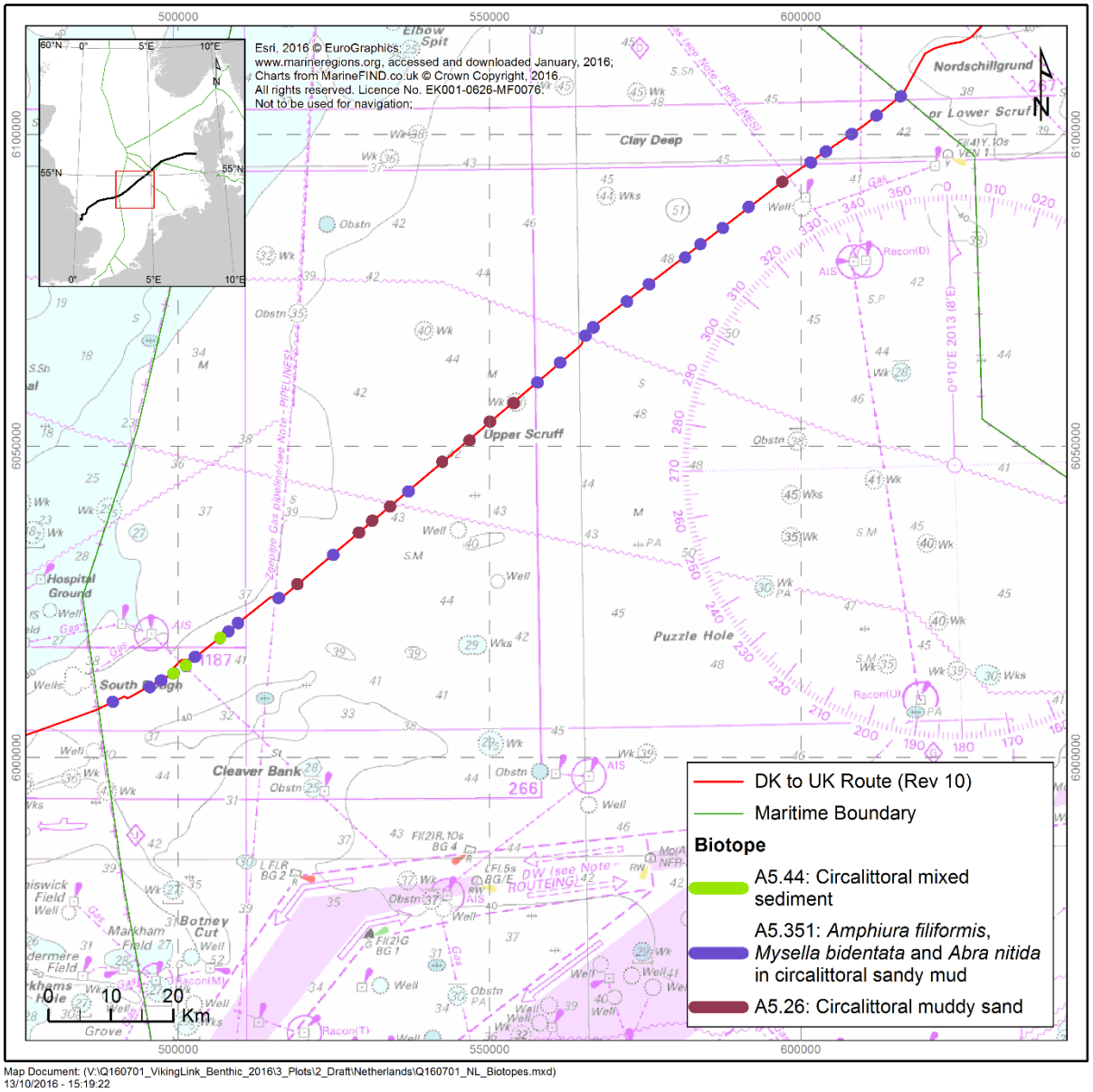


Figure 3.18: Distribution of biotopes within the Netherlands EEZ

The most common habitat identified from the survey was the Level 5 biotope *Amphiura filiformis*, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud (A5.351) (Figure 3.19).

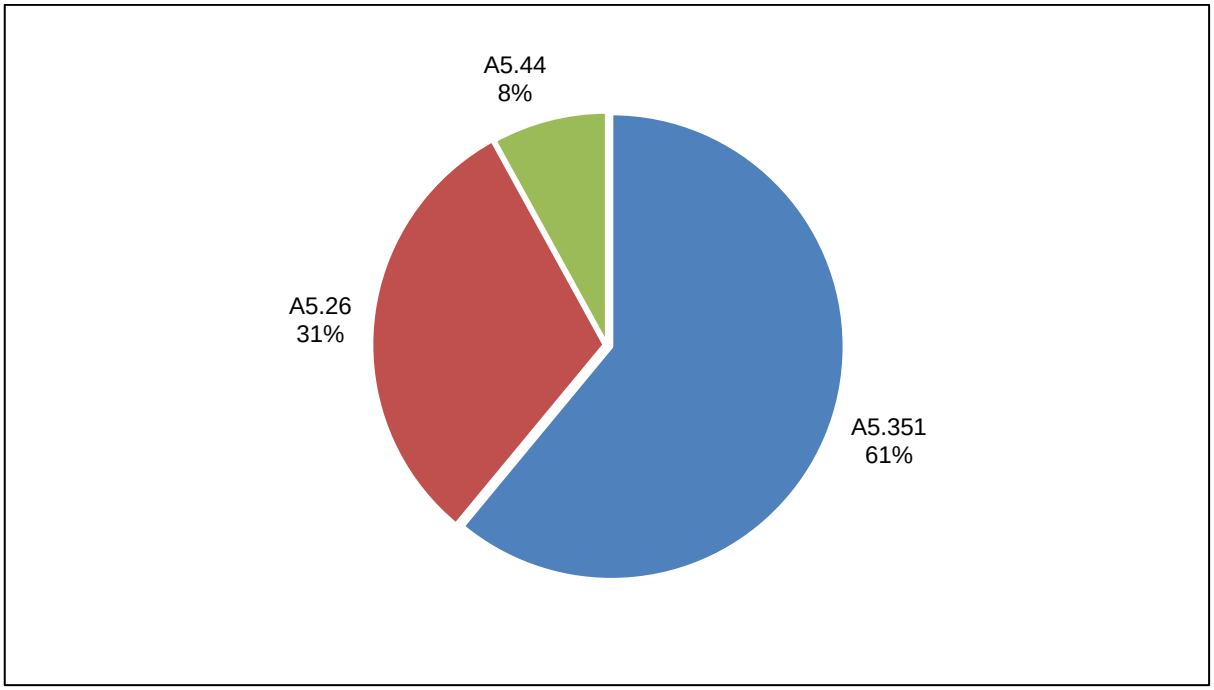


Figure 3.19: Biotope percentages within the Netherlands EEZ

Level 5 biotope '*Amphiura filiformis*, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud' (A5.351) generally occurs in cohesive sandy mud; associated fauna generally includes super-abundant brittlestar *Amphiura filiformis* with the bivalves *Kurtiella bidentata* (formerly *Mysella bidentata*) and *Abra nitida*. In moderately deep waters, like the Netherlands EEZ stations, this community can also be found in muddy sands, therefore in sandier sediments. The community associated with this biotope also includes the polychaete species of the *Nephtys, Phoronis* and *Pholoe* genera and cirratulids. Other taxa such as *Echinocardium cordatum* or *Nucula nitidosa* may also occur in offshore examples of this biotope (EEA, 2014; JNCC, 2015). The majority of these associated fauna was recorded in the grab samples at the stations where the biotope was identified.

Although the biotope '*Amphiura filiformis*, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud' (A5.351) was the most common biotope identified, at some stations along the cable route in the Netherlands EEZ its presence was not strongly supported by the data. The analysis indicated that other similar biotopes could have been assigned to the stations. The level 5 biotope '*Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment' (A5.261) was considered as well, as in sandier sediments, A5.351 is known to possibly grade into A5.261 (JNCC, 2015). This may suggest an area of variability or transition between the two biotopes, or indeed other similar biotopes. Therefore, these stations were described by the complex level 4 biotope Circalittoral muddy sand (A5.26).

The level 4 biotope complex 'Circalittoral muddy sand' (A5.26) is characterised by non-cohesive muddy sands with the silt content typically ranging from 5 % to 20 %. Generally found at depths of over 20 m, this habitat supports communities characterised by a wide variety of polychaetes, bivalves such as *Abra alba* and *Nucula nitidosa*, and echinoderms such as species of the genera *Amphiura* and *Ophiura*. Also, *Astropecten irregularis* is commonly found associated with habitats within this biotope complex (EEA, 2014; JNCC, 2015).

At three of the stations within the Netherlands EEZ, where the content of gravel ranged between 34.6 % and 65.1 % (10PST06, 10PST08 and 10PST09), the habitat was described by the level 4 biotope complex 'Circalittoral mixed sediment' (A5.44). This biotope complex describes mixed sediment habitats at depths of over 20 m, characterised by a variable nature of the seabed and therefore often supporting rich communities. A wide range of infaunal polychaetes, bivalves, echinoderms and burrowing anemones are often present and the presence of hard substrata allows the settling of epifaunal species (EEA, 2014; JNCC, 2015). At these stations, cobbles colonised by a variety of fauna were noted. The stations were assessed for the presence of a cobble reef (see details in Section 3.5.2.3). Figure 3.20 shows the distribution of the coarse substrate biotope complex.

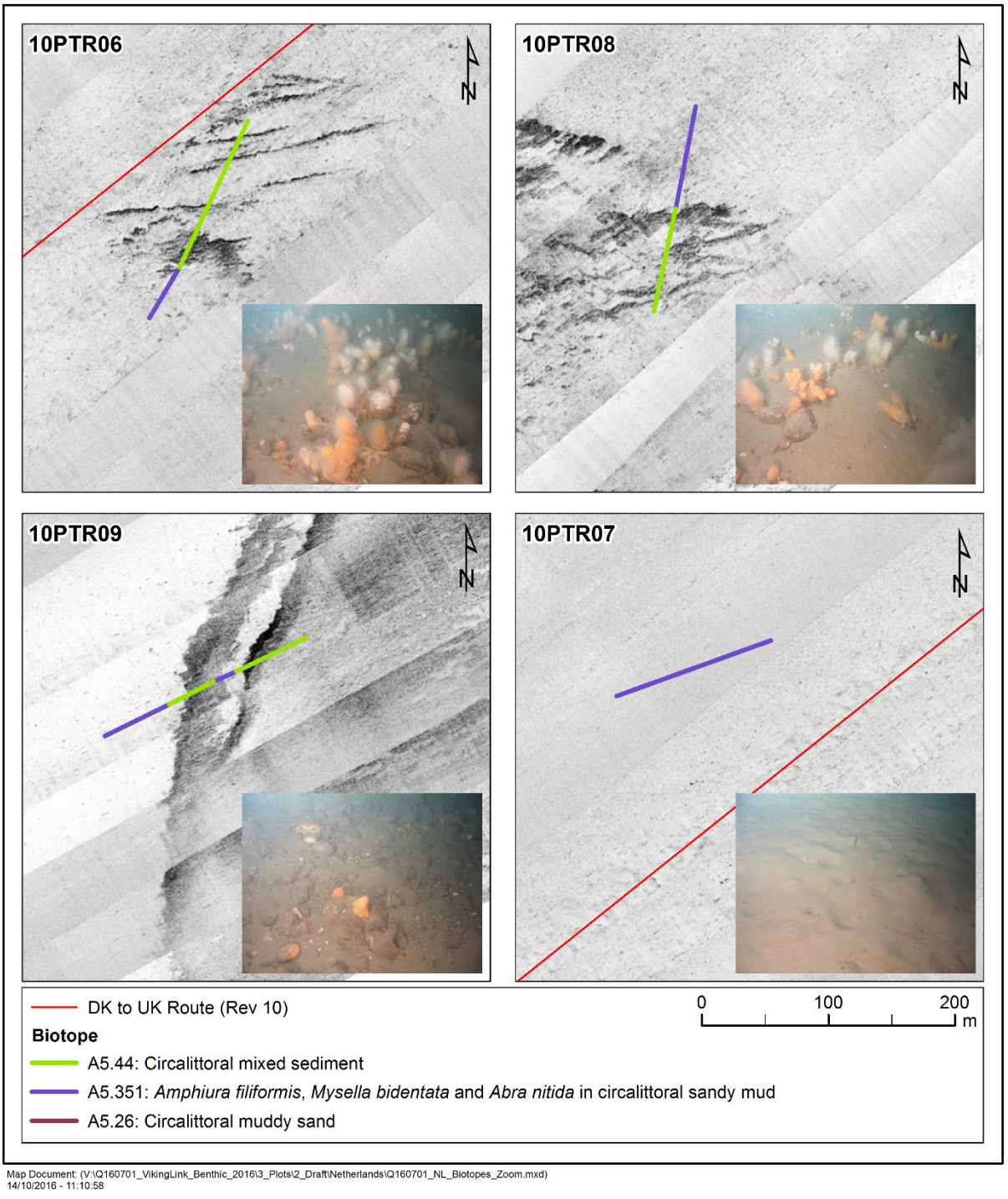


Figure 3.20: Circalittoral mixed sediments biotope complex overlain on sidescan sonar data

3.5 Species and Habitats of Conservation Interest

The list of species and habitats identified by the samples and data analysis were compared against the list of Habitats Directive (92/43/EEC) (Annex I Habitats and Annex II Species) (European Commission, 2016), OSPAR List of Threatened and/or Declining Species & Habitats (OSPAR, 2008) and the IUCN Red List of Threatened Species (IUCN, 2016).

3.5.1 Species of Conservation Interest

3.5.1.1 Plaice *Pleuronectes platessa*

Two individuals were confirmed along transects 8PTR05 and 10PTR02.

Plaice are on the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species designated as “least concern".

3.5.1.2 Solenette *Buglossidium luteum*

Individuals were recorded from a total of six transects (7FTR49, 8PTR01, 8PTR02, 8PTR07, 9PTR02 and 9PTR03).

Solenette are on the IUCN Red List of Threatened Species designated as “least concern”.

3.5.1.3 Whiting *Merlangius merlangus*

Individuals were recorded from four transects within block 8 (8PTR04, 8PTR06, 8PTR07 and 8PTR08). In addition, two unconfirmed individuals were observed along video transects at stations 10PTR03 and 10PTR10.

Whiting are on the IUCN Red List of Threatened Species, designated as “least concern”.

3.5.1.4 Norway lobster *Nephrops norvegicus*

The Norway lobster *Nephrops norvegicus* was recorded from the video footage at transects 8PTR05, 8PTR06 and 8PTR07; burrows were also noted from the video footage at transects 8PTR03 and 8PTR04. The Norway lobster is an important commercial species within the North Sea, and its stocks and exploitation is carefully monitored and managed to ensure the continuation of the important fishery (Sabatini and Hill, 2008).

The Norway lobster is on the IUCN Red List of Threatened Species, designated as “least concern”.

3.5.1.5 Ocean Quahog Arctica islandica

One juvenile individual was recorded in the grab sample at station 9PST05.

The ocean quahog is listed on the OSPAR (2008) “List of threatened and declining habitats and species”. The nomination of ocean quahog for inclusion on the OSPAR “List of Threatened and Declining Habitats and Species” was due to their slow growth and maturation rates, low fecundity and sporadic recruitment that makes populations vulnerable to physical disturbance or substratum loss. Within the Greater North Sea (OSPAR Region II), significant changes in the populations of ocean quahog have been recorded during the last century (OSPAR, 2009).

3.5.2 Habitats of Conservation Interest

3.5.2.1 Sites designations

Within the Netherlands EEZ, the proposed cable route traverses one designation, Klaverbank Site of Community Importance (SCI). Klaverbank SCI is 1,235 km^2 area and designated for the presence of 'Open-sea reefs' (Noordzeeloket).

Klaverbank has an average depth of over 40 m and is the only site in the Dutch North Sea where considerable quantities of gravel lie on the surface. Larger cobbles with a specific covering of calcareous red algae also occur. Due to the variation in sediment composition, species diversity and biomass is high within the bank, particularly attached sessile species. Approximately 140 species recorded from Klaverbank are yet to be recorded elsewhere within the Dutch North Sea (Noordzeeloket, 2012).

3.5.2.2 The Central Oyster Grounds

The Central Oyster grounds are located in a deeper (approximately 50 m), silt rich area within The Netherlands territorial waters (Lindeboom et al., 2005). Originally this area supported populations of the indigenous flat oyster (*Ostrea edulis*). Due to overfishing in the first half of the 20th century and competition from the invasive Pacific oyster (*Crassostrea gigas*), including the inability to fight the *Bonamia* pathogen carried by Pacific oysters, in the second half of the century, the flat oyster has all but disappeared from the Central Oyster Grounds and the wider Dutch North Sea (Noordzeeloket, 2012; Lindeboom et al., 2005). However, the Central Oyster Grounds have remained an area important for seabed benthos due to the biodiversity, density, biomass and distribution of species, and the balanced composition of the faunal communities. These favourable conditions have allowed the presence of long-lived, slow-growing species to establish themselves within the Central Oyster Grounds, including the OSPAR listed, Ocean quahog (*Arctica islandica*) (Noordzeeloket, 2012; Lindeboom et al., 2005). As currently no formal protection exists for the Central Oyster Grounds, anthropogenic impacts, especially beam trawling, has caused destruction of populations of *A. islandica* (Noordzeeloket, 2012).

Eight stations (8PST03 to 8PST08 and 9PST01) were sampled within the oyster grounds to investigate species biodiversity and biomass.

No *Arctica islandica* were observed along the video transects or identified from the grab samples within the Oyster Grounds. Faunal community structure and biomass did not differ significantly from other stations outside the Oyster Grounds with similar sediment conditions. Macrofaunal multivariate analysis grouped stations within the Oyster Grounds with ten stations outside the Oyster Grounds.

3.5.2.3 Cobble Reef

Potential Annex I habitat, cobble reef, was identified in sections of 10PTR06, 10PTR08 and 10PTR09. Using criteria set out by Irving (2009) and discussed in Section 2.3.1, Table 3.10 presents a measure of reefiness of the stony substrates encountered within the survey area from the video analysis. All sections of the transects assessed for resemblance to geogenic reef were classified as NOT REEF.

A full assessment of the attributes of these substrates in terms of resemblance to Annex I criteria is provided in Appendix B.2.

Table 3.10: Summary of the Measure of Reefiness of Stony Substrates Encountered within the Netherlands EEZ

Transect	Sediment Description and Cobble/Boulder %	Overall Geogenic Reef Classification	Representative Underwater Photograph	Habitat /Biotope Name and Code
10PTR06	Relatively low relief seabed of silty gravelly sand with pebbles and cobbles < 10 % cobbles and/or boulders	**NOT REEF**		**EUNIS Name:** Circalittoral mixed sediment **EUNIS Code:** A5.44
10PTR08	Relatively low relief seabed of silty gravelly sand with pebbles, cobbles and occasional boulders < 10 % cobbles and/or boulders	**NOT REEF**		**EUNIS Name:** Circalittoral mixed sediment **EUNIS Code:** A5.44
10PTR09	Relatively low relief seabed of silty gravelly sand with pebbles and cobbles. A small area along the transect comprised of silty sandy coarse gravel with pebbles and occasional cobbles. A thin veneer of sand covered some of the coarse sediment within this area < 10 % cobbles and/or boulders	**NOT REEF**		**EUNIS Name:** Circalittoral mixed sediment **EUNIS Code:** A5.44

3.5.2.4 Other Potential Habitats of Conservation Importance

Biotopes can also be illustrative of habitats listed for protection under the Habitats Directive (92/43/EEC) (Annex I Habitats) and OSPAR Convention (OSPAR Priority Habitats) (JNCC 2010) and UK Post-2010 Biodiversity Framework (UK BAP Habitats).

Annex I habitats could be found within the biotope complexes Circalittoral muddy sand (A5.26) and Circalittoral mixed sediment (A5.44). However, none were identified from the analysis of the data within the Netherlands EEZ.

3.6 Sediment Chemistry

At the time of writing, the laboratory analysis of the Netherlands EEZ sediment for heavy metals and hydrocarbons was not complete. This section will be completed separately once the data is available for statistical analysis.

3.7 Water Quality Profiling

Water profiles were successfully collected at all 36 sampling stations within the Netherlands EEZ. Water profile data were processed using Ocean V3. Water profiles for each station were trimmed and either the down or upcast chosen to best represent the data.

Seawater temperature ranged from 7.8 °C to 17.8 °C, salinity from 33.1 to 34.9 ppt, conductivity from 34.4 to 45.5 mS/cm and dissolved oxygen (DO) saturation from 80.4 to 107.6 % (Table 3.11). The four water profiles that were taken in Block 7 on the MV Fugro Frontier in July (7FST46 to 7FST49) increased the temperature, conductivity and DO ranges in comparison to all the other Netherland EEZ water profiles, which were completed earlier in May. Temperatures of up to 17.8 °C were recorded at 7FST46 to 7FST49 as well as conductivity of up to 45.5 mS/cm and DO saturation down to 80.4 %. In comparison, water profiles recorded at the remaining stations ranged up to 10.3 °C, 37.6 mS/cm and down to 94.1 % DO saturation.

Stratification of the water column was observed at all the water sampling stations within the Netherlands EEZ, although the strength and depth to which stratification occurred varied between stations. A warmer, often more saline and oxygen saturated water body was recorded at the sea surface down to between approximately 10 m to 34 m depth. Salinity did not vary with depth at 10PST01 to 10PST12, although variation in salinity with depth was observed at other stations. Stratification of the water column was weaker at 8PST01 to 8PST09 compared to the other water sampling stations within the Netherlands EEZ. An example water profile is presented within Figure 3.21.

Table 3.11: Summary Statistics for Water Profiles within the Netherlands EEZ

Station	Statistics	Parameter				
		Depth [m]	Temperature [°C]	Salinity [ppt]	Conductivity [mS/cm]	DO [%]
7FST46	Max	37.7	17.8	34.9	45.5	102.5
	Mean	**-**	**12.9**	**34.8**	**40.7**	**93.4**
	Min	-	10.3	34.0	38.1	86.0
7FST47	Max	41.0	17.4	35.4	45.2	103.6
	Mean	**-**	**13.5**	**34.9**	**41.5**	**94.0**
	Min	-	10.1	34.8	38.0	80.2
7FST48	Max	39.4	17.7	34.7	34.4	104.1
	Mean	**-**	**13.9**	**34.7**	**41.5**	**95.7**
	Min	-	10.0	34.4	37.7	81.2
7FST49	Max	42.2	17.5	35.1	44.9	104.8
	Mean	**-**	**14.2**	**34.6**	**41.6**	**94.4**
	Min	-	10.2	34.5	37.8	80.4
8PST01	Max	21.5	8.9	34.1	36.2	106.2
	Mean	**-**	**8.2**	**34.0**	**35.5**	**103.0**
	Min	-	8.0	34.0	35.2	101.5
8PST02	Max	39.3	9.0	34.1	36.2	105.7

Station	Statistics	Parameter				
		Depth [m]	Temperature [°C]	Salinity [ppt]	Conductivity [mS/cm]	DO [%]
	Mean	**-**	**8.2**	**34.0**	**35.4**	**102.8**
	Min	-	7.9	33.1	34.4	101.0
8PST03	Max	46.7	9.0	34.1	36.2	103.6
	Mean	**-**	**8.1**	**34**	**35.4**	**101.1**
	Min	-	7.8	33.9	35.1	98.4
8PST04	Max	48.9	8.6	34.0	35.8	102.4
	Mean	**-**	**8.1**	**34.0**	**35.4**	**100.4**
	Min	-	7.9	33.9	35.1	97.8
8PST05	Max	48.8	8.6	34.0	35.8	101.0
	Mean	**-**	**8.1**	**34.0**	**35.3**	**99.2**
	Min	-	7.8	33.9	35.1	96.6
8PST06	Max	48.1	8.7	34.0	35.8	101.0
	Mean	**-**	**8.1**	**33.9**	**35.3**	**98.2**
	Min	-	7.8	33.9	35.0	95.4
8PST07	Max	46.5	8.6	34.1	35.9	102.7
	Mean	**-**	**8.1**	**33.9**	**35.3**	**99.0**
	Min	-	8.0	33.9	35.1	97.3
8PST08	Max	46.7	8.4	34.0	35.6	101.5
	Mean	**-**	**8.1**	**34.0**	**35.3**	**99.6**
	Min	-	8.0	33.9	35.1	98.4
8PST09	Max	46.2	8.7	34.1	36.1	104.1
	Mean	**-**	**8.2**	**34.1**	**35.5**	**101.5**
	Min	-	8.0	34.0	35.3	99.5
9PST01	Max	45.6	9.6	34.3	37.0	102.7
	Mean	**-**	**8.5**	**34.1**	**35.8**	**100.8**
	Min	-	8.0	34.0	35.3	99.2
9PST02	Max	44.1	9.8	34.3	37.1	102.4
	Mean	**-**	**8.4**	**34.2**	**35.8**	**99.0**
	Min	-	8.1	34.1	35.5	97.4
9PST03	Max	44.2	9.7	34.3	37.0	102.8
	Mean	**-**	**8.3**	**34.1**	**35.7**	**98.4**
	Min	-	8.1	34.1	35.5	97.2
9PST04	Max	43.6	9.6	34.3	37.0	102.5
	Mean	**-**	**8.5**	**34.2**	**35.9**	**99.4**
	Min	-	8.1	34.1	35.5	97.6
9PST05	Max	42.4	9.5	34.3	36.9	102.0
	Mean	**-**	**8.4**	**34.1**	**35.8**	**99.3**
	Min	-	8.1	34.1	35.4	98.1
9PST06	Max	42.9	9.7	34.3	37.0	101.9
	Mean	**-**	**8.6**	**34.2**	**36.0**	**99.5**
	Min	-	8.1	34.1	35.5	97.5
9PST07	Max	42.2	10.0	34.1	37.3	102.2
	Mean	**-**	**8.7**	**34.1**	**36.0**	**99.1**
	Min	-	8.2	34.4	35.5	97.9
9PST08	Max	42.3	10.2	34.7	37.5	102.6
	Mean	**-**	**8.8**	**34.2**	**36.2**	**98.9**
	Min	-	8.2	34.1	35.5	97.3
9PST09	Max	42.5	10.2	34.6	37.5	102.8
	Mean	**-**	**8.6**	**34.1**	**35.9**	**98.4**
	Min	-	8.2	34.1	35.5	97.2
9PST10	Max	42.0	10.3	34.4	37.6	102.9

Station	Statistics	Parameter				
		Depth [m]	Temperature [°C]	Salinity [ppt]	Conductivity [mS/cm]	DO [%]
	Mean	**-**	**8.8**	**34.1**	**36.1**	**98.6**
	Min	-	8.2	34.1	35.5	96.7
9PST11	Max	41.7	10.2	34.3	37.5	103.2
	Mean	**-**	**8.7**	**34.1**	**36.1**	**98.4**
	Min	-	8.2	34.1	35.5	96.5
10PST01	Max	43.5	9.6	34.3	36.8	104.1
	Mean	**-**	**8.5**	**34.1**	**35.9**	**98.0**
	Min	-	8.2	34.1	35.5	96.1
10PST02	Max	42.7	9.4	34.2	36.7	103.2
	Mean	**-**	**8.6**	**34.1**	**35.9**	**96.9**
	Min	-	8.4	34.1	35.7	94.8
10PST03	Max	43.4	9.4	34.2	36.6	104.8
	Mean	**-**	**8.8**	**34.1**	**36.1**	**97.9**
	Min	-	8.4	34.1	35.7	94.5
10PST04	Max	44.6	9.6	34.2	36.8	104.7
	Mean	**-**	**8.8**	**34.1**	**36.1**	**97.6**
	Min	-	8.5	34.1	35.9	94.4
10PST05	Max	44.6	9.6	34.1	36.8	105.6
	Mean	**-**	**8.9**	**34.1**	**36.1**	**98.7**
	Min	-	8.5	34.0	35.9	94.1
10PST06	Max	44.7	9.9	34.1	37.0	106.0
	Mean	**-**	**8.8**	**34.1**	**36.1**	97.6
	Min	-	8.5	34.0	35.8	94.0
10PST07	Max	50.3	9.7	34.2	36.8	-
	Mean	**-**	**8.6**	**34.0**	**35.8**	**-**
	Min	-	8.4	34.0	35.6	-
10PST08	Max	47.9	9.8	34.5	37.2	106.7
	Mean	**-**	**9.2**	**34.4**	**36.8**	**102.2**
	Min	-	8.6	34.4	36.2	96.8
10PST09	Max	49.4	9.8	34.5	37.2	107.6
	Mean	**-**	**9.0**	**34.4**	**36.6**	**102.2**
	Min	-	8.6	34.4	36.2	96.6
10PST10	Max	51.6	9.7	34.5	37.3	107.4
	Mean	**-**	**9.0**	**34.4**	**36.6**	**102.4**
	Min	-	8.6	34.4	36.2	96.4
10PST11	Max	52.9	9.7	34.5	37.3	107.4
	Mean	**-**	**9.0**	**34.4**	**36.6**	**101.8**
	Min	-	8.5	34.4	36.1	95.6
10PST12	Max	54.9	9.5	34.5	37.1	106.4
	Mean	**-**	**8.8**	**34.5**	**36.5**	**99.8**
	Min	-	8.4	34.4	36.0	95.0

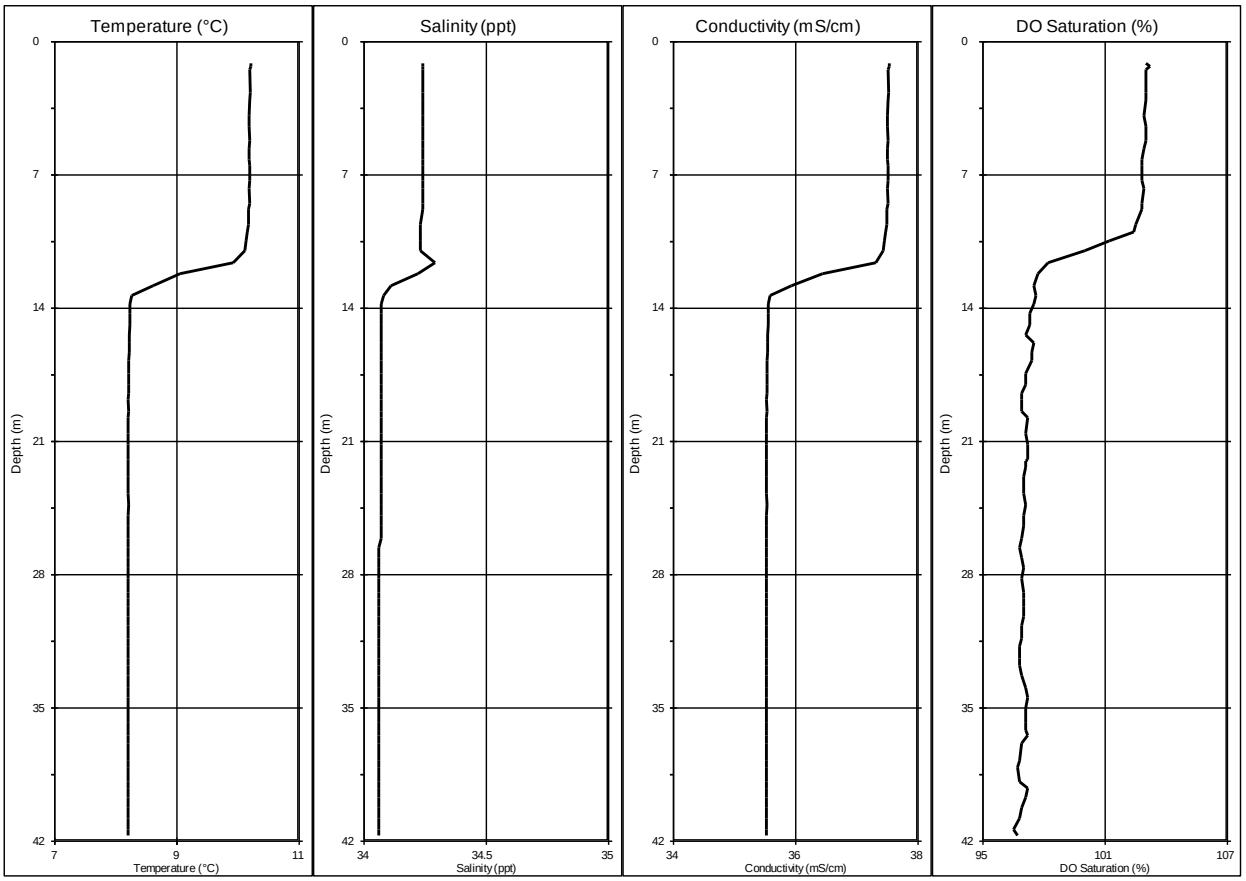


Figure 3.21: Water profile at 9PST11

4. DISCUSSION

4.1 Seabed Sediment Conditions

The majority of the seabed within the Netherlands EEZ was dominated by the sand fraction, with only three transects exhibiting areas of coarser gravel material. The dominant Folk classes were slightly gravelly sand (33 %) and slightly gravelly muddy sand (28 %). Multivariate analysis grouped the Netherlands EEZ stations into three groups; the three stations exhibiting coarser material (10PST06, 10PST08 and 10PST09), 9PST04 which lacked a finer mud fraction, and then all remaining stations.

Video analysis highlighted additional seafloor features not recorded through the grab work, such as the rippled nature of the seabed at 8PTR09, 9PTR01 to 9PTR11, 10PTR01 to 10PTR05 and 10PTR08 to 10TR12, faunal burrows observed throughout the Netherlands EEZ and shell fragments observed at 7FTR46 to 7FTR49.

The seabed sediments observed during the current survey are typical of the deeper, offshore areas of the Netherlands EEZ. The Dutch government characterised the commonly found sediment conditions across the Dutch North Sea, in their marine strategy for 2012 to 2020. Very fine sand transitioning to silty sand is observed in areas of 40 to 50 m water depth and silty sand in the Oyster grounds at 50 m (Noordzeeloket, 2012).

A monitoring study of the Dutch North Sea, including the Netherlands EEZ was conducted by Daan and Mulder in 2009. As part of a national program of monitoring marine waters (BIOMON), sediment and faunal data for Dutch waters from 1991 to 2005 were analysed and compared to previous surveys. All the stations completed during the current survey fall into their ‘Oyster Grounds’ area. The ‘Oyster Grounds’ area is a larger area than the Central Oyster Grounds discussed within this report (see Section 3.5.2.2). This area of the Dutch North Sea was characterised by very fine sand with a proportion of silt usually greater than 2 %. Although, the percentage of silt had decreased over the Daan and Mulder study period.

4.2 Macrobenthic Communities

The macrofaunal phyla with the greatest number of recorded taxa were the Annelida (45 % of the total taxa). However, the phyla which dominated in terms of abundance and biomass was Echinodermata (only 8 % of taxa but 45 % abundance). Echinodermata dominance was due to one species of brittlestar, *Amphiura filiformis*.

Multivariate analysis split the Netherlands EEZ stations into seven groups. Group a corresponded to the same three stations identified as group a in the sediment analysis. Stations 10PST06, 10PST08 and 10PST09 had a distinct infaunal community dominated by two species of Polychaeta. Due to the coarser material at these stations, the epifaunal community was also distinct in terms of abundance of colonial Cnidaria (such as *Alcyonium digitatum*) and Bryozoa.

The remaining faunal groups, including two ungrouped stations, identified by the multivariate analysis were mainly dominated by *A. filiformis* and were relatively closely grouped on the MDS plot. These groups were separated due to other defining species within the communities. Two remaining groups (b and c) were dominated by the crustacean *Harpinia antennaria*.

Combined with the video analysis, which identified epifaunal communities and seabed conditions not sampled by the singular grab along a transect, three EUNIS biotopes were identified for the Netherlands EEZ. These biotopes were '*Amphiura filiformis*, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud' (A5.351), 'Circalittoral sandy mud' (A5.26) and 'circalittoral mixed sediment' (A5.44). The three patches of coarser material identified from video analysis were designated 'circalittoral mixed sediment'.

Amphiura filiformis, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud' (A5.351) was the most common biotope observed across the Netherlands EEZ, followed by 'circalittoral sandy mud'. It should be noted that the two sandy mud biotopes assigned and several others are very similar in community composition and transition from one to the next. The assigned biotopes represent a best fit for the stations based on all available data for the Netherlands EEZ and on designations within the UK and Denmark portions of the survey route.

The high abundance and biomass of *A. filiformis* was the defining species of the 'Oyster Ground' area, identified by Daan and Mulder in 2009. *A. filiformis* was not identified commonly outside of this area. The other species commonly identified were the bivalve *Nucula nitidosa* and *Nephtys hombergii* (Daan & Moulder 2006; Daan & Moulder, 2001), which were also identified throughout the current survey. Although not recorded within the macrofaunal analysis, sea potatoes *Echinodermata cordatum* were commonly observed on the video footage from the current survey, and were common species throughout the Dutch North Sea between 1991 and 2005.

On a wider, North Sea scale many of the most abundant species observed during the current survey are common species throughout the North Sea. *Spiophanes bombyx*, *Pholoe* sp., *Amphiura filiformis* and *Goniada maculata* are species with the highest occurrence within the North Sea as a whole (Heip & Craemeersch, 1995).

4.3 Species and Habitats of Conservation Interest

Several species of conservation importance were identified and one known habitat of conservation importance was investigated.

Three species of fish (plaice, solenette and whiting) and one species of shellfish (Norway lobster) recorded in the current survey are on the IUCN red list for threatened species. All four of these species are listed as species of 'least concern'.

The Central Oyster Grounds are present within the Netherlands EEZ. Although the area is not formally protected, it has been identified as an area of high biodiversity and biomass. This area is known not to sustain native oyster populations but does support populations of the OSPAR protected ocean quahog. Only one juvenile ocean quahog was identified from a grab sample. Ocean quahog are listed as declining by OSPAR. Species biodiversity and biomass were not different within the Oyster Grounds compared to the surrounding area. Due to the lack of formal protection at the Central Oyster Grounds, fishing continues to occur across this area and the wider Dutch North Sea. In particular, the relatively destructive beam trawling occurs within this area and has been suggested as a main cause for the reduction in slow growing species, such as the ocean quahog (Noordzeeloket, 2012; Lindeboom et al., 2005).

Three patches of coarse material were investigated as possible, Annex I habitat Cobble reef. Due to the absence of medium to high concentrations of cobbles and boulders, all three patches were designated 'Not Reef'.

No habitats of conservation importance were identified during the current survey.

4.4 Sediment Chemistry

At the time of writing, the laboratory analysis of the Netherlands EEZ sediment for heavy metals and hydrocarbons was not complete. This section will be completed separately once the data is available for analysis.

4.5 Water Quality Profiles

Water quality profiles were similar throughout the Netherlands EEZ survey area. A medium to weak stratification of the water column was observed at the majority of stations, with warmer, more oxygen saturated and often more saline waters at the surface. The depth to which stratification was observed varied with total water depth recorded at each station but occurred between approximately 10 m to 34 m. Salinity did not vary with depth at 10PST01 to 10PST12 and the stratification was weaker at 8PST01 to 8PST09.

The stratified water column is typical of the water column conditions observed during the summer months in the deeper areas of the Dutch North Sea (Noordzeeloket, 2012). Due to a weak tidal current and the deep water (average depths between 40 and 50 m), a thermal stratification occurs during the summer months.

5. CONCLUSIONS

This report has described and characterised the benthic seabed habitat sampled by grab and drop down video and water conditions along the Netherlands EEZ section of the Viking Link cable route.

From the analysis of the results and the subsequent interpretation, the following conclusions can be drawn:

- The dominant physical seabed conditions observed throughout the Netherlands EEZ was (slightly) gravelly sand;
- Coarser sediments were only observed in patches on transects 10PTR06, 10PTR08 and 10PTR09. The coarse sediments did not meet the criteria for an Annex I, stony reef habitat. Although the coarser material did allow a different faunal community to exist compared to the rest of the Netherlands EEZ;
- Within the sand sediment, multivariate analysis identified six groups (including two ungrouped stations) of faunal communities;
- Three biotopes were designated, based on video and grab analysis. They were 'Circalittoral mixed sediment' (A5.44) for the three stations with coarser material, and '*Amphiura filiformis*, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud' (A5.351), 'Circalittoral sandy mud' (A5.26). The two sandy mud biotopes are closely related and throughout the Netherlands EEZ these two biotopes interchanged and some stations were also identified as transitional between the biotopes.
- One OSPAR listed ocean quahog was identified, although it was only a juvenile specimen. Several species on the IUCN red list were identified, although they were all listed as 'least concern'.
- The ground-truthed Central Oyster Grounds contained no species of conservation interest and did not vary from the biodiversity and biomass observed at stations outside the area.
- The water column conditions were similar throughout the Netherlands EEZ. Stratification of varying strength and depth was observed at the majority of stations.

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APPENDICES

A. GUIDELINES ON USE OF REPORT

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B. ROUTE POSITION LISTINGS

Route Position Listings: Route 4, Revision 10 (LF1 and LF2)

Geodetic Datum: ETRS89 Grid: UTM Zone 31 N (CM 3°E)					Route Revision : Route 4, Rev 10 (Landfall 1)	
Point	**KP**	**Easting [m]**	**Northing [m]**	**Latitude**	**Longitude**	**Remarks**
1	0.000	824 779.894	6 191 987.072	55.764228°N	8.178616°E	Denmark Landfall
2	7.084	817 732.364	6 192 707.301	55.775348°N	8.067580°E	
3	23.256	801 593.974	6 193 738.160	55.794902°N	7.812372°E	
4	51.987	772 868.354	6 193 178.646	55.806951°N	7.355016°E	
5	53.052	771 983.053	6 192 585.087	55.802132°N	7.340340°E	
6	54.553	771 890.529	6 191 087.118	55.788763°N	7.337373°E	
7	55.743	770 953.332	6 190 353.476	55.782716°N	7.321741°E	
8	72.837	754 074.175	6 187 657.616	55.767712°N	7.050786°E	
9	73.619	753 523.588	6 187 102.149	55.763022°N	7.041517°E	
10	74.589	753 580.166	6 186 133.507	55.754310°N	7.041517°E	
11	75.333	752 978.905	6 185 695.783	55.750701°N	7.031555°E	
12	90.170	738 749.399	6 181 493.668	55.720249°N	6.801698°E	
13	90.884	738 273.206	6 180 961.068	55.715709°N	6.793671°E	
14	91.734	738 285.101	6 180 111.264	55.708084°N	6.793120°E	
15	92.435	737 855.011	6 179 558.135	55.703335°N	6.785810°E	
16	106.169	724 703.427	6 175 601.140	55.674118°N	6.573712°E	
17	107.694	723 241.670	6 175 164.058	55.670872°N	6.550159°E	
18	130.542	701 376.520	6 168 534.825	55.620955°N	6.198229°E	
19	132.554	699 409.584	6 168 114.586	55.617995°N	6.166740°E	
20	140.843	691 452.231	6 165 792.849	55.600357°N	6.038964°E	
21	142.701	689 705.978	6 165 157.848	55.595342°N	6.010851°E	
22	148.538	684 308.467	6 162 935.343	55.577470°N	5.923829°E	
23	150.634	682 641.588	6 161 665.340	55.566700°N	5.896585°E	
24	161.826	672 153.171	6 157 759.578	55.535460°N	5.728032°E	
25	210.795	635 155.250	6 125 678.928	55.259036°N	5.126733°E	
26	217.839	631 281.573	6 119 796.162	55.207254°N	5.063086°E	
27	223.548	627 378.961	6 115 628.966	55.170851°N	4.999923°E	
28	225.278	625 802.235	6 114 916.280	55.164854°N	4.974867°E	
29	227.409	623 708.263	6 114 522.358	55.161844°N	4.941845°E	
30	229.680	621 533.616	6 113 866.764	55.156495°N	4.907450°E	
31	231.444	619 975.274	6 113 041.956	55.149467°N	4.882658°E	
32	239.117	616 271.929	6 106 321.042	55.089985°N	4.821828°E	
33	247.057	610 054.090	6 101 383.851	55.047056°N	4.722546°E	
34	260.662	598 782.817	6 093 763.836	54.980972°N	4.543574°E	
35	263.266	596 719.063	6 092 176.333	54.967116°N	4.510803°E	
36	302.225	565 762.751	6 068 522.535	54.759627°N	4.021966°E	
37	304.853	564 651.499	6 066 141.281	54.738375°N	4.004170°E	
38	367.480	516 744.903	6 025 803.244	54.379736°N	3.257806°E	

Geodetic Datum: ETRS89 Grid: UTM Zone 31 N (CM 3°E)					Route Revision : Route 4, Rev 10 (Landfall 1)	
Point	**KP**	**Easting [m]**	**Northing [m]**	**Latitude**	**Longitude**	**Remarks**
39	369.439	514 786.982	6 025 750.327	54.379321°N	3.227660°E	
40	385.361	502 356.259	6 015 801.008	54.290112°N	3.036198°E	
41	387.296	500 425.183	6 015 669.252	54.288933°N	3.006532°E	
42	389.266	499 076.639	6 014 233.964	54.276032°N	2.985820°E	
43	390.202	498 797.857	6 013 339.793	54.267995°N	2.981542°E	
44	398.150	491 829.264	6 009 519.089	54.233593°N	2.874647°E	
45	398.740	491 338.168	6 009 847.161	54.236533°N	2.867104°E	Netherlands/UK EEZ boundary (Point A)
46	403.464	487 086.025	6 007 788.747	54.217944°N	2.801953°E	
47	403.643	486 925.419	6 007 710.999	54.217241°N	2.799493°E	
48	430.211	461 903.259	5 998 780.409	54.135731°N	2.416908°E	
49	444.603	447 757.456	5 996 129.858	54.110667°N	2.200878°E	
50	448.188	444 172.690	5 996 145.819	54.110434°N	2.146047°E	
51	448.898	443 550.486	5 996 488.494	54.113446°N	2.136467°E	
52	454.425	438 026.651	5 996 300.577	54.111121°N	2.052017°E	
53	474.980	418 257.505	5 990 673.559	54.057798°N	1.751205°E	
54	475.585	417 770.670	5 991 033.393	54.060954°N	1.743672°E	
55	479.509	413 966.943	5 990 069.313	54.051670°N	1.685847°E	
56	480.195	413 283.328	5 990 123.225	54.052040°N	1.675393°E	
57	495.770	398 022.395	5 987 011.278	54.021288°N	1.443413°E	
58	496.671	397 122.810	5 986 958.361	54.020634°N	1.429706°E	
59	516.998	381 644.654	5 973 782.085	53.898948°N	1.198683°E	
60	518.057	380 612.777	5 974 020.210	53.900850°N	1.182894°E	
61	529.397	370 958.312	5 968 071.122	53.845098°N	1.038545°E	
62	530.131	370 541.897	5 967 466.309	53.839561°N	1.032474°E	
63	531.992	369 549.565	5 965 892.053	53.825172°N	1.018071°E	
64	532.477	369 211.613	5 965 544.319	53.821963°N	1.013087°E	
65	532.708	369 017.207	5 965 419.867	53.820796°N	1.010189°E	
66	532.930	368 816.779	5 965 323.937	53.819884°N	1.007187°E	
67	533.116	368 638.246	5 965 271.765	53.819370°N	1.004499°E	
68	533.409	368 351.425	5 965 214.553	53.818784°N	1.000169°E	
69	534.291	367 481.422	5 965 068.453	53.817251°N	0.987025°E	
70	534.496	367 279.477	5 965 032.693	53.816878°N	0.983975°E	
71	536.707	365 137.607	5 964 484.401	53.811402°N	0.951703°E	
72	547.484	355 962.822	5 958 830.891	53.758164°N	0.815105°E	
73	548.355	355 526.258	5 958 076.827	53.751271°N	0.808841°E	
74	551.357	353 318.385	5 956 042.102	53.732379°N	0.776348°E	
75	564.434	347 517.889	5 944 322.002	53.625456°N	0.694250°E	
76	567.572	346 430.231	5 941 378.546	53.598703°N	0.679269°E	
77	569.896	345 599.422	5 939 208.538	53.578970°N	0.667799°E	

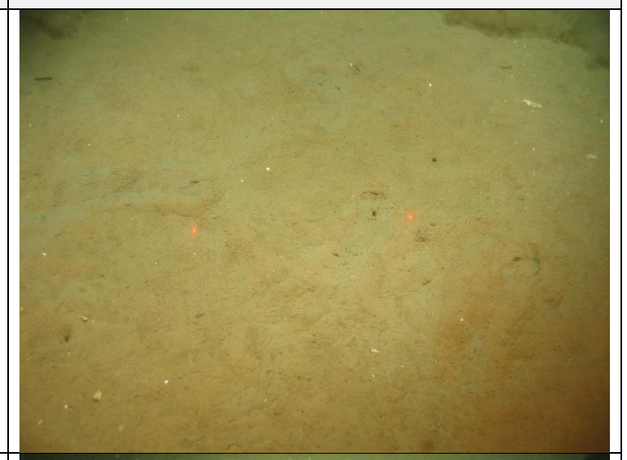
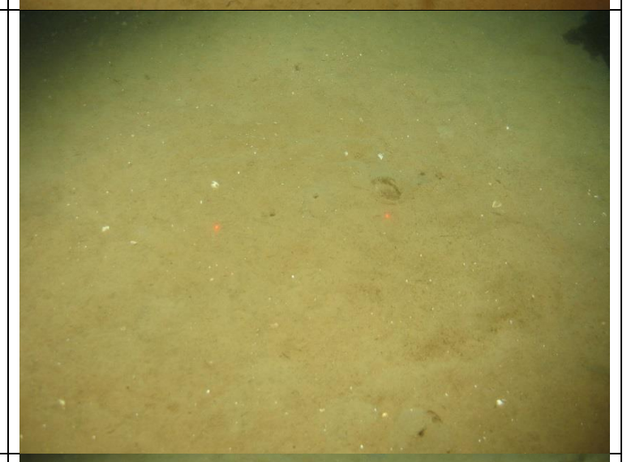
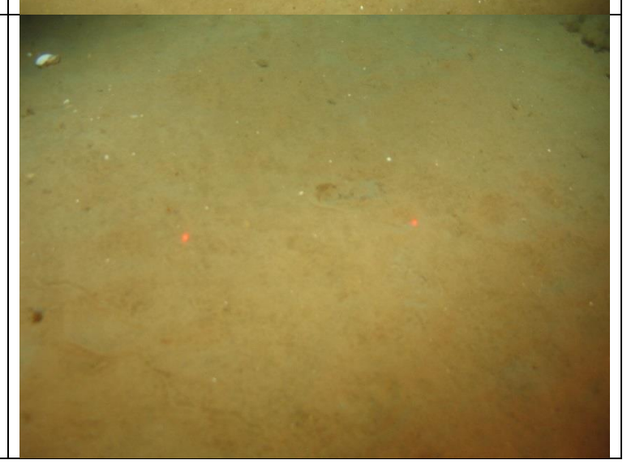
Geodetic Datum: ETRS89 Grid: UTM Zone 31 N (CM 3°E)					Route Revision : Route 4, Rev 10 (Landfall 1)	
Point	**KP**	**Easting [m]**	**Northing [m]**	**Latitude**	**Longitude**	**Remarks**
78	573.946	342 328.472	5 936 820.833	53.556554°N	0.619643°E	
79	575.862	341 147.668	5 935 312.028	53.542648°N	0.602600°E	
80	577.921	340 619.635	5 933 321.158	53.524608°N	0.595652°E	
81	578.815	340 813.306	5 932 448.196	53.516827°N	0.599015°E	
82	580.269	340 568.199	5 931 015.212	53.503884°N	0.596050°E	
83	582.203	339 594.435	5 929 344.539	53.488584°N	0.582236°E	
84	597.265	325 271.346	5 924 684.616	53.442181°N	0.369177°E	
85	597.853	324 850.233	5 924 274.857	53.438362°N	0.363071°E	
86	598.621	324 778.078	5 923 510.286	53.431473°N	0.362412°E	
87	605.190	326 756.904	5 917 245.606	53.375873°N	0.395605°E	
88	606.157	326 160.518	5 916 484.700	53.368845°N	0.387068°E	Point D
89	611.074	326 731.220	5 911 601.471	53.325183°N	0.398309°E	
90	613.204	325 509.420	5 909 855.718	53.309105°N	0.380944°E	
91	618.735	320 518.724	5 907 472.639	53.286040°N	0.307472°E	UK Landfall (LF1)

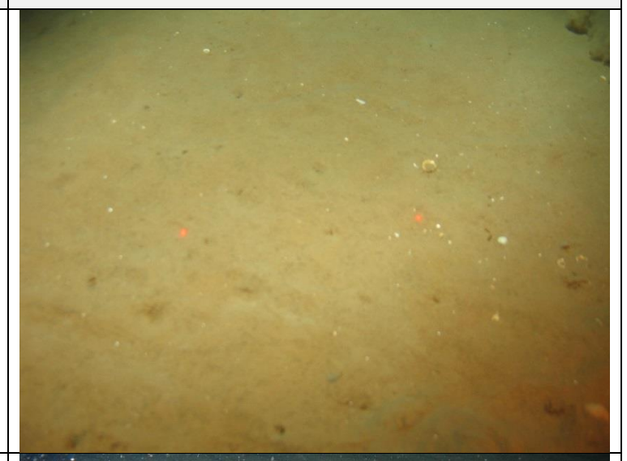
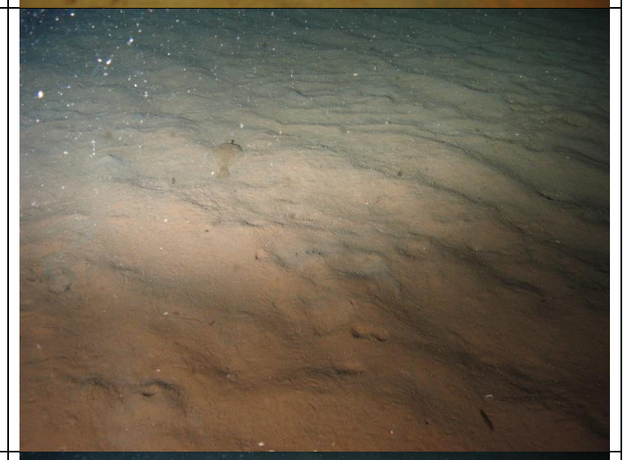
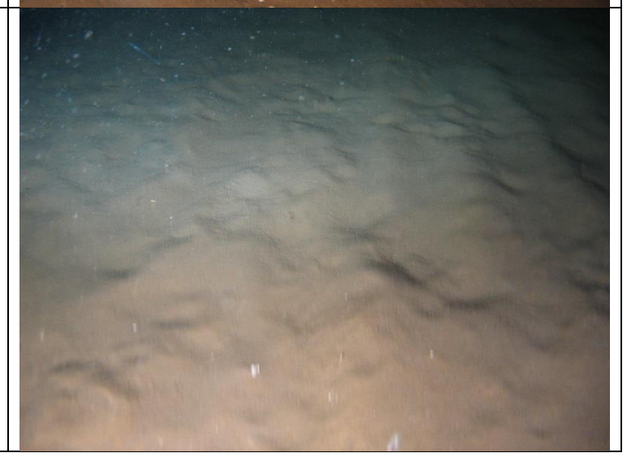
Geodetic Datum: ETRS89 Grid: UTM Zone 31 N (CM 3°E)					Route Revision : Route 4, Rev 10 (Landfall 2)	
Point	**KP**	**Easting [m]**	**Northing [m]**	**Latitude**	**Longitude**	**Remarks**
88	606.157	326 160.518	5 916 484.700	53.368845°N	0.387068°E	Point D
89	613.260	326 984.974	5 909 430.216	53.305768°N	0.403299°E	
90	617.352	326 901.360	5 905 338.456	53.268998°N	0.404275°E	
91	622.659	321 850.309	5 903 710.262	53.252706°N	0.329531°E	UK Landfall (LF2)

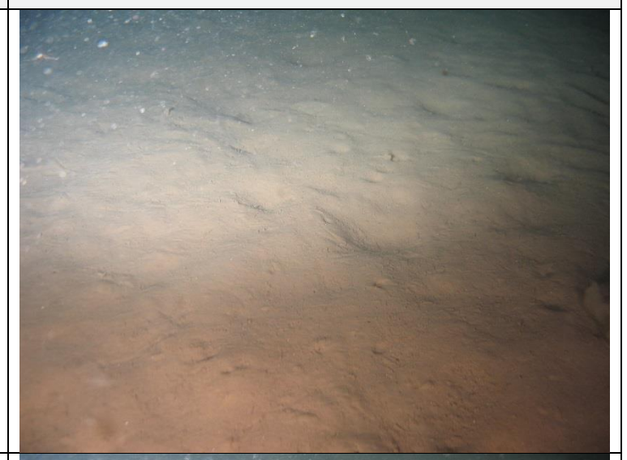
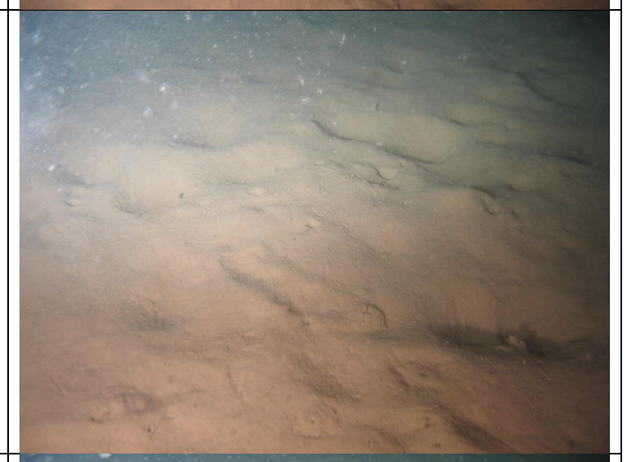
Note:
Route 4, Rev10 Landfall 2 shares common positions with Route 4, Rev10 Landfall 1 up to Point D (KP 606.157)

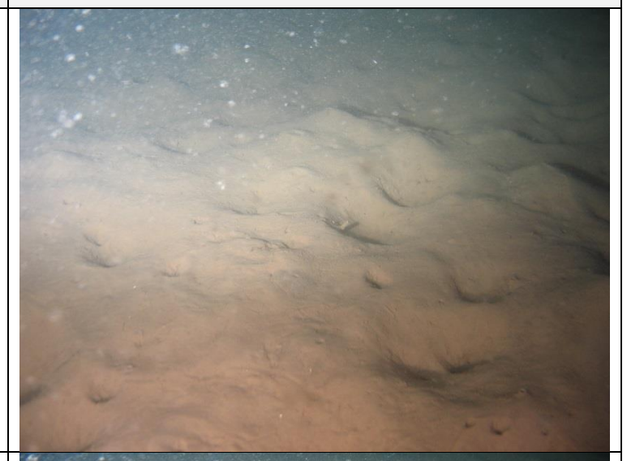
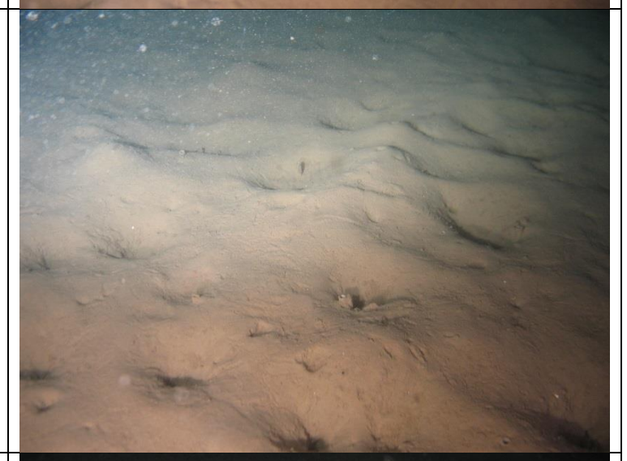
C. VIDEO ANALYSIS RESULTS

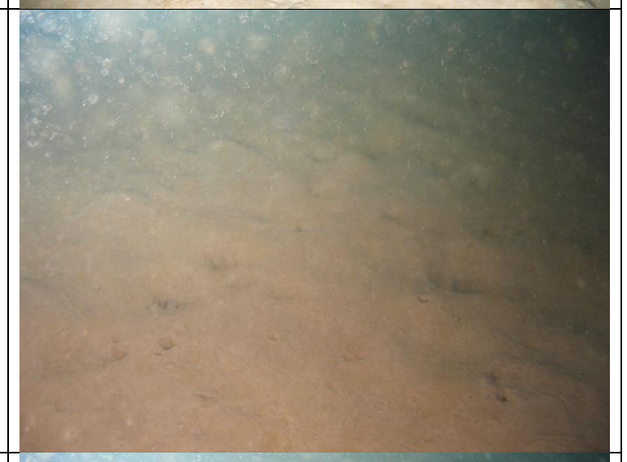
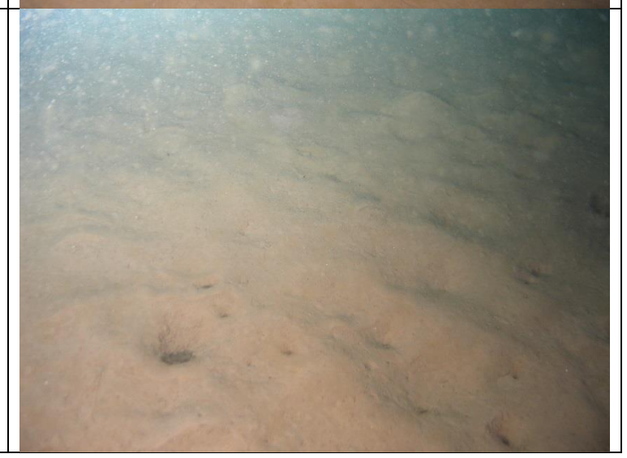
C.1 VIDEO ANALYSIS RESULTS

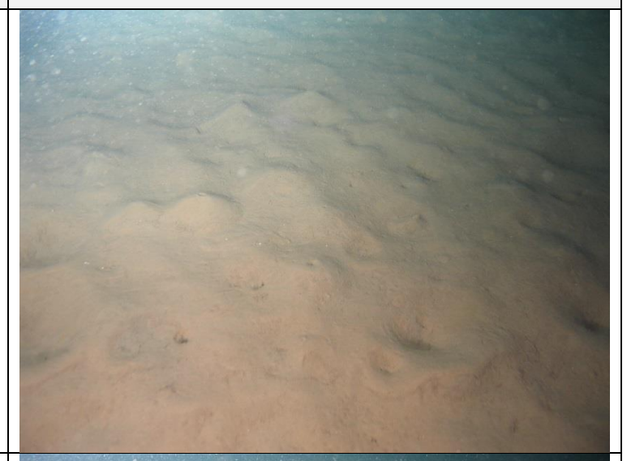
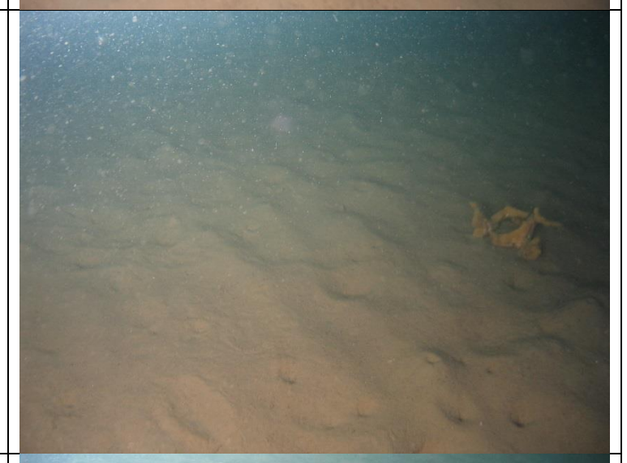
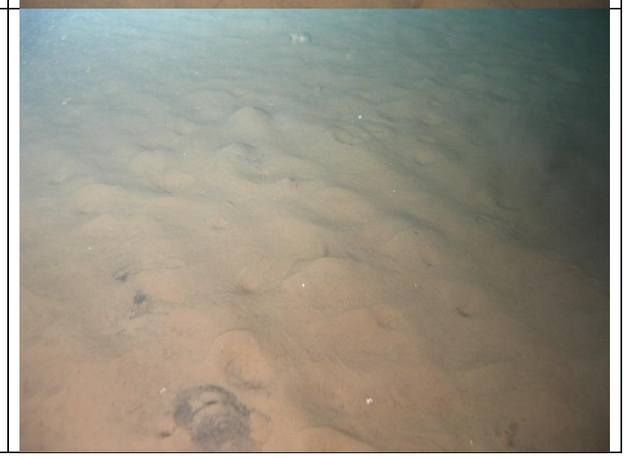
Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
7FTR46	Start End	615 991 616 114	6 106 097 6 106 200	Silty sand with shell fragments and occasional burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	*Echinocardium cordatum* Polychaete tubes Hydroid/bryozoan turf *Corystes cassivelaunus* Paguridae *Hydractinia echinata* *Asterias rubens* *Astropecten irregularis* Pleuronectiformes	C - A F R F F P F F F	
7FTR47	Start End	612 108 612 243	6 103 018 6 103 126	Silty sand with shell fragments and burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	*Corystes cassivelaunus* *Echinocardium cordatum* Polychaete tubes Hydroid/bryozoan turf *Aphrodita aculeata* *Asterias rubens* *Pagurus bernhardus* *Astropecten irregularis* Pleuronectiformes	F C - A O R F F F F F	
7FTR48	Start End	608 071 608 209	6 100 047 6 100 142	Silty sand with shell fragments and burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Paguridae *Echinocardium cordatum* Polychaete tubes *Astropecten irregularis* *Asterias rubens* *Ophiura ophiura* *Corystes cassivelaunus* Hydroid/bryozoan turf	F C - A O F F F F R	

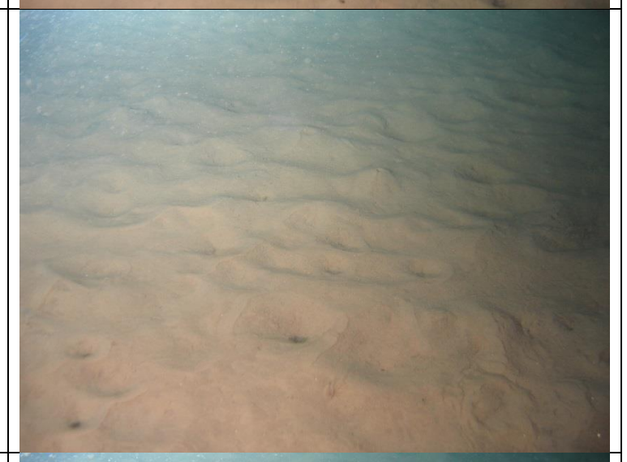
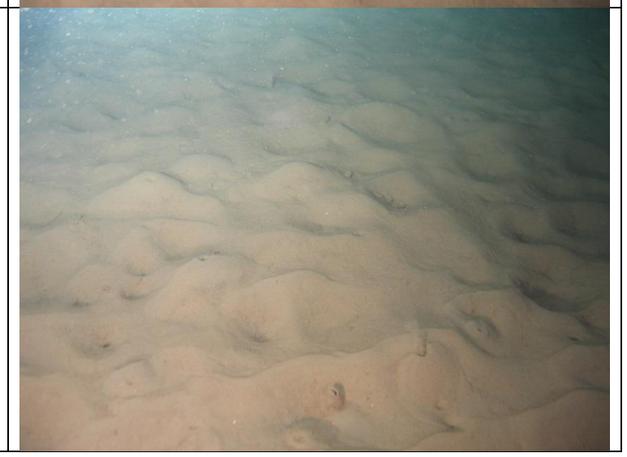
Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
7FTR49	Start End	603 955 604 084	6 097 264 6 097 357	Silty sand with shell fragments and burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychaete tubes *Echinocardium cordatum* *Buglossidium luteum* *Pagurus bernhardus* *Hydractinia echinata* *Astropecten irregularis* Hydroid/bryozoan turf *Corystes cassivelaunus* *Asterias rubens*	O C - A F F P F R F F	
8PTR01	Start End	601 527 601 659	6 095 595 6 095 503	Silty sand with shell fragments and burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychaete tubes *Buglossidium luteum* Hydroid/bryozoan turf *Limanda limanda* *Eutrigla gurnardus* *Corystes cassivelaunus* *Astropecten irregularis* *Echinocardium cordatum*	O F R F F F F F	
8PTR02	Start End	596 960 597 054	6 092 415 6 092 461	Silty sand with shell fragments and burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	*Astropecten irregularis* Pleuronectiformes *Corystes cassivelaunus* *Buglossidium luteum* *Luidia sarsi* Triglidae *Echinocardium cordatum*	F F F F F F F	

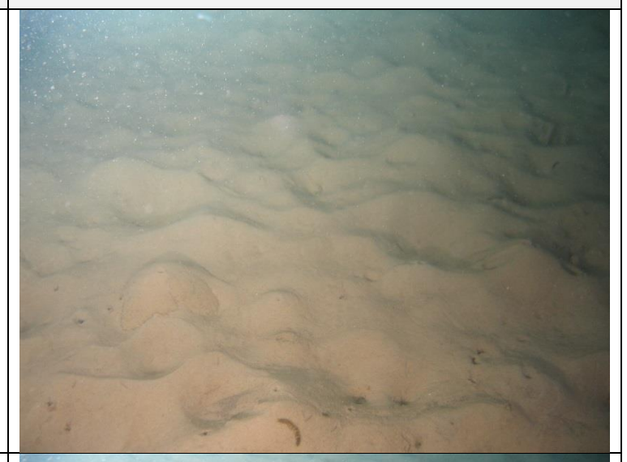
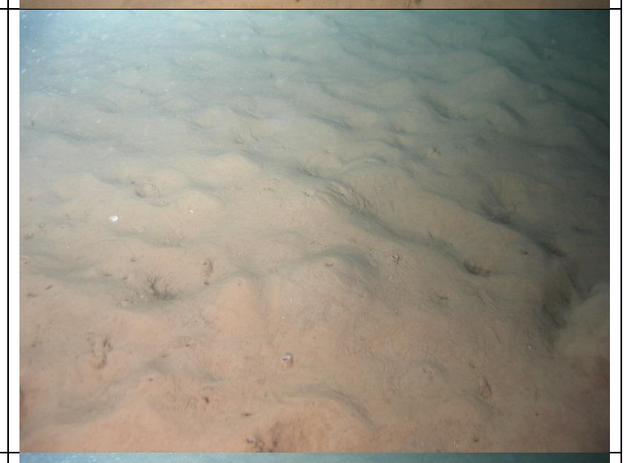
Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
8PTR03	Start End	591 574 591 658	6 088 350 6 088 436	Silty sand/sandy silt with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present. *Nephrops norvegicus* burrows. Piece of metal (pole) present.	*Luidia sarsi* *Astropecten irregularis* *Limanda limanda* *Corystes cassivelaunus* *Echinocardium cordatum* Polycheate tubes Paguridae *Merlangius merlangus*	O F F F A O O F	
8PTR04	Start End	587 440 587 525	6 085 061 6 084 990	Silty sand with burrows. *Nephrops norvegicus* burrows.	Paguridae *Merlangius merlangus* Hydroid/bryozoan turf Polychaete tubes *Echinocardium cordatum* *Pagurus bernhardus* Pleuronectiformes Gadidae *Hydractinia echinata*	F F R F C F F F P	
8PTR05	Start End	583 854 583 904	6 082 400 6 082 450	Silty sand with burrows. *Nephrops norvegicus* burrows.	*Astropecten irregularis* Paguridae Polychaete tubes *Liocarcinus* sp. *?Eutrigla gurnardus* *Nephrops norvegicus* *Pleuronectes platessa* Turitellidae	F F F F F C F O	

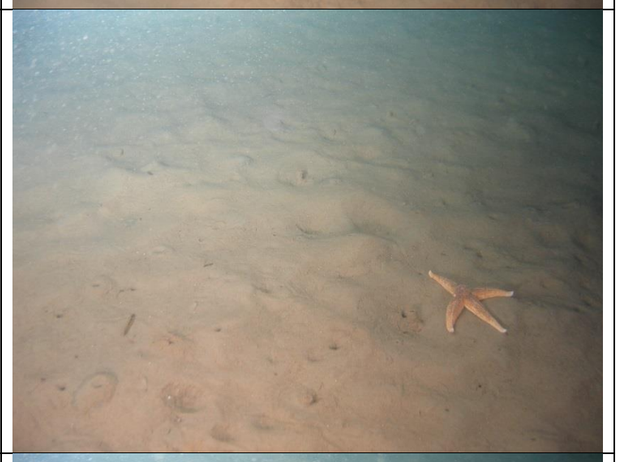
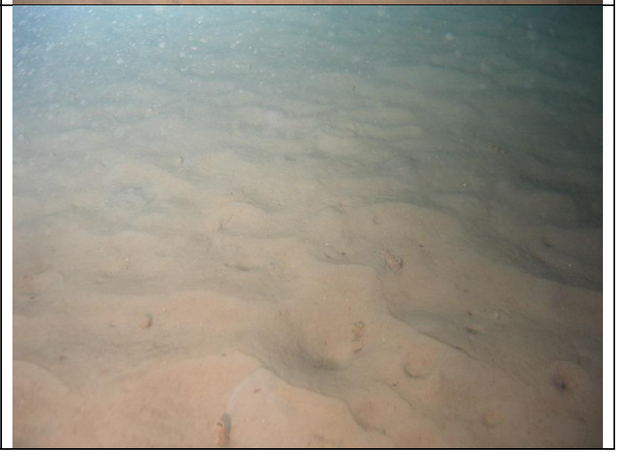
Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
8PTR06	Start End	581 411 581 390	6 080 322 6 080 242	Silty sand with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present. *Nephrops norvegicus* burrows.	*Nephrops norvegicus* Polychaete tubes ?*Merlangius merlangus* Triglidae *Aphrodita aculeata* Hydroid/bryozoan turf	C F F F F R	
8PTR07	Start End	575 558 575 682	6 076 026 6 075 915	Silty sand with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present. *Nephrops norvegicus* burrows.	Polychaete tubes *Bugglossidium luteum* *Merlangius merlangus* *Astropecten irregularis* *Nephrops norvegicus* Triglidae Paguridae *Corystes cassivelaunus* *Asterias rubens*	F F F F C F F F F	
8PTR08	Start End	572 018 572 110	6 073 274 6 073 200	Silty sand with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychaete tubes *Astropecten irregularis* Gadidae *Liocarcinus* sp. *Pagurus bernhardus* *Merlangius merlangus* *Luidia sarsi* *Asterias rubens* Ophiuridae *Brissposis lyrifera* (recorded from grab sample field records)	F F F F F F F F F P	

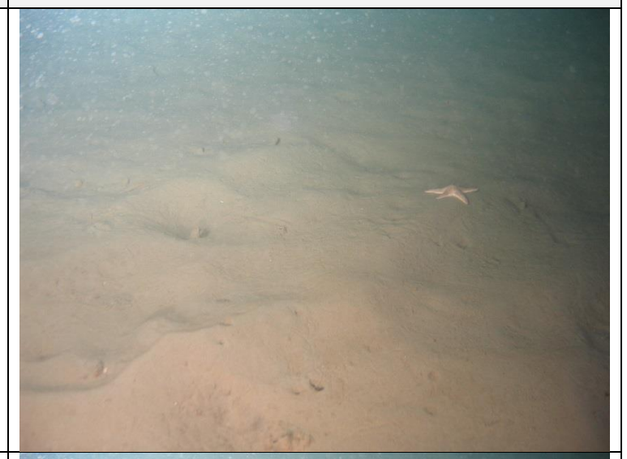
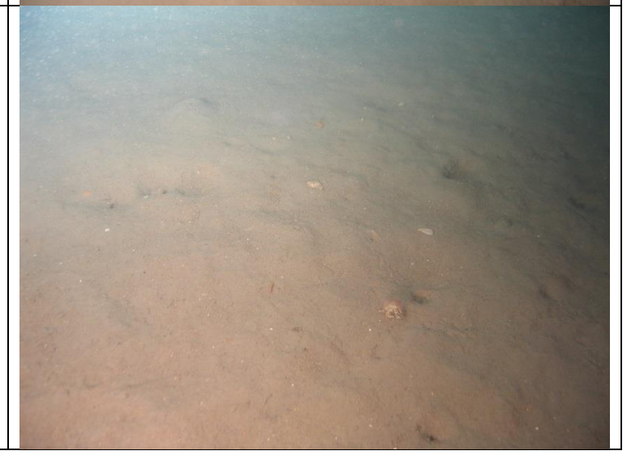
Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
8PTR09	Start End	566 626 566 746	6 069 144 6 069 031	Rippled silty sand with burrows. Spatangoida (*Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	*Limanda limanda* *Corystes cassivelaunus* Pleuronectiformes *Asterias rubens*	F F C F	
9PTR01	Start End	565 318 565 444	6 067 751 6 067 702	Rippled silty sand with burrows. Spatangoida (*Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	*Corystes cassivelaunus* *Astropecten irregularis* Gadidae *Luidia sarsi* *Asterias rubens* Pleuronectiformes Paguridae *Brissopsis lyrifera* (recorded from grab sample field records)	F F F F F F F P	
9PTR02	Start End	561 275 561 392	6 063 434 6 063 396	Rippled silty sand silt with burrows. Spatangoida (*Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	*Astropecten irregularis* *Buglossidium luteum* *Echinocardium cordatum* *Luidia sarsi* Pleuronectiformes *Corystes cassivelaunus* Paguridae *Asterias rubens* Hydroid/bryozoan turf Polychaete tubes	F F F F C F F F R F	

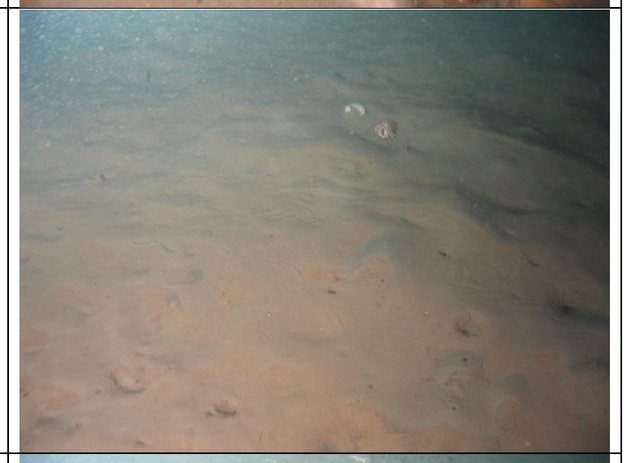
Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
9PTR03	Start End	557 628 557 754	6 060 270 6 060 226	Rippled silty sand with burrows. Spatangoida (*Echinocardium cordatum* or *Brissopsis lyrifera*) tests present. Empty large gastropod shell present colonised by sessile epifaunal species.	*Astropecten irregularis* *Buglossidium luteum* Polychaete tubes *Echinocardium cordatum* *Pagurus bernhardus* *Alcyonium digitatum* *Callionymus* sp. *Haliclona* sp. *Corystes cassivelaunus* *Pleuronectiformes*	F F O F F R F O C C	
9PTR04	Start End	553 823 553 949	6 056 940 6 056 896	Rippled silty sand with burrows.	Pleuronectiformes *Corystes cassivelaunus* *Astropecten irregularis* *Haliclona* sp. Polychaete tubes	F C F R O	
9PTR05	Start End	550 005 550 123	6 053 982 6 053 940	Rippled silty sand with burrows. Spatangoida (*Echinocardium cordatum* or *Brissopsis lyrifera*) tests present. Empty large gastropod shell present colonised by sessile epifaunal species.	Paguridae *Pagurus bernhardus* *Corystes cassivelaunus* *Haliclona* sp. Polychaete tubes *Astropecten irregularis* Pleuronectiformes *Hydractinia echinata* *Alcyonium digitatum* Hydroid/bryozoan meadow *Brissopsis lyrifera* (recorded from grab sample field records)	F F F R F F F P R R P	

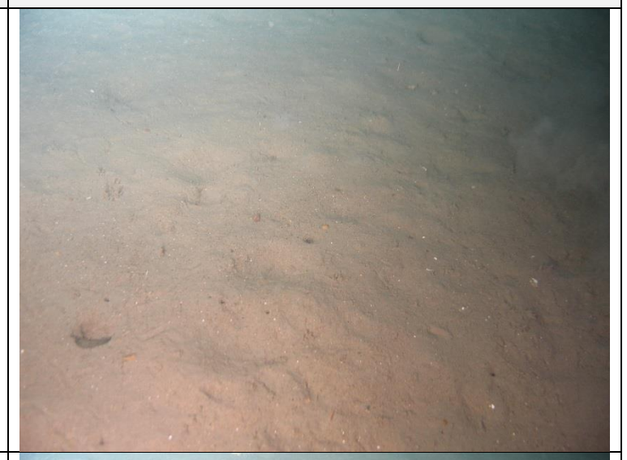
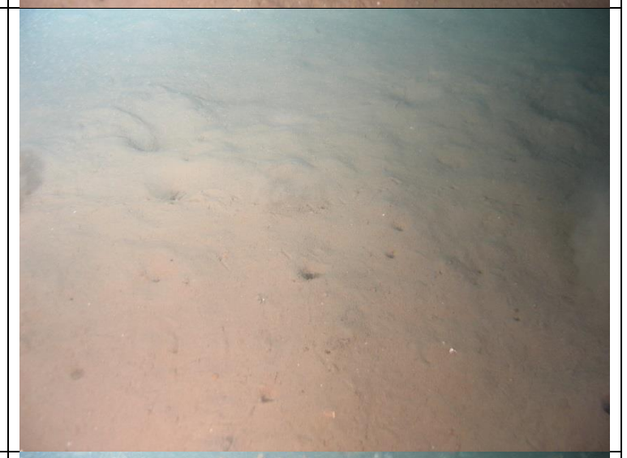
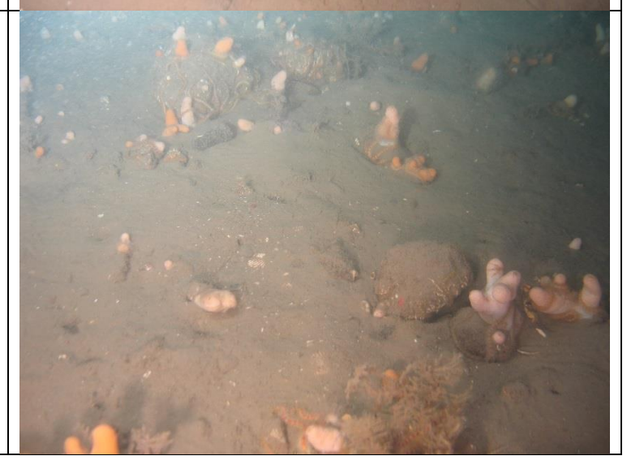
Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
9PTR06	Start End	546 731 546 816	6 050 962 6 050 932	Rippled silty sand with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	*Corystes cassivelaunus* Polychaete tubes *Asterias rubens* Necklace shells eggs	F F F P	
9PTR07	Start End	542 403 542 419	6 047 432 6 047 532	Rippled silty sand with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychaete tubes *Pagurus bernhardus* *Astropecten irregularis* *Haliclona* sp. *Corystes cassivelaunus* *Brissopsis lyrifera* (recorded from grab sample field records)	F F F O F P	
9PTR08	Start End	537 036 536 908	6 042 732 6 042 757	Rippled silty sand with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychaete tubes *Corystes cassivelaunus* Pagurdiae *Astropecten irregularis* *Aphrodita aculeata*	F F F F F	

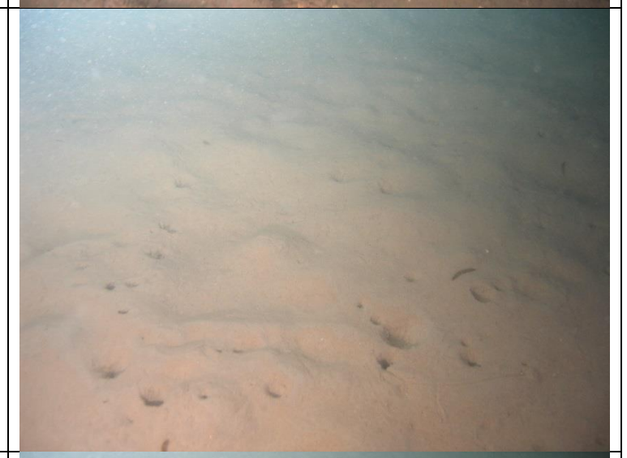
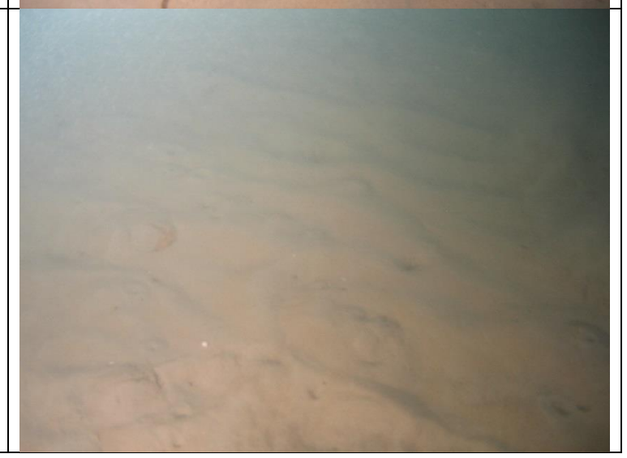
Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
9PTR09	Start End	533 966 534 074	6 040 305 6 040 308	Rippled silty sand with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychaete tubes *Haliclona* sp. *Astropecten irregularis* Paguridae Pleuronectiformes *Merlangius melangus* Gastropoda Polychaeta *Aphrodita aculeata* (recorded from grab sample field records)	F R F F F O O C P	
9PTR10	Start End	531 183 531 091	6 038 080 6 038 008	Rippled silty sand with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychaete tubes *Asterias rubens* Paguridae *Aphrodita aculeata* Ophiuridae	F F F F F	
9PTR11	Start End	528 972 529 115	6 036 159 6 036 154	Rippled silty sand with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Asteroidea Polychaete tubes *Luidia sarsi* *Astropecten irregularis* Paguridae *Corystes cassivelaunus*	F F F F F F	

Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
10PTR01	Start End	524 820 524 941	6 032 566 6 032 545	Rippled silty sand with burrows. Spatangoida (*Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychaete tubes Asterias rubens *Pagurus bernhardus* *Astropecten irregularis* *Corystes cassivelaunus* Polychaeta Ophiuridae *Hydractinia echinata* *Echinocardium cordatum* (recorded from grab sample field records)	F F F F F F F P P	
10PTR02	Start End	519 089 519 176	6 027 912 6 027 836	Rippled silty sand with burrows. Spatangoida (*Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	*Astropecten irregularis* Polychaete tubes *Pagurus bernhardus* *Hydractinia echinata* Polychaeta *Asterias rubens* *Luidia sarsi* *Corystes cassivelaunus* *Ophiura ophiura* Porifera on drift fucoid alagae *Pleuronectes platessa*	F F F F - C F F F R F R F	
10PTR03	Start End	516 074 516 191	6 025 613 6 025 655	Rippled silty sand with burrows. Spatangoida (*Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Poychaete tubes *Asterias rubens* *Astropecten irregularis* Paguridae *Corystes cassivelaunus* Gobidae Gadidae *Merlangius merlangus*	F -C F F F F O F F	

Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
10PTR04	Start End	509 568 509 658	6 021 666 6 021 581	Rippled silty sand with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present. Vehicle tyre present.	Polychaete tubes *Asterias rubens* *Astropecten irregularis* Hydroid/bryozoan turf Paguridae Polychaeta Ophiuridae *Echinocardium cordatum* (recorded from grab sample field records)	O F F R F F F P	
10PTR05	Start End	508 004 508 087	6 020 230 6 020 324	Rippled silty sand with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychaete tubes Polychaete *Astropecten irregularis* *Corystes cassivelaunus* *Asterias rubens* Gadidae Ophiuridae Pleuronectoformes *Brissopsis lyrifera* (recorded from grab sample field records)	F – C F F F F O F F P	
10PTR06	Start End	506 695 506 719	6 019 145 6 019 185	Slightly gravelly silty sand with burrows. Occasional pebbles and small cobbles. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychaete tubes *Alcyonium digitatum* Paguridae *Urticina felina* *Ophiothrix fragilis* *Asterias rubens* *Pagurus bernhardus* *Hydractinia echinata* *Limanda limanda* Turitellidae	O - F O C F F F F P F O	

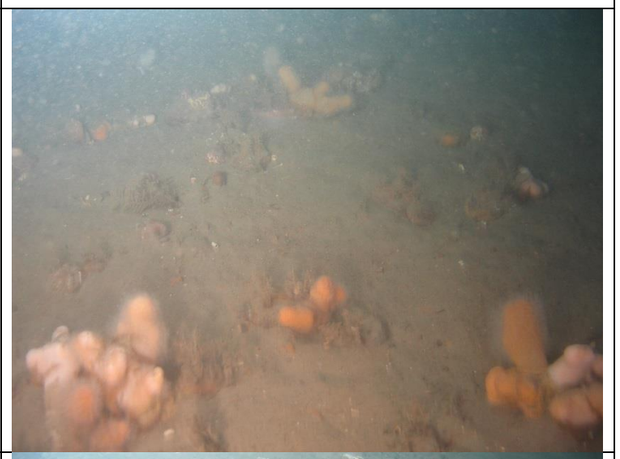
Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
10PTR06	Start End	506 719 502 773	6 019 185 6 019 301	Silty gravelly sand with pebbles and cobbles Piece of plastic sheet.	*Alcyonium digitatum* Hydroid/bryozoan turf *Ophiothrix fragilis* Porifera Pleuronectiformes *Alcyonidium diaphanum* Paguridae Holothurian *Callionymus* sp. Ophiuridae *Spirobranchus* sp. Hydroid/bryozoan meadow Bryozoan crusts *Sabella* sp. *Abietinaria abietina* *Pagurus bernhardus* *Hydractinia echinata*	C O C - A R F O F - C O F F F O R O R F P	
10PTR07	Start End	502 635 502 757	6 016 187 6 016 231	Sandy silt with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychate tubes Paguridae *Maja brachydactyla* *Astropecten irregularis* *Pagurus bernhardus* *Aphrodita aculeata* Actinaria *Echinocardium cordatum* (recorded from grab sample field records)	F F F F F F O P	
10PTR08	Start End	501 201 501 218	6 014 697 6 014 778	Silty gravelly sand with pebbles and cobbles and occasional boulders. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	*Alcyonium digitatum* *Ophiothrix fragilis* *Spirobranchus* sp. Hydroid/bryozoan turf *Asterias rubens* Pleuronectiformes Paguridae *Urticina felina* *Callionymus* sp. Polychaete *Astropecten irregularis* *Limanda limanda* *Abietina abietina* *?Psammechinus miliaris* *Ophiura ophiura*	C - A C – A F R F F F F F F F F R F F	

Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
10PTR08	Start End	501 218 501 234	6 014 778 6 014 859	Rippled gravelly silty sand.	*Asterias rubens* Hydroid/bryozoan turf Polychaete Pleuronectiformes Paguridae *Astropecten irregularis* *Buccinum undatum*	F F – C O F F F F	
10PTR09	Start End and Start End	499 167 499 218 and 499 253 499 271	6 013 474 6 013 499 and 6 013 517 6 013 525	Rippled silty sand with burrows, and small proportion of gravel. Spatangoida (*Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	*Alcyonium digitatum* *Astropecten irregularis* Paguridae *Callionymus* sp. ?*Euspira catina* *Asterias rubens* Caridea Pleuronectiformes Ophiuridae *Pagurus bernhardus* *Spirobranchus* sp.	R F F F O F O F F F F	
10PTR09	Start End	499 218 499 253	6 013 499 6 013 517	Gravelly sandy silt with pebbles and small cobbles.	*Urticina felina* Ascidiacea *Ophiothrix fragilis* Hydroid/bryozoan turf *Alyconium digitatum* *Pagurus bernhardus* *Asterias rubens* Gastropod eggs *Spirobranchus* sp. *Cancer pagurus*	F O A F F-C F F P C F	

Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
10PTR09	Start End	499 271 499 327	6 013 525 6 013 552	Small area of mixed coarse sediment. Silty sandy coarse gravel and pebbles with occasional cobbles. A thin veneer of sand covered some of the low lying coarse sediments.	*Alcyonium digitatum* *Ophiothrix fragilis* Hydroid/bryozoan turf *Spirobranchus* sp. Galathidae *Cancer pagurus* *Asterias rubens* *Urticina felina* Ophiuridae *Ophiura albida* Hydroid/bryozoan meadow Bryozoan crusts	R A - C C F F F F F A - S A - S R O	
10PTR10	Start End	497 184 497 293	6 012 408 6 012 441	Rippled sandy silt with burrows. Spatangoida (*Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Asteroidea Rajidae ?*Merlangius merlangus* *Astropecten irregularis* Paguridae Polychaete *Asterias rubens* *Pagurus bernhardus* *Flustra foliacea* (possibly drift) *Echinocardium cordatum* (recorded from grab sample field records)	F F F F F F F F P P	
10PTR11	Start End	495 464 495 409	6 011 263 6 011 368	Rippled sandy silt with burrows. Spatangoida (*Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	*Pagurus bernhardus* *Echinocardium cordatum* (recorded from grab sample field records)	F P	

Station	Geodetic Datum: ETRS89 UTM Zone 31N			Video Analysis			Representative Underwater Photograph
	Position On Line	Easting [m]	Northing [m]	Sediment Description [Wentworth, 1922]	Conspicuous Species	Estimated Abundance [SACFOR]	
10PTR12	Start End	489 532 489 455	6 008 931 6 009 017	Rippled sandy silt with burrows. Spatangoida *(Echinocardium cordatum* or *Brissopsis lyrifera*) tests present.	Polychaete tubes *Asterias rubens* *Pagurus bernhardus* Polychaete Pleuronectiofrmes *Astropecten irregularis* Paguridae *Echinocardium cordatum* and *Brissopsis lyrifera* (recorded from grab sample field records)	F F F F F F F P	

C.2 COBBLE REEF ASSESSMENT

Station	Geogenic Classification				Substrate Description and Associated Species	Representative Photo
	% Cobbles and or boulders	Elevation	% Epibiota Cover	Overall Geogenic Reef Classification		
10PTR06	< 10 %	< 64 mm	30 – 40 %	**NOT REEF**	**Substrate:** Relatively low relief seabed of silty gravelly sand with pebbles and cobbles. **Cobble/boulder component:** Cobbles were embedded within sediment or low lying on the sediment. **Epibiota community:** Mixed faunal turf covering the hard substrate. **Typical species:** *Alcyonium digitatum* *Ophiothrix fragilis* Bryozoan crusts *Spirobranchus* sp. Hydroid/bryozoan turf species	
10PTR08	< 10 %	< 64 mm	30 – 40 %	**NOT REEF**	**Substrate:** Relatively low relief seabed of silty gravelly sand with pebbles, cobbles and occasional boulders. **Cobble/boulder component:** Cobbles were embedded within sediment or low lying on the sediment. Boulders where present were embedded within the sediment and low lying. **Epibiota community:** Mixed faunal turf on the hard substrate. **Typical species:** *Alcyonium digitatum* *Ophiothrix fragilis* *Spirobranchus* sp. Hydroid/bryozoan turf species	
10PTR09	< 10 %	< 64 mm	20 – 40 %	**NOT REEF**	**Substrate:** Relatively low relief seabed of silty gravelly sand with pebbles and cobbles. A small area along the transect comprised silty sandy coarse gravel with pebbles and occasional cobbles. A thin veneer of sand covered some of the coarse sediment within this area. **Cobble/boulder component:** Cobbles were embedded within sediment or low lying on the sediment. **Epibiota community:** Mixed faunal turf on the hard substrate. **Typical species:** *Alcyonium digitatum* *Ophiothrix fragilis* *Spirobranchus* sp. Hydroid/bryozoan turf species	

D. PSD ANALYSIS RESULTS

D.1 PSD ANALYSIS RESULTS

Particle Size Distribution by Dry Sieving (63,000 – 1,000 µm) and Laser Diffraction (<1,000 - < 3.91 µm) @ 1 Phi Intervals

	Station	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04
	Laboratory Registration No.	WL032130	WL032131	WL032132	WL032133	WL032134	WL032135	WL032136	WL032137
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Moderately Sorted	Unimodal, Moderately Sorted	Unimodal, Moderately Well Sorted	Unimodal, Moderately Sorted	Unimodal, Moderately Well Sorted	Unimodal, Moderately Well Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted
	FOLK [1954 ORIGINAL]:	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Muddy Sand	Muddy Sand
	FOLK [BGS MODIFIED]:	Sand	Sand	Sand	Sand	Sand	Sand	Muddy Sand	Muddy Sand
	SEDIMENT NAME:	Slightly Fine Gravelly Fine Sand	Slightly Very Fine Gravelly Fine Sand	Slightly Very Fine Gravelly Fine Sand	Slightly Very Fine Gravelly Fine Sand	Slightly Fine Gravelly Fine Sand	Slightly Very Fine Gravelly Fine Sand	Slightly Very Fine Gravelly Medium Silty Very Fine Sand	Very Coarse Silty Very Fine Sand
METHOD OF MOMENTS Arithmetic [µm]	MEAN:	182.32	183.74	178.62	177.54	190.12	183.48	129.29	96.91
	SORTING:	161.91	98.31	125.53	82.67	126.13	89.21	121.75	55.39
	SKEWNESS:	24.69	6.32	25.01	4.12	28.53	5.71	15.08	1.92
	KURTOSIS:	857.08	160.98	1066.30	108.06	1279.80	135.67	351.84	43.88
METHOD OF MOMENTS Geometric [µm]	MEAN:	135.04	139.49	139.82	134.06	156.92	147.78	78.85	62.73
	SORTING:	2.68	2.57	2.35	2.73	2.02	2.18	3.87	3.57
	SKEWNESS:	-3.59	-3.74	-4.04	-3.79	-5.02	-4.35	-2.40	-2.52
	KURTOSIS:	18.70	20.26	23.95	19.04	38.36	28.84	8.61	9.11
METHOD OF MOMENTS Logarithmic [Phi]	MEAN:	2.89	2.84	2.84	2.90	2.67	2.76	3.66	3.99
	SORTING:	1.42	1.36	1.23	1.45	1.01	1.12	1.95	1.84
	SKEWNESS:	3.59	3.74	4.04	3.79	5.02	4.35	2.40	2.52
	KURTOSIS:	18.70	20.26	23.95	19.04	38.36	28.84	8.61	9.11
FOLK AND WARD METHOD [µm]	MEAN:	152.01	154.20	153.27	155.84	166.09	156.90	111.54	79.33
	SORTING:	1.93	1.86	1.58	1.88	1.53	1.60	2.47	2.50
	SKEWNESS:	-0.34	-0.29	-0.20	-0.37	-0.09	-0.14	-0.31	-0.38
	KURTOSIS:	2.16	1.92	1.31	2.34	1.36	1.33	1.98	2.71
FOLK AND WARD METHOD [Phi]	MEAN:	2.72	2.70	2.71	2.68	2.59	2.67	3.16	3.66
	SORTING:	0.95	0.90	0.66	0.91	0.61	0.68	1.30	1.32
	SKEWNESS:	0.34	0.29	0.20	0.37	0.09	0.14	0.31	0.38
	KURTOSIS:	2.16	1.92	1.31	2.34	1.36	1.33	1.98	2.71
FOLK AND WARD METHOD [Description]	MEAN:	Fine Sand	Fine Sand	Fine Sand	Fine Sand	Fine Sand	Fine Sand	Very Fine Sand	Very Fine Sand
	SORTING:	Moderately Sorted	Moderately Sorted	Moderately Well Sorted	Moderately Sorted	Moderately Well Sorted	Moderately Well Sorted	Poorly Sorted	Poorly Sorted
	SKEWNESS:	Very Fine Skewed	Fine Skewed	Fine Skewed	Very Fine Skewed	Symmetrical	Fine Skewed	Very Fine Skewed	Very Fine Skewed
	KURTOSIS:	Very Leptokurtic	Very Leptokurtic	Leptokurtic	Very Leptokurtic	Leptokurtic	Leptokurtic	Very Leptokurtic	Very Leptokurtic

Station	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04
Laboratory Registration No.	WL032130	WL032131	WL032132	WL032133	WL032134	WL032135	WL032136	WL032137
MODE 1 [µm]:	187.50	187.50	187.50	187.50	187.50	187.50	93.75	93.75
MODE 2 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODE 3 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODE 1 [Phi]:	2.50	2.50	2.50	2.50	2.50	2.50	3.50	3.50
MODE 2 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODE 3 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D10 [µm]:	73.10	74.60	76.67	74.80	88.61	79.97	12.87	12.37
D50 [µm]:	163.81	165.34	163.51	165.70	170.09	165.79	111.38	86.74
D90 [µm]:	250.25	279.59	243.69	244.30	254.48	250.03	219.23	175.79
(D90 / D10) [µm]:	3.42	3.75	3.18	3.27	2.87	3.13	17.03	14.21
(D90 - D10) [µm]:	177.14	204.99	167.02	169.49	165.87	170.06	206.35	163.42
(D75 / D25) [µm]:	1.70	1.72	1.65	1.62	1.62	1.67	2.32	1.83
(D75 - D25) [µm]:	87.61	90.86	82.40	81.20	83.23	86.06	96.81	53.01
D10 [Phi]:	2.00	1.84	2.04	2.03	1.97	2.00	2.19	2.51
D50 [Phi]:	2.61	2.60	2.61	2.59	2.56	2.59	3.17	3.53
D90 [Phi]:	3.77	3.74	3.71	3.74	3.50	3.64	6.28	6.34
(D90 / D10) [Phi]:	1.89	2.04	1.82	1.84	1.77	1.82	2.87	2.53
(D90 - D10) [Phi]:	1.78	1.91	1.67	1.71	1.52	1.64	4.09	3.83
(D75 / D25) [Phi]:	1.34	1.36	1.32	1.31	1.32	1.33	1.48	1.28
(D75 - D25) [Phi]:	0.76	0.78	0.72	0.70	0.70	0.74	1.22	0.87
% GRAVEL [63000 - 2000 µm]:	0.07	0.02	0.04	0.01	0.04	0.01	0.11	0.00
% SAND [< 2000 - 63 µm]:	94.14	94.86	95.42	93.83	98.30	96.88	84.28	77.22
% MUD [< 63 µm]:	5.78	5.12	4.53	6.17	1.66	3.10	15.61	22.78
% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% MEDIUM GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% FINE GRAVEL:	0.05	0.00	0.02	0.00	0.03	0.00	0.00	0.00
% V FINE GRAVEL:	0.02	0.02	0.02	0.01	0.01	0.01	0.11	0.00
% V COARSE SAND:	0.03	0.03	0.06	0.03	0.02	0.06	0.01	0.01
% COARSE SAND:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% MEDIUM SAND:	9.91	11.87	7.33	7.58	10.21	9.94	2.13	0.02
% FINE SAND:	65.56	63.84	69.48	71.42	71.52	67.50	40.88	19.63
% V FINE SAND:	18.64	19.12	18.55	14.79	16.55	19.39	41.26	57.57
% V COARSE SILT:	0.00	0.00	0.00	0.03	0.00	0.00	2.76	10.81
% COARSE SILT:	1.55	1.44	1.47	1.77	0.00	0.91	1.93	0.72
% MEDIUM SILT:	1.06	0.88	0.77	0.94	0.04	0.37	3.25	3.72
% FINE SILT:	1.34	1.12	1.00	1.34	0.74	0.79	2.82	2.56
% V FINE SILT:	0.35	0.32	0.24	0.39	0.17	0.20	0.91	0.94
% CLAY:	1.49	1.36	1.05	1.69	0.72	0.84	3.92	4.03

	Station	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03
	Laboratory Registration No.	WL032138	WL032139	WL032140	WL032141	WL032142	WL032143	WL032144	WL032145
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Moderately Sorted
	FOLK [1954 ORIGINAL]:	Slightly Gravelly Muddy Sand	Slightly Gravelly Muddy Sand	Muddy Sand	Muddy Sand	Slightly Gravelly Muddy Sand	Slightly Gravelly Muddy Sand	Slightly Gravelly Muddy Sand	Slightly Gravelly Sand
	FOLK [BGS MODIFIED]:	Muddy Sand	Muddy Sand	Muddy Sand	Muddy Sand	Muddy Sand	Muddy Sand	Muddy Sand	Sand
	SEDIMENT NAME:	Slightly Very Fine Gravelly Very Coarse Silty Very Fine Sand	Slightly Fine Gravelly Very Coarse Silty Very Fine Sand	Very Coarse Silty Very Fine Sand	Very Coarse Silty Very Fine Sand	Slightly Very Fine Gravelly Very Coarse Silty Very Fine Sand	Slightly Very Fine Gravelly Very Coarse Silty Very Fine Sand	Slightly Very Fine Gravelly Very Coarse Silty Very Fine Sand	Slightly Very Fine Gravelly Very Fine Sand
METHOD OF MOMENTS Arithmetic [µm]	MEAN:	89.38	98.69	90.78	90.08	108.43	103.47	108.52	110.87
	SORTING:	57.41	209.72	52.28	50.66	70.70	68.70	75.31	81.11
	SKEWNESS:	13.04	26.42	3.82	0.88	3.93	14.57	19.40	21.44
	KURTOSIS:	637.77	742.25	98.39	19.02	132.18	568.91	729.22	750.45
METHOD OF MOMENTS Geometric [µm]	MEAN:	56.39	61.29	59.05	56.44	66.14	68.36	76.96	80.77
	SORTING:	3.74	3.45	3.55	3.80	3.87	3.49	3.01	2.86
	SKEWNESS:	-2.39	-2.52	-2.51	-2.35	-2.29	-2.70	-3.11	-3.37
	KURTOSIS:	8.16	9.67	8.94	7.94	7.94	10.09	13.39	15.38
METHOD OF MOMENTS Logarithmic [Phi]	MEAN:	4.15	4.03	4.08	4.15	3.92	3.87	3.70	3.63
	SORTING:	1.90	1.78	1.83	1.93	1.95	1.80	1.59	1.52
	SKEWNESS:	2.39	2.52	2.51	2.35	2.29	2.70	3.11	3.37
	KURTOSIS:	8.16	9.67	8.94	7.94	7.94	10.09	13.39	15.38
FOLK AND WARD METHOD [µm]	MEAN:	71.20	75.06	73.35	71.11	85.49	92.45	98.96	100.63
	SORTING:	2.61	2.35	2.41	2.66	2.76	2.33	2.08	2.00
	SKEWNESS:	-0.49	-0.44	-0.46	-0.50	-0.37	-0.26	-0.17	-0.15
	KURTOSIS:	3.17	2.87	2.94	3.22	2.31	2.82	2.46	2.47
FOLK AND WARD METHOD [Phi]	MEAN:	3.81	3.74	3.77	3.81	3.55	3.44	3.34	3.31
	SORTING:	1.38	1.23	1.27	1.41	1.47	1.22	1.05	1.00
	SKEWNESS:	0.49	0.44	0.46	0.50	0.37	0.26	0.17	0.15
	KURTOSIS:	3.17	2.87	2.94	3.22	2.31	2.82	2.46	2.47
FOLK AND WARD METHOD [Description]	MEAN:	Very Fine Sand	Very Fine Sand	Very Fine Sand	Very Fine Sand	Very Fine Sand	Very Fine Sand	Very Fine Sand	Very Fine Sand
	SORTING:	Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted	Moderately Sorted
	SKEWNESS:	Very Fine Skewed	Very Fine Skewed	Very Fine Skewed	Very Fine Skewed	Very Fine Skewed	Fine Skewed	Fine Skewed	Fine Skewed
	KURTOSIS:	Extremely Leptokurtic	Very Leptokurtic	Very Leptokurtic	Extremely Leptokurtic	Very Leptokurtic	Very Leptokurtic	Very Leptokurtic	Very Leptokurtic

Station	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03
Laboratory Registration No.	WL032138	WL032139	WL032140	WL032141	WL032142	WL032143	WL032144	WL032145
MODE 1 [µm]:	93.75	93.75	93.75	93.75	93.75	93.75	93.75	93.75
MODE 2 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODE 3 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODE 1 [Phi]:	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
MODE 2 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODE 3 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D10 [µm]:	9.54	12.87	11.02	9.20	10.40	15.26	40.34	62.98
D50 [µm]:	82.88	84.23	83.86	83.65	92.96	91.31	94.23	95.67
D90 [µm]:	148.15	152.42	150.09	152.82	201.94	184.03	188.72	188.41
(D90 / D10) [µm]:	15.53	11.84	13.62	16.60	19.42	12.06	4.68	2.99
(D90 - D10) [µm]:	138.61	139.55	139.07	143.62	191.54	168.77	148.38	125.44
(D75 / D25) [µm]:	1.75	1.73	1.73	1.75	2.12	1.77	1.74	1.69
(D75 - D25) [µm]:	46.93	46.70	46.53	47.39	73.16	52.95	53.01	50.58
D10 [Phi]:	2.75	2.71	2.74	2.71	2.31	2.44	2.41	2.41
D50 [Phi]:	3.59	3.57	3.58	3.58	3.43	3.45	3.41	3.39
D90 [Phi]:	6.71	6.28	6.50	6.76	6.59	6.03	4.63	3.99
(D90 / D10) [Phi]:	2.44	2.31	2.38	2.50	2.85	2.47	1.93	1.66
(D90 - D10) [Phi]:	3.96	3.57	3.77	4.05	4.28	3.59	2.23	1.58
(D75 / D25) [Phi]:	1.25	1.25	1.25	1.25	1.38	1.27	1.27	1.25
(D75 - D25) [Phi]:	0.81	0.79	0.79	0.81	1.08	0.83	0.80	0.75
% GRAVEL [63000 - 2000 µm]:	0.01	0.12	0.00	0.00	0.00	0.02	0.03	0.05
% SAND [< 2000 - 63 µm]:	75.24	77.13	76.83	76.06	78.08	83.12	86.92	90.68
% MUD [< 63 µm]:	24.75	22.75	23.17	23.94	21.92	16.86	13.04	9.27
% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% MEDIUM GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% FINE GRAVEL:	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00
% V FINE GRAVEL:	0.01	0.00	0.00	0.00	0.00	0.02	0.03	0.05
% V COARSE SAND:	0.00	0.02	0.02	0.00	0.00	0.02	0.01	0.01
% COARSE SAND:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% MEDIUM SAND:	0.00	0.00	0.00	0.00	1.51	0.01	0.02	0.00
% FINE SAND:	13.23	13.81	13.56	14.08	27.54	22.50	24.50	24.36
% V FINE SAND:	62.01	63.30	63.25	61.98	49.02	60.58	62.40	66.31
% V COARSE SILT:	10.96	11.15	10.35	9.55	8.56	6.00	4.82	1.88
% COARSE SILT:	0.74	0.51	0.71	0.97	1.03	0.75	0.58	0.68
% MEDIUM SILT:	4.29	3.88	4.20	4.48	3.96	3.16	2.63	2.31
% FINE SILT:	3.11	2.50	2.88	3.18	3.13	2.19	1.57	1.26
% V FINE SILT:	1.07	0.89	0.95	1.09	0.99	0.90	0.65	0.59
% CLAY:	4.58	3.81	4.08	4.67	4.24	3.86	2.79	2.55

	Station	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11
	Laboratory Registration No.	WL032146	WL032147	WL032148	WL032149	WL032150	WL032151	WL032152	WL032153
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Moderately Well Sorted	Unimodal, Moderately Sorted	Unimodal, Moderately Sorted	Unimodal, Moderately Sorted	Unimodal, Moderately Sorted	Unimodal, Poorly Sorted	Unimodal, Moderately Sorted	Unimodal, Moderately Sorted
	FOLK [1954 ORIGINAL]:	Sand	Slightly Gravelly Sand	Sand	Slightly Gravelly Sand	Slightly Gravelly Sand	Slightly Gravelly Muddy Sand	Sand	Sand
	FOLK [BGS MODIFIED]:	Sand	Sand	Sand	Sand	Sand	Muddy Sand	Sand	Sand
	SEDIMENT NAME:	Moderately Well Sorted Very Fine Sand	Slightly Very Fine Gravelly Very Fine Sand	Moderately Sorted Very Fine Sand	Slightly Very Fine Gravelly Fine Sand	Slightly Very Fine Gravelly Very Fine Sand	Slightly Very Fine Gravelly Very Coarse Silty Fine Sand	Moderately Sorted Fine Sand	Moderately Sorted Very Fine Sand
METHOD OF MOMENTS Arithmetic [µm]	MEAN:	123.90	126.47	131.94	137.22	133.71	144.08	157.86	120.22
	SORTING:	46.26	64.78	59.13	65.73	64.49	93.38	93.18	54.13
	SKEWNESS:	0.67	14.18	2.05	4.67	5.90	4.27	1.55	0.10
	KURTOSIS:	2.12	613.83	51.59	187.85	236.95	107.45	8.69	2.66
METHOD OF MOMENTS Geometric [µm]	MEAN:	109.33	99.21	100.89	103.90	103.59	92.53	115.79	90.58
	SORTING:	1.43	2.38	2.58	2.63	2.44	3.60	2.62	2.66
	SKEWNESS:	0.24	-3.98	-3.75	-3.67	-3.82	-2.64	-3.22	-3.54
	KURTOSIS:	2.33	22.40	19.30	18.72	21.03	10.25	17.18	17.28
METHOD OF MOMENTS Logarithmic [Phi]	MEAN:	3.19	3.33	3.31	3.27	3.27	3.43	3.11	3.46
	SORTING:	0.52	1.25	1.37	1.40	1.29	1.85	1.39	1.41
	SKEWNESS:	-0.24	3.98	3.75	3.67	3.82	2.64	3.22	3.54
	KURTOSIS:	2.33	22.40	19.30	18.72	21.03	10.25	17.18	17.28
FOLK AND WARD METHOD [µm]	MEAN:	110.58	113.44	118.13	121.54	118.33	121.19	129.87	109.13
	SORTING:	1.52	1.66	1.88	1.89	1.72	2.48	1.90	1.98
	SKEWNESS:	0.21	-0.01	-0.21	-0.25	-0.11	-0.30	-0.12	-0.15
	KURTOSIS:	0.82	1.04	1.39	1.36	1.06	1.93	1.17	1.75
FOLK AND WARD METHOD [Phi]	MEAN:	3.18	3.14	3.08	3.04	3.08	3.04	2.94	3.20
	SORTING:	0.60	0.73	0.91	0.92	0.78	1.31	0.93	0.99
	SKEWNESS:	-0.21	0.01	0.21	0.25	0.11	0.30	0.12	0.15
	KURTOSIS:	0.82	1.04	1.39	1.36	1.06	1.93	1.17	1.75
FOLK AND WARD METHOD [Description]	MEAN:	Very Fine Sand	Very Fine Sand	Very Fine Sand	Very Fine Sand	Very Fine Sand	Very Fine Sand	Fine Sand	Very Fine Sand
	SORTING:	Moderately Well Sorted	Moderately Sorted	Moderately Sorted	Moderately Sorted	Moderately Sorted	Poorly Sorted	Moderately Sorted	Moderately Sorted
	SKEWNESS:	Coarse Skewed	Symmetrical	Fine Skewed	Fine Skewed	Fine Skewed	Fine Skewed	Fine Skewed	Fine Skewed
	KURTOSIS:	Platykurtic	Mesokurtic	Leptokurtic	Leptokurtic	Mesokurtic	Very Leptokurtic	Leptokurtic	Very Leptokurtic

Station	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11
Laboratory Registration No.	WL032146	WL032147	WL032148	WL032149	WL032150	WL032151	WL032152	WL032153
MODE 1 [µm]:	93.75	93.75	93.75	187.50	93.75	187.50	187.50	93.75
MODE 2 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODE 3 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODE 1 [Phi]:	3.50	3.50	3.50	2.50	3.50	2.50	2.50	3.50
MODE 2 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MODE 3 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D10 [µm]:	67.58	66.19	65.99	66.02	65.94	33.10	65.60	64.06
D50 [µm]:	104.39	108.83	116.80	122.65	116.58	123.29	132.70	103.84
D90 [µm]:	203.39	209.37	215.34	220.62	217.51	238.41	248.41	204.99
(D90 / D10) [µm]:	3.01	3.16	3.26	3.34	3.30	7.20	3.79	3.20
(D90 - D10) [µm]:	135.81	143.17	149.35	154.60	151.56	205.31	182.81	140.93
(D75 / D25) [µm]:	1.87	2.01	2.09	2.13	2.10	2.37	2.29	1.98
(D75 - D25) [µm]:	69.38	80.36	89.10	93.81	90.01	107.66	110.66	74.91
D10 [Phi]:	2.30	2.26	2.22	2.18	2.20	2.07	2.01	2.29
D50 [Phi]:	3.26	3.20	3.10	3.03	3.10	3.02	2.91	3.27
D90 [Phi]:	3.89	3.92	3.92	3.92	3.92	4.92	3.93	3.96
(D90 / D10) [Phi]:	1.69	1.74	1.77	1.80	1.78	2.38	1.96	1.73
(D90 - D10) [Phi]:	1.59	1.66	1.71	1.74	1.72	2.85	1.92	1.68
(D75 / D25) [Phi]:	1.33	1.38	1.42	1.44	1.42	1.51	1.51	1.36
(D75 - D25) [Phi]:	0.90	1.01	1.06	1.09	1.07	1.24	1.20	0.98
% GRAVEL [63000 - 2000 µm]:	0.00	0.02	0.00	0.00	0.01	0.01	0.00	0.00
% SAND [< 2000 - 63 µm]:	97.18	94.60	93.81	93.53	93.76	87.71	92.72	92.05
% MUD [< 63 µm]:	2.82	5.38	6.19	6.46	6.24	12.28	7.28	7.95
% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% MEDIUM GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% FINE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% V FINE GRAVEL:	0.00	0.02	0.00	0.00	0.01	0.01	0.00	0.00
% V COARSE SAND:	0.00	0.01	0.02	0.00	0.01	0.01	0.00	0.00
% COARSE SAND:	0.00	0.00	0.00	0.00	0.00	0.01	0.24	0.00
% MEDIUM SAND:	0.07	0.06	0.31	1.46	1.16	7.09	9.35	0.11
% FINE SAND:	33.36	38.77	44.92	47.31	43.93	42.12	44.22	34.53
% V FINE SAND:	63.75	55.77	48.56	44.76	48.66	38.49	38.91	57.41
% V COARSE SILT:	2.82	0.57	0.58	0.86	1.46	2.48	2.46	1.48
% COARSE SILT:	0.00	0.74	0.88	0.88	0.66	1.13	0.59	0.77
% MEDIUM SILT:	0.00	1.56	1.57	1.51	1.54	2.43	1.50	2.09
% FINE SILT:	0.00	0.74	0.99	1.00	0.77	2.15	0.94	1.24
% V FINE SILT:	0.00	0.33	0.41	0.42	0.34	0.77	0.34	0.45
% CLAY:	0.00	1.43	1.76	1.79	1.47	3.31	1.45	1.93

	Station	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08
	Laboratory Registration No.	WL032154	WL032155	WL032156	WL032157	WL032158	WL032159	WL032160	WL032161
TEXTURAL GROUP	SAMPLE TYPE:	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Poorly Sorted	Bimodal, Very Poorly Sorted	Unimodal, Poorly Sorted	Polymodal, Extremely Poorly Sorted
	FOLK [1954 ORIGINAL]:	Slightly Gravelly Sand	Slightly Gravelly Sand	Sand	Slightly Gravelly Muddy Sand	Slightly Gravelly Muddy Sand	Muddy Sandy Gravel	Muddy Sand	Muddy Sandy Gravel
	FOLK [BGS MODIFIED]:	Sand	Sand	Sand	Muddy Sand	Muddy Sand	Muddy Sandy Gravel	Muddy Sand	Muddy Sandy Gravel
	SEDIMENT NAME:	Slightly Fine Gravelly Very Fine Sand	Slightly Very Fine Gravelly Fine Sand	Poorly Sorted Very Fine Sand	Slightly Very Fine Gravelly Medium Silty Very Fine Sand	Slightly Fine Gravelly Medium Silty Very Fine Sand	Fine Silty Sandy Coarse Gravel	Medium Silty Very Fine Sand	Fine Silty Sandy Coarse Gravel
METHOD OF MOMENTS Arithmetic [µm]	MEAN:	129.84	176.90	128.98	122.92	130.59	13118.46	119.52	5645.77
	SORTING:	264.39	148.79	66.74	65.47	163.00	10848.36	60.51	8894.86
	SKEWNESS:	21.07	2.94	4.32	5.79	29.51	-0.16	-0.13	1.36
	KURTOSIS:	466.66	19.02	89.93	225.60	1044.42	1.18	2.47	3.12
METHOD OF MOMENTS Geometric [µm]	MEAN:	87.78	115.68	93.72	83.59	85.13	2400.34	78.79	462.42
	SORTING:	2.89	3.08	2.91	3.37	3.50	19.49	3.57	19.57
	SKEWNESS:	-3.16	-2.62	-3.33	-2.89	-2.78	-1.14	-2.70	-0.45
	KURTOSIS:	15.29	12.80	15.16	11.34	10.81	3.22	10.02	2.52
METHOD OF MOMENTS Logarithmic [Phi]	MEAN:	3.51	3.11	3.42	3.58	3.55	-1.26	3.67	1.11
	SORTING:	1.53	1.62	1.54	1.75	1.81	4.29	1.84	4.29
	SKEWNESS:	3.16	2.62	3.33	2.89	2.78	1.14	2.70	0.45
	KURTOSIS:	15.29	12.80	15.16	11.34	10.81	3.22	10.02	2.52
FOLK AND WARD METHOD [µm]	MEAN:	107.99	131.20	115.23	111.50	114.30	3226.37	109.21	536.08
	SORTING:	2.04	2.30	2.08	2.29	2.33	14.72	2.35	22.66
	SKEWNESS:	-0.16	-0.16	-0.24	-0.26	-0.30	-0.82	-0.26	-0.03
	KURTOSIS:	1.90	1.61	1.72	2.04	2.02	0.75	2.12	0.88
FOLK AND WARD METHOD [Phi]	MEAN:	3.21	2.93	3.12	3.16	3.13	-1.69	3.19	0.90
	SORTING:	1.03	1.20	1.06	1.19	1.22	3.88	1.23	4.50
	SKEWNESS:	0.16	0.16	0.24	0.26	0.30	0.82	0.26	0.03
	KURTOSIS:	1.90	1.61	1.72	2.04	2.02	0.75	2.12	0.88
FOLK AND WARD METHOD [Description]	MEAN:	Very Fine Sand	Fine Sand	Very Fine Sand	Very Fine Sand	Very Fine Sand	Very Fine Gravel	Very Fine Sand	Coarse Sand
	SORTING:	Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted	Poorly Sorted	Very Poorly Sorted	Poorly Sorted	Extremely Poorly Sorted
	SKEWNESS:	Fine Skewed	Fine Skewed	Fine Skewed	Fine Skewed	Very Fine Skewed	Very Fine Skewed	Fine Skewed	Symmetrical
	KURTOSIS:	Very Leptokurtic	Very Leptokurtic	Very Leptokurtic	Very Leptokurtic	Very Leptokurtic	Platykurtic	Very Leptokurtic	Platykurtic

Station	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08
Laboratory Registration No.	WL032154	WL032155	WL032156	WL032157	WL032158	WL032159	WL032160	WL032161
MODE 1 [µm]:	93.75	187.50	93.75	93.75	93.75	23750.00	93.75	23750.00
MODE 2 [µm]:	0.00	0.00	0.00	0.00	0.00	93.75	0.00	375.00
MODE 3 [µm]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6000.00
MODE 1 [Phi]:	3.50	2.50	3.50	3.50	3.50	-4.49	3.50	-4.49
MODE 2 [Phi]:	0.00	0.00	0.00	0.00	0.00	3.50	0.00	1.50
MODE 3 [Phi]:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.50
D10 [µm]:	63.67	63.78	64.01	29.84	25.93	32.24	16.35	6.95
D50 [µm]:	102.49	132.36	112.98	108.53	113.46	14427.32	105.85	447.35
D90 [µm]:	203.80	320.74	214.35	210.64	214.80	27390.79	208.88	21417.05
(D90 / D10) [µm]:	3.20	5.03	3.35	7.06	8.28	849.69	12.78	3080.41
(D90 - D10) [µm]:	140.13	256.96	150.34	180.80	188.87	27358.55	192.53	21410.10
(D75 / D25) [µm]:	1.96	2.44	2.12	2.12	2.18	104.56	2.13	82.54
(D75 - D25) [µm]:	72.69	120.84	88.40	85.79	91.34	21997.43	84.31	7000.92
D10 [Phi]:	2.29	1.64	2.22	2.25	2.22	-4.78	2.26	-4.42
D50 [Phi]:	3.29	2.92	3.15	3.20	3.14	-3.85	3.24	1.16
D90 [Phi]:	3.97	3.97	3.97	5.07	5.27	4.96	5.93	7.17
(D90 / D10) [Phi]:	1.73	2.42	1.78	2.25	2.37	-1.04	2.63	-1.62
(D90 - D10) [Phi]:	1.68	2.33	1.74	2.82	3.05	9.73	3.68	11.59
(D75 / D25) [Phi]:	1.35	1.56	1.42	1.41	1.44	-0.50	1.41	-1.25
(D75 - D25) [Phi]:	0.97	1.29	1.08	1.09	1.12	6.71	1.09	6.37
% GRAVEL [63000 - 2000 µm]:	0.20	0.00	0.00	0.01	0.08	65.11	0.00	34.57
% SAND [< 2000 - 63 µm]:	91.36	91.10	91.68	89.28	88.93	23.24	87.58	44.48
% MUD [< 63 µm]:	8.45	8.89	8.32	10.71	10.99	11.65	12.42	20.94
% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	48.46	0.00	17.56
% MEDIUM GRAVEL:	0.00	0.00	0.00	0.00	0.00	10.31	0.00	6.24
% FINE GRAVEL:	0.19	0.00	0.00	0.00	0.06	3.59	0.00	6.90
% V FINE GRAVEL:	0.01	0.00	0.00	0.01	0.02	2.74	0.00	3.88
% V COARSE SAND:	0.01	0.08	0.05	0.02	0.01	0.87	0.00	2.64
% COARSE SAND:	0.00	3.54	0.00	0.00	0.00	2.94	0.00	10.74
% MEDIUM SAND:	0.04	9.95	0.57	0.15	0.47	4.35	0.15	12.76
% FINE SAND:	33.06	39.70	42.27	39.77	43.10	7.38	37.99	9.49
% V FINE SAND:	58.24	37.83	48.80	49.34	45.34	7.70	49.44	8.86
% V COARSE SILT:	1.30	2.76	1.10	0.62	0.60	1.73	0.85	3.19
% COARSE SILT:	0.81	0.84	0.92	1.41	1.47	1.52	1.68	2.81
% MEDIUM SILT:	2.11	1.63	2.03	2.58	2.52	2.41	2.98	4.17
% FINE SILT:	1.28	1.20	1.38	2.10	2.20	2.61	2.43	4.62
% V FINE SILT:	0.56	0.47	0.55	0.76	0.80	0.64	0.85	1.16
% CLAY:	2.38	2.00	2.34	3.25	3.42	2.75	3.63	4.99

	Station	10PST09	10PST10	10PST11	10PST12
	Laboratory Registration No.	WL032162	WL032163	WL032164	WL032165
TEXTURAL GROUP	SAMPLE TYPE:	Polymodal, Very Poorly Sorted	Unimodal, Poorly Sorted	Unimodal, Very Poorly Sorted	Unimodal, Poorly Sorted
	FOLK [1954 ORIGINAL]:	Muddy Sandy Gravel	Slightly Gravelly Muddy Sand	Muddy Sand	Muddy Sand
	FOLK [BGS MODIFIED]:	Muddy Sandy Gravel	Muddy Sand	Muddy Sand	Muddy Sand
	SEDIMENT NAME:	Fine Silty Sandy Coarse Gravel	Slightly Very Fine Gravelly Medium Silty Very Fine Sand	Medium Silty Very Fine Sand	Medium Silty Very Fine Sand
METHOD OF MOMENTS Arithmetic [µm]	MEAN:	7880.61	120.89	103.27	111.70
	SORTING:	10107.56	76.56	64.92	62.33
	SKEWNESS:	0.81	7.30	0.18	0.90
	KURTOSIS:	1.82	239.15	2.58	22.24
METHOD OF MOMENTS Geometric [µm]	MEAN:	829.59	75.27	56.54	69.39
	SORTING:	19.38	3.87	4.61	3.91
	SKEWNESS:	-0.58	-2.44	-1.91	-2.40
	KURTOSIS:	2.52	8.56	5.76	8.21
METHOD OF MOMENTS Logarithmic [Phi]	MEAN:	0.27	3.73	4.14	3.85
	SORTING:	4.28	1.95	2.21	1.97
	SKEWNESS:	0.58	2.44	1.91	2.40
	KURTOSIS:	2.52	8.56	5.76	8.21
FOLK AND WARD METHOD [µm]	MEAN:	1056.08	108.52	60.49	101.15
	SORTING:	16.00	2.47	4.08	2.54
	SKEWNESS:	-0.05	-0.28	-0.58	-0.28
	KURTOSIS:	0.71	2.10	2.70	2.40
FOLK AND WARD METHOD [Phi]	MEAN:	-0.08	3.20	4.05	3.31
	SORTING:	4.00	1.30	2.03	1.34
	SKEWNESS:	0.05	0.28	0.58	0.28
	KURTOSIS:	0.71	2.10	2.70	2.40
FOLK AND WARD METHOD [Description]	MEAN:	Very Coarse Sand	Very Fine Sand	Very Coarse Silt	Very Fine Sand
	SORTING:	Very Poorly Sorted	Poorly Sorted	Very Poorly Sorted	Poorly Sorted
	SKEWNESS:	Symmetrical	Fine Skewed	Very Fine Skewed	Fine Skewed
	KURTOSIS:	Platykurtic	Very Leptokurtic	Very Leptokurtic	Very Leptokurtic

Station	10PST09	10PST10	10PST11	10PST12
Laboratory Registration No.	WL032162	WL032163	WL032164	WL032165
MODE 1 [µm]:	23750.00	93.75	93.75	93.75
MODE 2 [µm]:	93.75	0.00	0.00	0.00
MODE 3 [µm]:	6000.00	0.00	0.00	0.00
MODE 1 [Phi]:	-4.49	3.50	3.50	3.50
MODE 2 [Phi]:	3.50	0.00	0.00	0.00
MODE 3 [Phi]:	-2.50	0.00	0.00	0.00
D10 [µm]:	12.85	12.09	6.02	10.54
D50 [µm]:	862.73	106.28	92.34	98.79
D90 [µm]:	24517.17	212.62	198.45	202.60
(D90 / D10) [µm]:	1908.42	17.58	32.99	19.23
(D90 - D10) [µm]:	24504.33	200.52	192.44	192.06
(D75 / D25) [µm]:	153.18	2.24	2.18	2.09
(D75 - D25) [µm]:	16724.98	89.85	75.21	76.66
D10 [Phi]:	-4.62	2.23	2.33	2.30
D50 [Phi]:	0.21	3.23	3.44	3.34
D90 [Phi]:	6.28	6.37	7.38	6.57
(D90 / D10) [Phi]:	-1.36	2.85	3.16	2.85
(D90 - D10) [Phi]:	10.90	4.14	5.04	4.26
(D75 / D25) [Phi]:	-0.78	1.44	1.39	1.38
(D75 - D25) [Phi]:	7.26	1.16	1.12	1.06
% GRAVEL [63000 - 2000 µm]:	45.37	0.01	0.00	0.00
% SAND [< 2000 - 63 µm]:	39.22	84.52	76.43	83.82
% MUD [< 63 µm]:	15.41	15.47	23.57	16.18
% V COARSE GRAVEL:	0.00	0.00	0.00	0.00
% COARSE GRAVEL:	27.03	0.00	0.00	0.00
% MEDIUM GRAVEL:	6.01	0.00	0.00	0.00
% FINE GRAVEL:	7.11	0.00	0.00	0.00
% V FINE GRAVEL:	5.23	0.01	0.00	0.00
% V COARSE SAND:	3.20	0.03	0.00	0.01
% COARSE SAND:	6.70	0.00	0.00	0.00
% MEDIUM SAND:	6.69	0.98	0.26	0.14
% FINE SAND:	10.85	38.42	29.23	32.47
% V FINE SAND:	11.78	45.09	46.94	51.19
% V COARSE SILT:	2.52	2.20	3.80	2.07
% COARSE SILT:	2.00	2.01	2.92	2.03
% MEDIUM SILT:	3.12	3.39	5.08	3.66
% FINE SILT:	3.34	2.81	4.68	3.04
% V FINE SILT:	0.84	0.96	1.34	1.02
% CLAY:	3.59	4.10	5.74	4.36

D.2 TOTAL ORGANIC MATTER ANALYSIS RESULTS

Total Organic Matter	
Station	**Loss on Ignition [%]**
7FST46	0.77
7FST47	0.70
7FST48	0.71
7FST49	0.94
8PST01	0.78
8PST02	0.78
8PST03	1.72
8PST04	1.86
8PST05	1.98
8PST06	1.90
8PST07	1.79
8PST08	2.34
8PST09	2.17
9PST01	2.13
9PST02	1.68
9PST03	1.75
9PST04	1.47
9PST05	1.46
9PST06	1.38
9PST07	1.09
9PST08	1.38
9PST09	1.13
9PST10	1.15
9PST11	1.33
10PST01	1.44
10PST02	1.37
10PST03	1.47
10PST04	1.63
10PST05	1.63
10PST06	3.12
10PST07	1.99
10PST08	3.89
10PST09	5.03
10PST10	<0.5
10PST11	3.11
10PST12	2.29

E. SEDIMENT CHEMISTRY ANALYSES RESULTS

E.1 HEAVY METALS ANALYSIS RESULTS

At the time of writing, the laboratory analysis of the Netherlands EEZ sediment for heavy metals was not complete. This appendix will be completed separately once the data is available.

E.2 HYDROCARBON ANALYSIS RESULTS

At the time of writing, the laboratory analysis of the Netherlands EEZ sediment for hydrocarbons was not complete. This appendix will be completed separately once the data is available.

E.3 TOTAL ORGANIC CARBON ANALYSIS RESULTS

Station	Total Organic Carbon [Dry Weight as Carbon, %]
7FST46	<0.2
8PST02	<0.2
8PST08	0.29
9PST04	<0.2
9PST09	<0.2
10PST03	<0.2
10PST11	0.40

F. MACROFAUNAL DATA

F.1 INFAUNAL ANALYSIS CERTIFICATE

FUGRO EMU LIMITED
CERTIFICATE OF ANALYSIS

Certificate Number	EP/16/0006	**Fugro EMU Job Number**	160623
Job Reference	Viking Link (Netherlands sites)		

Prepared For	**Prepared By**
Hannah Lawson Fugro EMU Limited Trafalgar Wharf (Unit 16) Hamilton Road Portchester Portsmouth PO6 4PX United Kingdom	**Grant Rowe** Fugro EMU Limited Trafalgar Wharf (Unit 16) Hamilton Road Portchester Portsmouth PO6 4PX United Kingdom
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Web www.fugroemu.com	**Web** www.fugroemu.com

Sampling Undertaken By	Fugro EMU	**Sampling Date**	-
Date of Receipt	**07/06/16**	**Date of Analysis**	07/06/16 - 01/10/16
Sample Matrix	Macrobenthic Species Identification (Infauna)		
Method Reference	TM23_001		
Test Results	Please double click on symbol:		
Laboratory Comments	None		
Deviating Codes	None		
Authorised Signature			
Name	Grant Rowe		
Position	Principal Taxonomist/QC Manager		
Issue Date	03/10/16		

- Further information on methods of analysis may be obtained from the above address;
- Opinions and interpretations expressed herein are outside the scope of UKAS accreditation;
- Test results reported relate only to those items tested;
- ^{Sub}Indicates subcontracted test;
- ^{DS}Indicates relevant deviating code applies to test results.

A UKAS TESTING LABORATORY

UKAS TESTING 1272

FUGRO EMU LIMITED
CERTIFICATE OF ANALYSIS

A. DEVIATING SAMPLE - CRITERIA

Code and Criteria	Description	Reporting Comment
DS1 - Damaged container(s)/ packaging	Sample was received in a damaged container which may have resulted in contamination or loss of integrity of the sample.	*Sample was received in a damaged container. The results reported may not be representative of the sample at the time of sampling.*
DS2 - Unsuitable container	Sample was received in an unsuitable container that is known to have an effect on the analysis.	*Sample was received in an unsuitable container. The results reported may not be representative of the sample at the time of sampling.*
DS3 - Incorrect or no sample preservation	Sample was received with no preservative, an incorrect preservative, or in a condition which indicates inappropriate sample storage, where specific criteria are referenced in the method.	*Sample was received in a condition unsuitable for the test. The results reported may not be representative of the sample at the time of sampling.*
DS4 - Missing date/time details	Sample date/time details were not recorded at time of sampling or not provided to the laboratory.	*Sampling date/time was not provided and therefore assessment of sample stability cannot be made. The test results may have been compromised.*
DS5 - Error in sample labelling/details	Sample information is missing, unreadable, conflicting or incorrect. Analysis was undertaken but traceability of results cannot be guaranteed against sample location.	*Incorrect/incomplete sample details have been provided. The traceability of results may have been compromised.*
DS6 - Sample received outside holding time	The date and time information provided with the sample indicate the sample was received at the laboratory outside of the holding time.	*Sample was received outside analysis holding time. The results reported may not be representative of the sample at the time of sampling.*
DS7 - Analysis commenced after holding time	The sample was received at the laboratory within its holding time but an analytical issue led to delay in commencement of analysis which exceeded the holding time.	*The holding time expired prior to analysis being undertaken. The results reported may not be representative of the sample at the time of sampling.*
DS8 - Insufficient analysis material	Insufficient material was received which meant that analysis could not be undertaken, or the analysis could not be carried out in accordance with the method.	*Insufficient sample material was received. The test results may not be representative of the sample at the time of sampling.*
DS9 - Sample contamination	Sample was received in a satisfactory condition but cross-contamination has occurred due to an analytical issue which has resulted in loss of sample integrity.	*The sample integrity may have been compromised due to an analytical issue. The results reported may not be representative of the sample at the time of sampling and are outside the scope of UKAS accreditation.*
Note: Where it is agreed with the client that a deviating sample should not be tested, then the report should state "Sample not analysed" and the relevant deviating sample code recorded.		

- Further information on methods of analysis may be obtained from the above address;
- Opinions and interpretations expressed herein are outside the scope of UKAS accreditation;
- Test results reported relate only to those items tested;
- ^{Sub}Indicates subcontracted test;
- ^{DS}Indicates relevant deviating code applies to test results.

A UKAS TESTING LABORATORY

UKAS TESTING 1272

Fugro EMU Limited. Incorporated in England No. 3469947. Reg. Office: Fugro House, Hithercroft Road, Wallingford, Oxfordshire, OX10 9RB

Fugro Document No. Type Here

Appendix A.1

F.2 INFAUNAL RAW ABUNDANCE DATA

Abundance is expressed as number of individuals per 0.1 m^2.

Taxa	SDC	Aphia ID	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11
Astrorhiza	A0000	112299																								
Edwardsiidae	D0759	100665				3														1						
PLATYHELMINTHES	F0001	793				1				4	1		1	1	1						1					
NEMERTEA	G0001	152391		4		1				1	1	3	1	3	2	4										
Priapulus caudatus	J0007	101160							1																	
SIPUNCULA (juv.)	N0001	1268																								
Golfingia elongate	N0014	175026									2			P												
POLYCHAETA (fragments)	P0002	883							P	P	P	P			P											
Aphroditidae (juv.)	P0017	938																							1	
Aphrodita aculeata	P0019	129840																		1				1		
Polynoidae	P0025	939			1									1		1	1									
Subadyte pellucida	P0032	130833																								
Gattyana cirrhosa	P0049	130749										1		1												
Harmothoe	P0050	129491																								
Malmgrenia ljungmani	P0066	152304																								
Pholoe baltica	P0092	130599	4	5		4			7		1		4	7	3	3		2		1						
Pholoe inornata	P0094	130601										3	1			1										
Sigalionidae	P0096	943					1																			
Sigalion mathildae	P0104	131072																								
Sthenelais	P0106	129595							1		1			1				1	1	2		1	1			1
Sthenelais limicola	P0109	131077			1																					
Phyllodocidae	P0114	931					1																			
Phyllodoce maculata	P0144	334510																								
Eulalia viridis	P0161	130639																								
Eumida sanguinea	P0167	130644																								
Glyceridae	P0254	952																								
Glycera	P0255	129296														1										
Glycera alba	P0256	130116																		1					1	1
Glycera lapidum	P0260	130123										2														
Glycera unicornis	P0255	130131								3	1		3	3												
Glycinde nordmanni	P0268	130136							2	2				1					1		1			1		
Goniada maculata	P0271	130140			1	1		2	1	2	5		1			1	2						1	1		
Goniadella gracilis	P0276	130145																								
Sphaerodoridae	P0278	957																								
Sphaerodorum gracilis	P0291	131100																								
Nereimyra punctata	P0311	130185																								
Oxydromus flexuosus	P0313	710680			1				2							1	1									
Podarkeopsis capensis	P0319	130195		1																						
Glyphohesione klatti	P0340	130696							1																	
Nereididae (juv.)	P0458	22496																								
Nereididae (Type B)	P0458	22496																								

Taxa	SDC	Aphia ID	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11
Nephtys	P0494	129370							1	1								1					2			
Nephtys (juv.)	P0494	129370								1	4			2	1		1			1	2				1	
Nephtys assimilis	P0495	130353	1			1													1						1	
Nephtys hombergii	P0499	130359			1		1		1					1	1	2	4	1	1	4	4	2	1	4	1	
Nephtys incisa	P0501	130362											1													
Nephtys kersivalensis	P0502	130363											2													
Nephtys longosetosa	P0503	130364						1																		
Onuphidae (juv.)	P0537	965																								
Lumbrineris cingulata	P0572	130240							2		3															
Drilonereis filum	P0591	129856																								
Scoloplos armiger	P0672	334772	1	2		4	2		1								1	3	1		2	3	1	2	3	2
Levinsenia gracilis	P0693	130578							1					2	1											
Paradoneis lyra	P0699	130585																								
Scolelepis	P0777	129623																								
Scolelepis bonnieri	P0779	131171	1	1			1																			
Spio decoratus	P0789	131182		1	1																					
Spiophanes	P0793	129626				1																				
Spiophanes bombyx	P0794	131187	11	9	9	10																				
Magelona	P0803	129341		1																						
Magelona alleni	P0804	130266			1	1																				
Magelona filiformis	P0805	130268	1	3		1	1	2											1							
Magelona johnstoni	P0803	130269	3			1	2																			
Chaetopterus variopedatus	P0814	129914												P												
Chaetozone christiei	P0832	152217				2																				
Chaetozone setosa	P0834	129955		4	1				3	3	1					1	2	1	2	1	2	2		1	4	1
Diplocirrus glaucus	P0878	130100							4	3	3	1	3	2	3	3	3	2	1	2	1	2			1	
Flabelligera affinis	P0881	130103																								
Mediomastus fragilis	P0919	129892																								
Notomastus	P0920	129220													1											
Ophelina acuminata	P1014	130500																								
Ophelina modesta	P1016	130507		1				1																		
Scalibregma inflatum	P1027	130980																								
Polygordius	P1062	129472																								
Oweniidae	P1090	975											P													
Owenia	P1097	129427													2	1										2
Owenia borealis	P1097	329882		3					2																	
Pectinariidae	P1100	980																								
Pectinariidae (juv.)	P1100	980					1	1			2					2									2	1
Amphictene auricoma	P1102	152448				1		1	12	6	7	4	5	6	19	13	13									
Lagis koreni	P1107	152367																								
Sabellaria spinulosa	P1117	130867																								

Taxa	SDC	Aphia ID	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11
Amphicteis gunneri	P1142	129784											1													
Amphicteis midas	P1143	129785																								
Anobothrus gracilis	P1147	129789																								
Terebellides stroemii	P1175	131573										2														
Trichobranchus	P1176	129718																								
Lanice conchilega	P1195	131495		1		2															1					
Hydroides norvegica	P1334	131009																								
Spirobranchus	P1339	129582																								
Spirobranchus lamarcki	P1340	560033																								
Spirobranchus triqueter	P1341	555935																								
Perioculodes longimanus	S0131	102915		1				1								1				1		2				
Synchelidium maculatum	S0138	102928	1							1																
Westwoodilla caecula	S0140	102932																								
Leucothoe lilljeborgi	S0178	102462																						1		
Urothoe elegans	S0248	103228			1																					
Harpinia	S0253	101716																		1						
Harpinia antennaria	S0254	102960	1	8	1	5	7	3	4		2	8				1	3	3	5	6	8	9	4	4	3	1
Harpinia crenulata	S0255	102963																				2				
Harpinia pectinata	S0257	102972																								
Hippomedon denticulatus	S0296	102570		1				2							1			1								
Tryphosa nana	S0321	102748																				1				
Scopelocheirus hopei	S0328	102720		2																						
Argissa hamatipes	S0360	102064					1										1				1					
Ampelisca brevicornis	S0427	101891									1		1	1		1										1
Ampelisca diadema	S0429	101896																								
Ampelisca macrocephala	S0432	101908												1												
Ampelisca tenuicornis	S0440	101930	1			1	1					1	1	1	1	1		1		3	1		1		1	
Bathyporeia (juv.)	S0451	101742		1											1											
Bathyporeia elegans	S0452	103058	1					2																		
Bathyporeia tenuipes	S0459	103076	1	1		1													1							
Megaluropus agilis	S0489	102783																								
Othomaera othonis	S0519	534781																								
Medicorophium affine	S0608	423507							1						2			1								
Pariambus typicus	S0651	101857																				1				
Gnathia (Type I)	S0793	118437																								
Gnathia (juv.)	S0793	118437																								
Natatolana borealis	S0844	118859							5					1		2										
Tanaopsis graciloides	S1142	136458																								
Eudorella emarginata	S1206	110524									1		1													
Eudorella truncatula	S1208	110535				1			1			1		1		3	1	1	1			1	3	1	1	1
Eudorellopsis deformis	S1210	110536				1		1																		

Taxa	SDC	Aphia ID	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11
Pseudocuma simile	S1237	110628					2																			
Diastylis laevis	S1251	110481				1		1			2	1	2	1					1						1	
DECAPODA (megalopa)	S1276	1130									1															
Eualus occultus	S1344	107506																								
Callianassa subterranea	S1415	107729																								
Upogebia deltaura	S1419	107739																								
Pisidia longicornis	S1482	107188																								
Ebalia (juv.)	S1504	106889												1												
Ebalia cranchii	S1505	107294																								
Ebalia tumefacta	S1509	107302																								
Liocarcinus depurator	S1580	107387																								
Liocarcinus pusillus	S1584	107393																								
Pinnotheres pisum	S1638	107473																		1						
Chaetoderma nitidulum	W0009	139106							3		2	2		P		1										
POLYPLACOPHORA (juv.)	W0046	55																								
Turritella communis	W0270	141872				1		3	1	2			1						1							
Hyala vitrea	W0410	140129								1		1	5													
Euspira nitida	W0491	151894							1										P	1	1					1
Vitreolina philippi	W0669	139903				2																				
Tritia incrassata	W0747	876825																								
Sorgenfreispira brachystoma	W0798	847930				1																				
Turbonilla lactea	W0971	141072				1																				
Brachystomia scalaris	W0925	491633																								
Volvulella acuminata	W1089	141139																								
Cylichna cylindracea	W1028	139476	5	3	3	2			1	4	1	5	9	2	5	5	6	6						2	1	
Nuculidae (juv.)	W1563	204				1					1										1				1	
Nucula (juv.)	W1565	138262		1	1		1		1											1						
Nucula nitidosa	W1569	140589	4	3		1		2	1		1												3	2	2	
Ennucula tenuis	W1577	140584										1									2					
Mytilidae (juv.)	W1691	211																								
Monia patelliformis	W1814	153027																								
Mendicula ferruginosa	W1851	152905																						18		
Thyasira	W1835	138552																								
Thyasira (juv.)	W1835	138552	1	1			1			1													5			
Thyasira flexuosa	W1837	141662		1															3	4	2	4		5		5
Kurtiella bidentata	W1906	345281	3	11	1	6	1		6	1	3	3	5	3	19	8	14	7			2		1			
Kurtiella tumidula	W1908	345287																								1
Tellimya ferruginosa	W1902	146952	1							1															2	
Cardiidae (juv.)	W1938	229																								
Mactridae (juv.)	W1967	230																								
Mactra stultorum	W1972	140299	8	7	3	6														1						

Taxa	SDC	Aphia ID	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11
Phaxas pellucidus	W2006	140737	3	3	1	1		3				1				1				1	2	4			1	
Abra (juv.)	W2058	138474										1														
Abra nitida	W2061	141435					1			6			2			1		1		3		1			1	
Abra prismatica	W2062	141436																							1	
Arctica islandica (juv.)	W2072	138802																		1						
Veneridae (juv.)	W2086	243		2		7	1								1											
Dosinia (juv.)	W2126	138636		1		2			2				1							1	1	2	1		1	
Dosinia lupinus	W2128	141912			1	1				1																
Chamelea striatula	W2097	141908	6	2			1	1	2	1		1	3	3	2	6	3	6	3	7	5	3				
Timoclea ovata	W2104	141929																								
Mysia undata	W2139	140728				1			1		1															
Corbula gibba	W2157	139410	1	2		11	1		11	13	15	31	7	6	9	7	9	1	4	7	1			8	1	3
Hiatella arctica	W2166	140103																								
Thracioidea (juv.)	W2226	382318																		1						
Thracia (juv.)	W2227	138549	3	4	1																					
Thracia convexa (?)	W2229	141644										1														
Phoronis	ZA0003	128545	1	7		5							1	1												
ASTEROIDEA (juv.)	ZB0018	123080																								
Astropecten irregularis	ZB0026	123867				1		1																1	2	
Asterias rubens	ZB0100	123776																								
OPHIUROIDEA (juv.)	ZB0105	123084	2																							
Ophiothrix fragilis	ZB0124	125131																								
Amphiuridae	ZB0148	123206																	4							
Amphiuridae (juv.)	ZB0148	123206				2		1	20		25	10	20	40		41	22			14	7	2		7	5	2
Amphiura filiformis	ZB0154	125080	38	54	20	66	10		92	23	28	28	46	39	101	67	65	83	2				4	8	3	
Ophiuridae (juv.)	ZB0165	123200																								
Psammechinus miliaris	ZB0193	124319																								
SPATANGOIDA	ZB0213	123106									1				1			1			1					
SPATANGOIDA (juv.)	ZB0213	123106																								
Echinocardium	ZB0222	123426	1		1												1									
Echinocardium cordatum	ZB0223	124392	2																							
Echinocardium flavescens	ZB0224	124394														1								3		
Brissopsis lyrifera	ZB0228	124373								1				1		1				1		1				
Labidoplax buskii	ZB0299	124455											1	1												
ENTEROPNEUSTA	ZC0012	1820								1																

Taxon	SDC	Aphia ID	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
Astrorhiza	A0000	112299								1				
Edwardsiidae	D0759	100665											2	
PLATYHELMINTHES	F0001	793								1				
NEMERTEA	G0001	152391		1		1	2	1	3	1	2	3		2
Priapulus caudatus	J0007	101160												
SIPUNCULA (juv.)	N0001	1268						1		1				
Golfingia elongata	N0014	175026												2
POLYCHAETA (fragments)	P0002	883												
Aphroditidae (juv.)	P0017	938						1						
Aphrodita aculeata	P0019	129840												
Polynoidae	P0025	939		1										
Subadyte pellucida	P0032	130833								5				
Gattyana cirrhosa	P0049	130749												
Harmothoe	P0050	129491						2		2	1			1
Malmgrenia ljungmani	P0066	152304						1						
Pholoe baltica	P0092	130599	5		1	2	1	2		1		2		12
Pholoe inornata	P0094	130601								1	2			
Sigalionidae	P0096	943												
Sigalion mathildae	P0104	131072		1										
Sthenelais	P0106	129595	2				1							1
Sthenelais limicola	P0109	131077												
Phyllodocidae	P0114	931												
Phyllodoce maculata	P0144	334510									1			
Eulalia viridis	P0161	130639						1						
Eumida sanguinea	P0167	130644									1			
Glyceridae	P0254	952									1			
Glycera	P0255	129296						1						
Glycera alba	P0256	130116						2		2	1	2		1
Glycera lapidum	P0260	130123												
Glycera unicornis	P0255	130131										1		
Glycinde nordmanni	P0268	130136		3	1	2					1		3	1
Goniada maculata	P0271	130140		1	1		3	2	1	1	1	1	1	
Goniadella gracilis	P0276	130145						1						
Sphaerodoridae	P0278	957									1			
Sphaerodorum gracilis	P0291	131100						3		5				
Nereimyra punctata	P0311	130185									1			
Oxydromus flexuosus	P0313	710680					1						2	2
Podarkeopsis capensis	P0319	130195												
Glyphohesione klatti	P0340	130696												
Nereididae (juv.)	P0458	22496									1			
Nereididae (Type B)	P0458	22496				1								

Taxon	SDC	Aphia ID	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
Nephtys	P0494	129370	1				3		3				1	
Nephtys (juv.)	P0494	129370			2				1			1	3	
Nephtys assimilis	P0495	130353		1										
Nephtys hombergii	P0499	130359	1		1	2	1		2			3	2	1
Nephtys incisa	P0501	130362												
Nephtys kersivalensis	P0502	130363												
Nephtys longosetosa	P0503	130364												
Onuphidae (juv.)	P0537	965									1			
Lumbrineris cingulata	P0572	130240						27		15	38			1
Drilonereis filum	P0591	129856									1			
Scoloplos armiger	P0672	334772	2	6	3	1	3						1	
Levinsenia gracilis	P0693	130578												
Paradoneis lyra	P0699	130585									6			
Scolelepis	P0777	129623											1	
Scolelepis bonnieri	P0779	131171												
Spio decoratus	P0789	131182												
Spiophanes	P0793	129626												
Spiophanes bombyx	P0794	131187												
Magelona	P0803	129341												
Magelona alleni	P0804	130266				1	2	2	1	1				1
Magelona filiformis	P0805	130268												
Magelona johnstoni	P0803	130269												
Chaetopterus variopedatus	P0814	129914												
Chaetozone christiei	P0832	152217												
Chaetozone setosa	P0834	129955		4	1	3	2		7			3	1	8
Diplocirrus glaucus	P0878	130100			5	7	3	3	3			1	6	5
Flabelligera affinis	P0881	130103								1				
Mediomastus fragilis	P0919	129892												1
Notomastus	P0920	129220								2	1			
Ophelina acuminata	P1014	130500											1	
Ophelina modesta	P1016	130507												
Scalibregma inflatum	P1027	130980						1						
Polygordius	P1062	129472						1						
Oweniidae	P1090	975												
Owenia	P1097	129427												
Owenia borealis	P1097	329882												
Pectinariidae	P1100	980												1
Pectinariidae (juv.)	P1100	980			1									
Amphictene auricoma	P1102	152448		1	1	6	2	1	5	1	3	5	18	21
Lagis koreni	P1107	152367				1			1				2	2
Sabellaria spinulosa	P1117	130867						1			2			

Taxon	SDC	Aphia ID	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
Amphicteis gunneri	P1142	129784												
Amphicteis midas	P1143	129785											1	
Anobothrus gracilis	P1147	129789								1	2			
Terebellides stroemii	P1175	131573												
Trichobranchus	P1176	129718												1
Lanice conchilega	P1195	131495												
Hydroides norvegica	P1334	131009						1		1	1			
Spirobranchus	P1339	129582						3		3	2			
Spirobranchus lamarcki	P1340	560033						19		1	4			
Spirobranchus triqueter	P1341	555935								15				
Perioculodes longimanus	S0131	102915	1				4							
Synchelidium maculatum	S0138	102928												
Westwoodilla caecula	S0140	102932		1						1	1			
Leucothoe lilljeborgi	S0178	102462												
Urothoe elegans	S0248	103228	1											
Harpinia	S0253	101716												
Harpinia antennaria	S0254	102960	1	2	10	4			2					2
Harpinia crenulata	S0255	102963												
Harpinia pectinata	S0257	102972					1							5
Hippomedon denticulatus	S0296	102570												
Tryphosa nana	S0321	102748												
Scopelocheirus hopei	S0328	102720												
Argissa hamatipes	S0360	102064					1							
Ampelisca brevicornis	S0427	101891												
Ampelisca diadema	S0429	101896									1			
Ampelisca macrocephala	S0432	101908												
Ampelisca tenuicornis	S0440	101930		1			1				3	1	1	1
Bathyporeia (juv.)	S0451	101742												
Bathyporeia elegans	S0452	103058												
Bathyporeia tenuipes	S0459	103076												
Megaluropus agilis	S0489	102783				1								
Othomaera othonis	S0519	534781									2			
Medicorophium affine	S0608	423507												
Pariambus typicus	S0651	101857												
Gnathia (Type I)	S0793	118437						2		1	1			1
Gnathia (juv.)	S0793	118437								1				
Natatolana borealis	S0844	118859												
Tanaopsis graciloides	S1142	136458					1							
Eudorella emarginata	S1206	110524												
Eudorella truncatula	S1208	110535		2	3	2								1
Eudorellopsis deformis	S1210	110536												

Taxon	SDC	Aphia ID	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
Pseudocuma simile	S1237	110628												
Diastylis laevis	S1251	110481	1	1										
DECAPODA (megalopa)	S1276	1130												
Eualus occultus	S1344	107506								1				
Callianassa subterranea	S1415	107729									1			
Upogebia deltaura	S1419	107739									2			
Pisidia longicornis	S1482	107188								3				
Ebalia (juv.)	S1504	106889						1						
Ebalia cranchii	S1505	107294				1		2			6			
Ebalia tumefacta	S1509	107302									1			
Liocarcinus depurator	S1580	107387								1				
Liocarcinus pusillus	S1584	107393									1			
Pinnotheres pisum	S1638	107473												
Chaetoderma nitidulum	W0009	139106												
POLYPLACOPHORA (juv.)	W0046	55						1						
Turritella communis	W0270	141872					1							1
Hyala vitrea	W0410	140129					1				1			
Euspira nitida	W0491	151894						3	1	2	1	1	1	
Vitreolina philippi	W0669	139903												
Tritia incrassata	W0747	876825								1				
Sorgenfreispira brachystoma	W0798	847930												
Turbonilla lactea	W0971	141072												
Brachystomia scalaris	W0925	491633											1	
Volvulella acuminata	W1089	141139								1				
Cylichna cylindracea	W1028	139476	1		1	3			9			2	8	4
Nuculidae (juv.)	W1563	204												
Nucula (juv.)	W1565	138262	1											
Nucula nitidosa	W1569	140589		8	6									
Ennucula tenuis	W1577	140584												
Mytilidae (juv.)	W1691	211						1						
Monia patelliformis	W1814	153027								1				
Mendicula ferruginosa	W1851	152905												
Thyasira	W1835	138552				6								
Thyasira (juv.)	W1835	138552	1	6	10		4	6	3	2	3		9	6
Thyasira flexuosa	W1837	141662		2			1							
Kurtiella bidentata	W1906	345281	8	11	2	27	7		10		1	4	6	12
Kurtiella tumidula	W1908	345287												
Tellimya ferruginosa	W1902	146952					2		1			3		3
Cardiidae (juv.)	W1938	229					1							
Mactridae (juv.)	W1967	230											1	
Mactra stultorum	W1972	140299												

Taxon	SDC	Aphia ID	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
Phaxas pellucidus	W2006	140737			2							1		
Abra (juv.)	W2058	138474								1		1	1	
Abra nitida	W2061	141435		4					1			1		1
Abra prismatica	W2062	141436												
Arctica islandica (juv.)	W2072	138802												
Veneridae (juv.)	W2086	243							1					
Dosinia (juv.)	W2126	138636								1				
Dosinia lupinus	W2128	141912												
Chamelea striatula	W2097	141908		1	1							1		
Timoclea ovata	W2104	141929									2			
Mysia undata	W2139	140728	1											
Corbula gibba	W2157	139410		10	5	1	16		6			5	11	2
Hiatella arctica	W2166	140103									1			
Thracioidea (juv.)	W2226	382318												
Thracia (juv.)	W2227	138549												
Thracia convexa (?)	W2229	141644												
Phoronis	ZA0003	128545												
ASTEROIDEA (juv.)	ZB0018	123080						1						
Astropecten irregularis	ZB0026	123867												
Asterias rubens	ZB0100	123776						1						
OPHIUROIDEA (juv.)	ZB0105	123084				1		1					4	2
Ophiothrix fragilis	ZB0124	125131						16		82				
Amphiuridae	ZB0148	123206												
Amphiuridae (juv.)	ZB0148	123206												
Amphiura filiformis	ZB0154	125080	86	89	3	40	47	13	45	1	8	54	54	181
Ophiuridae (juv.)	ZB0165	123200						9		3	8			
Psammechinus miliaris	ZB0193	124319								3				
SPATANGOIDA	ZB0213	123106					1							
SPATANGOIDA (juv.)	ZB0213	123106												1
Echinocardium	ZB0222	123426	1			1								
Echinocardium cordatum	ZB0223	124392	3	1		1			3			7	8	1
Echinocardium flavescens	ZB0224	124394	1											1
Brissopsis lyrifera	ZB0228	124373					1							2
Labidoplax buskii	ZB0299	124455												
ENTEROPNEUSTA	ZC0012	1820									1			

Note:
SDC = Taxon code from: The species directory of the marine fauna and flora of the British Isles and surrounding seas
APHIA ID = World Register of Marine Species (WoRMS) taxon code
Juv. = Juvenile
P = Present

F.3 EPIFAUNAL RAW ABUNDANCE DATA

Abundance expressed as number of individuals per 0.1 m^2 for sessile solitary taxa.

Abundance for colonial taxa are recorded as P (present).

Taxa	SDC	Aphia ID	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11
Folliculinidae		1692																									
Bougainvilliidae	D0246	1594			P																						
Abietinaria abietina	D0409	117870																									
Clytia	D0501	117030																									
Alcyonium digitatum	D0597	125333																									
Sessilia juv.	R0015	106033																		32						13	13
Verruca stroemia	R0041	106257																									
Tubuliporidae	Y0026	110814																									
Escharella immersa	Y0364	111484																									

Taxa	SDC	Aphia ID	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
Folliculinidae		1692									P			
Bougainvilliidae	D0246	1594												
Abietinaria abietina	D0409	117870						P						
Clytia	D0501	117030						P		P				
Alcyonium digitatum	D0597	125333						P		P	P			
Sessilia (juv.)	R0015	106033			11	2		149						
Verruca stroemia	R0041	106257						1		3				
Tubuliporidae	Y0026	110814								P				
Escharella immersa	Y0364	111484						P		P	P			

Note:
SDC = Taxon code from: The species directory of the marine fauna and flora of the British Isles and surrounding seas
APHIA ID = World Register of Marine Species (WoRMS) taxon code
Juv. = Juvenile

F.4 PRIMER READY DATA

Abundance is expressed as number of individuals per 0.1 m^2.

Taxa	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
rorhiza																																1				
wardsiidae				3														1																2	
ATYHELMINTHES				1				4	1		1	1	1						1													1				
MERTEA		4		1				1	1	3	1	3	2	4											1		1	2	1	3	1	2	3		2
pulus caudatus							1																												
fingia elongata									2																										2
rodita aculeata																		1				1													
ynoidae			1									1		1	1										1										
adyte pellucida																																5				
tyana cirrhosa										1		1																								
mothoe																													2		2	1			1
mgrenia ljungmani																													1							
loe baltica	4	5		4			7		1		4	7	3	3		2		1							5		1	2	1	2		1		2		12
loe inornata										3	1			1																	1	2				
alionidae					1																															
alion mathildae																									1											
enelais							1		1			1				1	1	2		1	1			1	2				1							1
enelais limicola			1																																	
llodocidae					1																															
llodoce maculata																															1					
alia viridis																													1							
nida sanguinea																															1					
ceridae																															1					
cera														1															1							
cera alba																		1					1	1					2		2	1	2		1
cera lapidum										2																										
cera unicornis								3	1		3	3																					1			
cinde nordmanni							2	2				1					1		1			1				3	1	2					1		3	1
niada maculata			1	1		2	1	2	5		1			1	2						1	1				1	1		3	2	1	1	1	1	1	
niadella gracilis																													1							
aerodoridae																															1					
aerodorum gracilis																													3		5					
eimyra punctata																															1					
dromus flexuosus			1				2							1	1														1					2	2
larkeopsis capensis		1																																		
phohesione klatti							1																													
eididae (Type B)																												1								
phtys							1	1								1					2				1				3		3				1	
phtys assimilis	1			1													1						1			1										
phtys hombergii			1		1		1					1	1	2	4	1	1	4	4	2	1	4	1		1		1	2	1		2			3	2	1

Taxa	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
phtys incisa											1																									
phtys kersivalensis											2																									
phtys longosetosa						1																														
nbrineris cingulata							2		3																				27		15	38			1
onereis filum																																1				
Aloplos armiger	1	2		4	2		1								1	3	1		2	3	1	2	3	2	2	6	3	1	3						1	
insenia gracilis							1					2	1																							
adoneis lyra																																6				
Nelepis																																			1	
Nelepis bonnieri	1	1			1																															
o decoratus		1	1																																	
ophanes				1																																
ophanes bombyx	11	9	9	10																																
gelona		1																																		
gelona alleni			1	1																								1	2	2	1	1				1
gelona filiformis	1	3		1	1	2											1																			
gelona johnstoni	3			1	2																															
aetopterus variopedatus																																				
aetozone christiei				2																																
aetozone setosa		4	1				3	3	1					1	2	1	2	1	2	2		1	4	1		4	1	3	2		7			3	1	8
Nocirrus glaucus							4	3	3	1	3	2	3	3	3	2	1	2	1	2			1				5	7	3	3	3			1	6	5
belligera affinis																																1				
diomastus fragilis																																				1
omastus													1																			2	1			
helina acuminata																																			1	
helina modesta		1				1																														
libregma inflatum																														1						
ygordius																														1						
eniidae																																				
enia													2	1										2												
enia borealis		3					2																													
tinariidae																																				1
phictene auricoma				1		1	12	6	7	4	5	6	19	13	13										1	1	6	2	1	5	1	3	5	18	21
is koreni																											1			1				2	2
ellaria spinulosa																													1			2				
phicteis gunneri											1																									
phicteis midas																																			1	
bothrus gracilis																																1	2			
ebellides stroemii										2																										
hobranchus																																				1

Taxa	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
ice conchilega		1		2															1																	
lroides norvegica																													1		1	1				
robranchus																													3		3	2				
robranchus lamarcki																													19		1	4				
robranchus triqueter																															15					
ioculodes longimanus		1				1								1				1		2					1				4							
chelidium maculatum	1							1																												
stwoodilla caecula																										1					1	1				
cothoe lilljeborgi																						1														
thoe elegans			1																						1											
pinia																		1																		
pinia antennaria	1	8	1	5	7	3	4		2	8				1	3	3	5	6	8	9	4	4	3	1	1	2	10	4			2					2
pinia crenulata																				2																
pinia pectinata																													1							5
bomedon denticulatus		1				2							1			1																				
phosa nana																				1																
pelocheirus hopei		2																																		
issa hamatipes					1										1				1										1							
pelisca brevicornis									1		1	1		1										1												
pelisca diadema																																1				
pelisca macrocephala												1																								
pelisca tenuicornis	1			1	1					1	1	1	1	1		1		3	1		1		1			1			1				3	1	1	1
hyporeia elegans	1					2																														
hyporeia tenuipes	1	1		1													1																			
galuropus agilis																												1								
omaera othonis																																2				
dicorophium affine							1						2			1																				
iambus typicus																				1																
Gnathia (Type I)																													2		1	1				1
atolana borealis							5					1		2																						
haopsis graciloides																												1								
lorella emarginata									1		1																									
lorella truncatula				1			1			1		1		3	1	1	1			1	3	1	1	1		2	3	2								1
lorellopsis deformis				1		1																														
udocuma simile					2																															
stylis laevis				1		1			2	1	2	1					1						1		1	1										
CAPODA (megalopa)									1																											
lus occultus																															1					
lianassa subterranea																																1				
gebia deltaura																																2				

Taxa	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
dia longicornis																																3				
lia cranchii																												1		2			6			
lia tumefacta																																	1			
carcinus depurator																																1				
carcinus pusillus																																	1			
notheres pisum																		1																		
etoderma nitidulum							3		2	2				1																						
ritella communis				1		3	1	2			1						1												1							1
la vitrea								1		1	5																		1				1			
spira nitida							1											1	1					1						3	1	2	1	1	1	
eolina philippi				2																																
a incrassata																																1				
genfreispira brachystoma				1																																
bonilla lactea				1																																
chystomia scalaris																																		1		
vulella acuminata																																1				
chna cylindracea	5	3	3	2			1	4	1	5	9	2	5	5	6	6						2	1		1		1	3			9			2	8	4
cula nitidosa	4	3		1		2	1		1												3	2	2			8	6									
nucula tenuis										1									2																	
nia patelliformis																																1				
ndicula ferruginosa																						18														
rasira																												6								
rasira flexuosa		1															3	4	2	4		5		5		2			1							
tiella bidentata	3	11	1	6	1		6	1	3	3	5	3	19	8	14	7			2		1				8	11	2	27	7		10		1	4	6	12
tiella tumidula																								1												
imya ferruginosa	1							1															2						2		1			3		3
ctra stultorum	8	7	3	6														1																		
xas pellucidus	3	3	1	1		3				1				1				1	2	4			1				2							1		
a nitida					1			6			2			1		1		3		1			1			4				1			1		1
a prismatica																							1													
cinia lupinus			1	1				1																												
amelea striatula	6	2			1	1	2	1		1	3	3	2	6	3	6	3	7	5	3						1	1						1		
oclea ovata																																	2			
sia undata				1			1		1																1											
bula gibba	1	2		11	1		11	13	15	31	7	6	9	7	9	1	4	7	1			8	1	3		10	5	1	16		6			5	11	2
tella arctica																																	1			
Thracia convexa (?)										1																										
ronis	1	7		5							1	1																								
ropecten irregularis				1		1																1	2													
erias rubens																														1						

Taxa	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
niothrix fragilis																														16		82				
phiuridae																	4																			
phiura filiformis	38	54	20	66	10		92	23	28	28	46	39	101	67	65	83	2				4	8	3		86	89	3	40	47	13	45	1	8	54	54	181
mmechinus miliaris																																3				
ATANGOIDA									1				1			1			1										1							
inocardium	1		1												1										1			1							
inocardium cordatum	2																								3	1		1			3			7	8	1
inocardium flavescens														1								3			1											1
sopsis lyrifera								1				1		1				1		1									1							2
idoplax buskii											1	1																								
TEROPNEUSTA								1																								1				
ruca stroemia																														1		3				

F.5 BIOMASS DATA

F.5.1 Phyla Biomass Data

Station	Wet Blot Biomass [g]															
	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11
Polychaeta	0.1188	0.1354	0.1223	0.566	0.1084	0.0464	0.4735	0.0284	0.1537	0.3233	0.0663	0.1007	0.0465	30.4226	0.1437	0.0374
Crustacea	0.0082	0.0186	0.0026	0.0104	0.0064	0.0142	0.0025	0.0131	0.0062	0.2178	0.0072	0.0105	0.0099	0.0035	0.0094	0.0205
Mollusca	0.1543	3.0888	6.9725	2.0594	0.0983	0.3798	0.3108	0.2302	0.3608	5.6023	2.6415	0.3015	0.2592	0.2477	0.3921	0.0733
Echinodermata	44.391	1.7662	6.992	1.8456	0.1343	1.6886	0.7918	2.4002	0.0573	12.5471	0.9582	2.419	0.0167	1.0319	0.8476	0.0029
Others	0.0049	0.0363	0.0018	0.0383				0.0042		0.0017	0.001					

Station	Wet Blot Biomass [g]											
	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
Polychaeta	0.1402	0.0778	0.0597	0.1417	0.1557	0.5967	0.0741	0.4492	0.6577	0.5526	0.2968	1.0472
Crustacea	0.0034	0.0107	0.0124	0.0136	0.0075	0.3628	0.0016	0.6901	0.1986	0.0011	0.0031	0.0119
Mollusca	0.0221	2.6637	0.0692	0.0404	0.173	0.0854	0.1299	0.6832	0.0962	0.3115	0.1312	0.1288
Echinodermata	28.7961	5.2281	0.1185	17.8941	7.3955	5.0291	36.5183	62.4683	0.2336	120.0316	97.7586	53.5273
Others		0.0071		0.0094	2.1182	0.0096	0.0009	0.0081	0.0024	0.0286	0.0193	0.0722

Station	AFDW Biomass [g]															
	7FST46	7FST47	7FST48	7FST49	8PST01	8PST02	9PST02	9PST03	9PST04	9PST05	9PST06	9PST07	9PST08	9PST09	9PST10	9PST11
Polychaeta	0.0184	0.0210	0.0190	0.0877	0.0168	0.0072	0.0349	0.0479	0.0971	0.0178	0.0803	0.0547	0.0847	0.0672	0.0734	0.0044
Crustacea	0.0018	0.0042	0.0006	0.0023	0.0014	0.0032	0.0102	0.0003	0.0054	0.0025	0.0036		0.0018	0.0703	0.0006	0.0029
Mollusca	0.0131	0.2625	0.5927	0.1750	0.0084	0.0323	0.0562	0.4968	0.0139	0.0308	0.0223	0.0458	0.0085	0.6869	0.0264	0.0196
Echinodermata	3.5513	0.1413	0.5594		0.0107	0.1351	0.0914	0.2175	0.2122	0.0694	0.0540	0.3157	0.2015	1.6383	0.0633	0.1920
Others	0.0008	0.0056	0.0003	0.0059	0.0000	0.0000	0.0016	0.0023	0.0140	0.0058	0.0013	0.0139	0.0162	0.1046	0.0000	0.0007

Station	AFDW Biomass [g]											
	10PST01	10PST02	10PST03	10PST04	10PST05	10PST06	10PST07	10PST08	10PST09	10PST10	10PST11	10PST12
Polychaeta	0.0217	0.0121	0.0093	0.0220	0.0241	0.0925	0.0115	0.0696	0.1019	0.0857	0.0460	0.1623
Crustacea	0.0008	0.0024	0.0028	0.0031	0.0017	0.0816	0.0004	0.1553	0.0447	0.0002	0.0007	0.0027
Mollusca	0.0019	0.2264	0.0059	0.0034	0.0147	0.0073	0.0110	0.0581	0.0082	0.0265	0.0112	0.0109
Echinodermata	2.3037	0.4182	0.0095	1.4315	0.5916	0.4023	2.9215	4.9975	0.0187	9.6025	7.8207	4.2822
Others	0.0000	0.0011	0.0000	0.0015	0.3283	0.0015	0.0001	0.0013	0.0004	0.0044	0.0030	0.0112

Note:
AFDW = Ash free dry weight

F.5.2 Species Biomass Abundance Data

Taxa	SDC	Aphia ID	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01
PLATYHELMINTHES	F0001	793		4	1		1	1	1	
NEMERTEA	G0001	152391		1	1	3	1	3	2	4
Priapulus caudatus	J0007	101160	1							
Golfingia elongata	N0014	175026			2			P		
POLYCHAETA (fragments)	P0002	883	P	P	P	P			P	
Polynoidae	P0025	939						1		1
Gattyana cirrhosa	P0049	130749				1		1		
Pholoe baltica	P0092	130599	7		1		4	7	3	3
Pholoe inornata	P0094	130601				3	1			1
Sthenelais	P0106	129595	1		1			1		
Glycera	P0255	129296								1
Glycera lapidum	P0260	130123				2				
Glycera unicornis	P0255	130131		3	1		3	3		
Glycinde nordmanni	P0268	130136	2	2				1		
Goniada maculata	P0271	130140	1	2	5		1			1
Oxydromus flexuosus	P0313	710680	2							1
Glyphohesione klatti	P0340	130696	1							
Nephtys	P0494	129370	1	1						
Nephtys (juv.)	P0494	129370		1	4			2	1	
Nephtys hombergii	P0499	130359	1					1	1	2
Nephtys incisa	P0501	130362					1			
Nephtys kersivalensis	P0502	130363					2			
Lumbrineris cingulata	P0572	130240	2		3					
Scoloplos armiger	P0672	334772	1							
Levinsenia gracilis	P0693	130578	1					2	1	
Chaetopterus variopedatus	P0814	129914						P		
Chaetozone setosa	P0834	129955	3	3	1					1
Diplocirrus glaucus	P0878	130100	4	3	3	1	3	2	3	3
Notomastus	P0920	129220							1	
Oweniidae	P1090	975					P			
Owenia	P1097	129427							2	1
Owenia borealis	P1097	329882	2							
Pectinariidae (juv.)	P1100	980			2					2
Amphictene auricoma	P1102	152448	12	6	7	4	5	6	19	13
Amphicteis gunneri	P1142	129784					1			
Terebellides stroemii	P1175	131573				2				
Perioculodes longimanus	S0131	102915								1
Synchelidium maculatum	S0138	102928		1						
Harpinia antennaria	S0254	102960	4		2	8				1
Hippomedon denticulatus	S0296	102570							1	

Taxa	SDC	Aphia ID	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01
Ampelisca brevicornis	S0427	101891			1		1	1		1
Ampelisca macrocephala	S0432	101908						1		
Ampelisca tenuicornis	S0440	101930				1	1	1	1	1
Bathyporeia (juv.)	S0451	101742							1	
Medicorophium affine	S0608	423507	1						2	
Natatolana borealis	S0844	118859	5					1		2
Eudorella emarginata	S1206	110524			1		1			
Eudorella truncatula	S1208	110535	1			1		1		3
Diastylis laevis	S1251	110481			2	1	2	1		
DECAPODA (megalopa)	S1276	1130			1					
Ebalia (juv.)	S1504	106889						1		
Chaetoderma nitidulum	W0009	139106	3		2	2		P		1
Turritella communis	W0270	141872	1	2			1			
Hyala vitrea	W0410	140129		1		1	5			
Euspira nitida	W0491	151894	1							
Cylichna cylindracea	W1028	139476	1	4	1	5	9	2	5	5
Nuculidae (juv.)	W1563	204			1					
Nucula (juv.)	W1565	138262	1							
Nucula nitidosa	W1569	140589	1		1					
Ennucula tenuis	W1577	140584				1				
Thyasira (juv.)	W1835	138552		1						
Tellimya ferruginosa	W1902	146952		1						
Kurtiella bidentata	W1906	345281	6	1	3	3	5	3	19	8
Phaxas pellucidus	W2006	140737				1				1
Abra (juv.)	W2058	138474				1				
Abra nitida	W2061	141435		6			2			1
Veneridae (juv.)	W2086	243							1	
Dosinia (juv.)	W2126	138636	2				1			
Dosinia lupinus	W2128	141912		1						
Chamelea striatula	W2097	141908	2	1		1	3	3	2	6
Mysia undata	W2139	140728	1		1					
Corbula gibba	W2157	139410	11	13	15	31	7	6	9	7
Thracia convexa (?)	W2229	141644				1				
Phoronis	ZA0003	128545					1	1		
Amphiuridae (juv.)	ZB0148	123206	20		25	10	20	40		41
Amphiura filiformis	ZB0154	125080	92	23	28	28	46	39	101	67
SPATANGOIDA	ZB0213	123106			1				1	
Echinocardium flavescens	ZB0224	124394								1
Brissopsis lyrifera	ZB0228	124373		1				1		1
Labidoplax buskii	ZB0299	124455					1	1		
ENTEROPNEUSTA	ZC0012	1820		1						

Taxa	SDC	Aphia ID	8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01
Note: SDC = Taxon code from: The species directory of the marine fauna and flora of the British Isles and surrounding seas APHIA ID = World Register of Marine Species (WoRMS) taxon code										

F.5.3 Species Biomass Data

Taxon	SDC	Aphia ID	Wet Blot Biomass [g]							
			8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01
PLATYHELMINTHES	F0001	793		0.0104	0.0012		0.0018	0.0107	0.0015	
NEMERTEA	G0001	152391		0.0044	0.0015	0.0376	0.0066	0.0458	0.1031	0.6747
Priapulus caudatus	J0007	101160	0.0106							
Golfingia elongata	N0014	175026			0.0879			0.0331		
POLYCHAETA (fragments)	P0002	883	0.0038	0.0085	0.011	0.0185			0.0023	
Polynoidae	P0025	939						0.0007		0.0011
Gattyana cirrhosa	P0049	130749				0.0006		0.0151		
Pholoe baltica	P0092	130599	0.0034		0.0008		0.0008	0.0037	0.0016	0.0012
Pholoe inornata	P0094	130601				0.0009	0.0007			0.0001
Sthenelais	P0106	129595	0.0183		0.0012			0.0042		
Glycera	P0255	129296								0.0004
Glycera lapidum	P0260	130123				0.0018				
Glycera unicornis	P0255	130131		0.1216	0.4502		0.1416	0.0701		
Glycinde nordmanni	P0268	130136	0.0084	0.0067				0.0006		
Goniada maculata	P0271	130140	0.0061	0.0019	0.018		0.0048			0.0076
Oxydromus flexuosus	P0313	710680	0.0564							0.0159
Glyphohesione klatti	P0340	130696	0.001							
Nephtys	P0494	129370	0.0007	0.004						
Nephtys (juv.)	P0494	129370		0.001	0.0081			0.001	0.001	
Nephtys hombergii	P0499	130359	0.0078					0.003	0.0355	0.0307
Nephtys incisa	P0501	130362					0.0325			
Nephtys kersivalensis	P0502	130363					0.0308			
Lumbrineris cingulata	P0572	130240	0.0234		0.0174					
Scoloplos armiger	P0672	334772	0.0014							
Levinsenia gracilis	P0693	130578	0.0002					0.0005	0.0001	
Chaetopterus variopedatus	P0814	129914						0.0702		
Chaetozone setosa	P0834	129955	0.0073	0.0015	0.0003					0.0005
Diplocirrus glaucus	P0878	130100	0.0115	0.0113	0.0153	0.0058	0.0053	0.013	0.0131	0.0088
Notomastus	P0920	129220							0.099	
Oweniidae	P1090	975					0.0044			
Owenia	P1097	129427							0.0121	0.0284
Owenia borealis	P1097	329882	0.0286							
Pectinariidae (juv.)	P1100	980			0.0003					0.0001
Amphictene auricoma	P1102	152448	0.0467	0.1527	0.1038	0.0813	0.2158	0.1709	0.382	0.3387
Amphicteis gunneri	P1142	129784					0.0813			
Terebellides stroemii	P1175	131573				0.0061				
Perioculodes longimanus	S0131	102915								0.001
Synchelidium maculatum	S0138	102928		0.0013						
Harpinia antennaria	S0254	102960	0.0077		0.0021	0.008				0.0016

Taxon	SDC	Aphia ID	Wet Blot Biomass [g]							
			8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01
Hippomedon denticulatus	S0296	102570							0.0034	
Ampelisca brevicornis	S0427	101891			0.0094		0.0085	0.0135		0.0059
Ampelisca macrocephala	S0432	101908						0.0006		
Ampelisca tenuicornis	S0440	101930				0.0019	0.0018	0.0012	0.0008	0.0007
Bathyporeia (juv.)	S0451	101742							0.0011	
Medicorophium affine	S0608	423507	0.0011						0.0029	
Natatolana borealis	S0844	118859	0.0361					0.0927		0.084
Eudorella emarginata	S1206	110524			0.0039		0.0045			
Eudorella truncatula	S1208	110535	0.0004			0.0005		0.0001		0.0013
Diastylis laevis	S1251	110481			0.0026	0.0007	0.0012	0.0024		
DECAPODA (megalopa)	S1276	1130			0.0061					
Ebalia (juv.)	S1504	106889						0.0013		
Chaetoderma nitidulum	W0009	139106	0.0269		0.0121	0.014		0.0104		0.0003
Turritella communis	W0270	141872	0.2453	0.4892			0.1471			
Hyala vitrea	W0410	140129		0.0022		0.0011	0.0093			
Euspira nitida	W0491	151894	0.0031							
Cylichna cylindracea	W1028	139476	0.006	0.0166	0.0045	0.0383	0.031	0.0069	0.015	0.0148
Nuculidae (juv.)	W1563	204			0.0015					
Nucula (juv.)	W1565	138262	0.0019							
Nucula nitidosa	W1569	140589	0.0041		0.0098					
Ennucula tenuis	W1577	140584				0.002				
Thyasira (juv.)	W1835	138552		0.0011						
Tellimya ferruginosa	W1902	146952		0.0032						
Kurtiella bidentata	W1906	345281	0.0078	0.0012	0.0031	0.0036	0.0072	0.0057	0.0262	0.012
Phaxas pellucidus	W2006	140737				0.1598				0.0226
Abra (juv.)	W2058	138474				0.0017				
Abra nitida	W2061	141435		0.1083			0.0062			0.0041
Veneridae (juv.)	W2086	243							0.0065	
Dosinia (juv.)	W2126	138636	0.0238				0.0148			
Dosinia lupinus	W2128	141912		5.1589						
Chamelea striatula	W2097	141908	0.2185	0.0067		0.0023	0.0159	0.415	0.0293	0.0809
Mysia undata	W2139	140728	0.0019		0.0955					
Corbula gibba	W2157	139410	0.1219	0.0576	0.0373	0.1379	0.031	0.1009	0.0232	0.0129
Thracia convexa (?)	W2229	141644				0.0018				
Phoronis	ZA0003	128545					0.0038	0.0008		
Amphiuridae (juv.)	ZB0148	123206	0.0077		0.015	0.0099	0.0255	0.0812		0.0556
Amphiura filiformis	ZB0154	125080	1.1351	0.2088	0.377	0.8575	0.6404	0.6659	1.5756	1.233
SPATANGOIDA	ZB0213	123106			2.2611				0.9437	
Echinocardium flavescens	ZB0224	124394								4.5162
Brissopsis lyrifera	ZB0228	124373		2.5056				3.1973		0.1516
Labidoplax buskii	ZB0299	124455					0.005	0.0016		

Taxon	SDC	Aphia ID	Wet Blot Biomass [g]							
			8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01
ENTEROPNEUSTA	ZC0012	1820		0.0041						

Note:
SDC = Taxon code from: The species directory of the marine fauna and flora of the British Isles and surrounding seas
APHIA ID = World Register of Marine Species (WoRMS) taxon code

Taxon	SDC	Aphia ID	AFDW Biomass [g]							
			8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01
PLATYHELMINTHES	F0001	793		0.0016	0.0002		0.0003	0.0017	0.0002	
NEMERTEA	G0001	152391		0.0007	0.0002	0.0058	0.0010	0.0071	0.0160	0.1046
Priapulus caudatus	J0007	101160	0.0016							
Golfingia elongata	N0014	175026			0.0136			0.0051		
POLYCHAETA (fragments)	P0002	883	0.0006	0.0013	0.0017	0.0029			0.0004	
Polynoidae	P0025	939						0.0001		0.0002
Gattyana cirrhosa	P0049	130749				0.0001		0.0023		
Pholoe baltica	P0092	130599	0.0005		0.0001		0.0001	0.0006	0.0002	0.0002
Pholoe inornata	P0094	130601				0.0001	0.0001			
Sthenelais	P0106	129595	0.0028		0.0002			0.0007		
Glycera	P0255	129296								0.0001
Glycera lapidum	P0260	130123				0.0003				
Glycera unicornis	P0255	130131		0.0188	0.0698		0.0219	0.0109		
Glycinde nordmanni	P0268	130136	0.0013	0.0010			0.0000	0.0001		
Goniada maculata	P0271	130140	0.0009	0.0003	0.0028		0.0007			0.0012
Oxydromus flexuosus	P0313	710680	0.0087							0.0025
Glyphohesione klatti	P0340	130696	0.0002							
Nephtys	P0494	129370	0.0001	0.0006						
Nephtys (juv.)	P0494	129370		0.0002	0.0013			0.0002	0.0002	
Nephtys hombergii	P0499	130359	0.0012					0.0005	0.0055	0.0048
Nephtys incisa	P0501	130362					0.0050			
Nephtys kersivalensis	P0502	130363					0.0048			
Lumbrineris cingulata	P0572	130240	0.0036		0.0027					
Scoloplos armiger	P0672	334772	0.0002							
Levinsenia gracilis	P0693	130578						0.0001		
Chaetopterus variopedatus	P0814	129914						0.0109		
Chaetozone setosa	P0834	129955	0.0011	0.0002						0.0001
Diplocirrus glaucus	P0878	130100	0.0018	0.0018	0.0024	0.0009	0.0008	0.0020	0.0020	0.0014
Notomastus	P0920	129220							0.0153	
Oweniidae	P1090	975					0.0007			
Owenia	P1097	129427							0.0019	0.0044
Owenia borealis	P1097	329882	0.0044							
Pectinariidae (juv.)	P1100	980								
Amphictene auricoma	P1102	152448	0.0072	0.0237	0.0161	0.0126	0.0334	0.0265	0.0592	0.0525
Amphicteis gunneri	P1142	129784					0.0126			
Terebellides stroemii	P1175	131573				0.0009				
Perioculodes longimanus	S0131	102915								0.0002
Synchelidium maculatum	S0138	102928		0.0003						
Harpinia antennaria	S0254	102960	0.0017		0.0005	0.0018				0.0004
Hippomedon denticulatus	S0296	102570							0.0008	

Taxon	SDC	Aphia ID	AFDW Biomass [g]							
			8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01
Ampelisca brevicornis	S0427	101891			0.0021		0.0019	0.0030		0.0013
Ampelisca macrocephala	S0432	101908						0.0001		
Ampelisca tenuicornis	S0440	101930				0.0004	0.0004	0.0003	0.0002	0.0002
Bathyporeia (juv.)	S0451	101742							0.0002	
Medicorophium affine	S0608	423507	0.0002						0.0007	
Natatolana borealis	S0844	118859	0.0081					0.0209		0.0189
Eudorella emarginata	S1206	110524			0.0009		0.0010			
Eudorella truncatula	S1208	110535	0.0001			0.0001				0.0003
Diastylis laevis	S1251	110481			0.0006	0.0002	0.0003	0.0005		
DECAPODA (megalopa)	S1276	1130			0.0014					
Ebalia (juv.)	S1504	106889						0.0003		
Chaetoderma nitidulum	W0009	139106	0.0023		0.0010	0.0012		0.0009		
Turritella communis	W0270	141872	0.0209	0.0416			0.0125			
Hyala vitrea	W0410	140129		0.0002		0.0001	0.0008			
Euspira nitida	W0491	151894	0.0003							
Cylichna cylindracea	W1028	139476	0.0005	0.0014	0.0004	0.0033	0.0026	0.0006	0.0013	0.0013
Nuculidae (juv.)	W1563	204			0.0001					
Nucula (juv.)	W1565	138262	0.0002							
Nucula nitidosa	W1569	140589	0.0003		0.0008					
Ennucula tenuis	W1577	140584				0.0002				
Thyasira (juv.)	W1835	138552		0.0001						
Tellimya ferruginosa	W1902	146952		0.0003						
Kurtiella bidentata	W1906	345281	0.0007	0.0001	0.0003	0.0003	0.0006	0.0005	0.0022	0.0010
Phaxas pellucidus	W2006	140737				0.0136				0.0019
Abra (juv.)	W2058	138474				0.0001				
Abra nitida	W2061	141435		0.0092			0.0005			0.0003
Veneridae (juv.)	W2086	243							0.0006	
Dosinia (juv.)	W2126	138636	0.0020				0.0013			
Dosinia lupinus	W2128	141912		0.4385						
Chamelea striatula	W2097	141908	0.0186	0.0006		0.0002	0.0014	0.0353	0.0025	0.0069
Mysia undata	W2139	140728	0.0002		0.0081					
Corbula gibba	W2157	139410	0.0104	0.0049	0.0032	0.0117	0.0026	0.0086	0.0020	0.0011
Thracia convexa (?)	W2229	141644				0.0002				
Phoronis	ZA0003	128545					0.0003	0.0001		
Amphiuridae (juv.)	ZB0148	123206	0.0006		0.0012	0.0008	0.0020	0.0065		0.0044
Amphiura filiformis	ZB0154	125080	0.0908	0.0167	0.0302	0.0686	0.0512	0.0533	0.1260	0.0986
SPATANGOIDA	ZB0213	123106			0.1809				0.0755	
Echinocardium flavescens	ZB0224	124394								0.3613
Brissopsis lyrifera	ZB0228	124373		0.2004				0.2558		0.0121
Labidoplax buskii	ZB0299	124455					0.0004	0.0001		
ENTEROPNEUSTA	ZC0012	1820		0.0003						

Taxon	SDC	Aphia ID	AFDW Biomass [g]							
			8PST03	8PST04	8PST05	8PST06	8PST07	8PST08	8PST09	9PST01

Note:
SDC = Taxon code from: The species directory of the marine fauna and flora of the British Isles and surrounding seas
APHIA ID = World Register of Marine Species (WoRMS) taxon code
AFDW = Ash free dry weight

G. STATISTICAL ANALYSIS RESULTS

G.1 UNIVARIATE ANALYSES

Station	Total Species [S]	Total Individuals [N]	Margalef's Richness [d]	Pielou's Evenness [J']	Shannon-Weiner [H'(log^2)]	Simpson's Dominance [1-λ]
7FST46	24	100	4.994387	0.749246	2.381145	0.831717
7FST47	28	142	5.448132	0.754756	2.515002	0.836879
7FST48	18	49	4.368136	0.737267	2.130977	0.802721
7FST49	36	150	6.985142	0.684892	2.454323	0.792931
8PST01	16	34	4.253677	0.838992	2.326181	0.877005
8PST02	16	27	4.551196	0.964049	2.672912	0.960114
8PST03	30	172	5.633809	0.608774	2.070559	0.702434
8PST04	22	81	4.778756	0.814188	2.516689	0.881173
8PST05	24	85	5.177089	0.764810	2.430607	0.852381
8PST06	21	101	4.333581	0.722276	2.198986	0.821980
8PST07	25	108	5.125871	0.726108	2.337251	0.802700
8PST08	26	91	5.542181	0.725646	2.364226	0.802930
8PST09	18	174	3.295177	0.556148	1.607475	0.638031
9PST01	28	139	5.471708	0.655416	2.183980	0.751851
9PST02	17	130	3.287085	0.658188	1.864787	0.723673
9PST03	19	123	3.740505	0.498799	1.468684	0.538585
9PST04	18	34	4.820834	0.930009	2.688072	0.946524
9PST05	21	50	5.112444	0.900984	2.743065	0.937143
9PST06	18	38	4.673429	0.907574	2.623227	0.928876
9PST07	16	39	4.094376	0.910844	2.525394	0.920378
9PST08	11	22	3.235155	0.927605	2.224300	0.917749
9PST09	17	63	3.861810	0.835483	2.367103	0.878648
9PST10	19	31	5.241720	0.951625	2.802001	0.961290
9PST11	12	20	3.671890	0.921544	2.289952	0.921053
10PST01	16	116	3.155510	0.427807	1.186133	0.445577
10PST02	22	152	4.180036	0.572127	1.768469	0.644737
10PST03	17	47	4.155685	0.889345	2.519703	0.915819
10PST04	22	114	4.433936	0.711108	2.198064	0.814004
10PST05	26	109	5.328959	0.694831	2.263827	0.788481
10PST06	27	113	5.499866	0.775099	2.554599	0.883217
10PST07	18	104	3.660329	0.733672	2.120586	0.788835
10PST08	33	162	6.289807	0.612207	2.140588	0.726478
10PST09	38	107	7.918116	0.771798	2.807482	0.862282
10PST10	20	101	4.116902	0.654789	1.961573	0.704356
10PST11	22	132	4.300809	0.703666	2.175060	0.799676
10PST12	33	282	5.671841	0.481983	1.685256	0.578607

G.2 MULTIVARIATE ANALYSES

Full SIMPER Results

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Group b - Less than 2 samples in group					
Group f - Less than 2 samples in group					
Group g - Average similarity: 57.35					
Amphiura filiformis	2.68	6.98	17.97	12.17	12.17
Spiophanes bombyx	1.78	4.78	10.92	8.33	20.50
Mactra stultorum	1.62	4.34	8.87	7.57	28.07
Pholoe baltica	1.44	3.87	10.90	6.74	34.81
Kurtiella bidentata	1.57	3.80	19.61	6.63	41.44
Cylichna cylindracea	1.33	3.38	6.72	5.89	47.33
Harpinia antennaria	1.39	3.15	6.07	5.48	52.82
Phoronis	1.37	3.15	6.07	5.48	58.30
Nucula nitidosa	1.24	3.05	3.93	5.32	63.62
Phaxas pellucidus	1.21	3.05	3.93	5.32	68.94
Scoloplos armiger	1.20	2.89	19.61	5.04	73.98
Corbula gibba	1.34	2.89	19.61	5.04	79.02
Magelona filiformis	1.11	2.73	10.90	4.77	83.79
Bathyporeia tenuipes	1.00	2.73	10.90	4.77	88.55
Chamelea striatula	0.92	1.19	0.58	2.07	90.62
Amphiura filiformis	2.68	6.98	17.97	12.17	12.17
Group d - Average similarity: 40.54					
Amphiura filiformis	2.08	9.10	24.64	22.45	22.45
Harpinia antennaria	1.35	6.89	3.31	16.98	39.43
Scoloplos armiger	1.13	6.32	31.91	15.58	55.01
Nephtys hombergii	1.00	5.98	9.33	14.76	69.77
Kurtiella bidentata	1.23	5.98	9.33	14.76	84.53
Ampelisca tenuicornis	0.67	2.18	0.58	5.37	89.90
Sthenelais	0.73	2.05	0.58	5.05	94.95
Amphiura filiformis	2.08	9.10	24.64	22.45	22.45
Harpinia antennaria	1.35	6.89	3.31	16.98	39.43
Scoloplos armiger	1.13	6.32	31.91	15.58	55.01
Nephtys hombergii	1.00	5.98	9.33	14.76	69.77
Kurtiella bidentata	1.23	5.98	9.33	14.76	84.53
Ampelisca tenuicornis	0.67	2.18	0.58	5.37	89.90
Sthenelais	0.73	2.05	0.58	5.05	94.95
Amphiura filiformis	2.08	9.10	24.64	22.45	22.45
Harpinia antennaria	1.35	6.89	3.31	16.98	39.43
Scoloplos armiger	1.13	6.32	31.91	15.58	55.01
Nephtys hombergii	1.00	5.98	9.33	14.76	69.77
Kurtiella bidentata	1.23	5.98	9.33	14.76	84.53
Ampelisca tenuicornis	0.67	2.18	0.58	5.37	89.90
Sthenelais	0.73	2.05	0.58	5.05	94.95

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Group e - Average similarity: 54.40					
Amphiura filiformis	2.65	8.23	5.33	15.93	15.93
Corbula gibba	1.64	5.04	4.26	9.76	25.69
Kurtiella bidentata	1.59	4.88	5.24	9.45	35.14
Amphictene auricoma	1.55	4.42	2.44	8.56	43.70
Diplocirrus glaucus	1.32	4.29	6.51	8.31	52.01
Cylichna cylindracea	1.31	3.88	2.30	7.50	59.51
Chaetozone setosa	0.94	2.19	1.12	4.23	63.75
Nephtys hombergii	0.85	2.09	1.12	4.04	67.79
Pholoe baltica	0.93	1.87	0.95	3.62	71.40
NEMERTEA	0.84	1.81	0.95	3.50	74.90
Chamelea striatula	0.79	1.60	0.81	3.10	78.00
Goniada maculata	0.72	1.46	0.81	2.82	80.83
Harpinia antennaria	0.79	1.42	0.68	2.74	83.57
Ampelisca tenuicornis	0.59	1.11	0.69	2.15	85.72
Eudorella truncatula	0.58	0.92	0.59	1.79	87.50
Scoloplos armiger	0.47	0.59	0.42	1.14	88.64
Glycinde nordmanni	0.46	0.54	0.42	1.04	89.68
Abra nitida	0.46	0.53	0.42	1.02	90.70
Group c - Average similarity: 43.47					
Harpinia antennaria	1.42	6.07	6.15	13.97	13.97
Chaetozone setosa	1.17	5.15	7.27	11.85	25.82
Thyasira flexuosa	1.19	4.65	1.59	10.69	36.52
Corbula gibba	1.23	4.28	1.58	9.85	46.36
Scoloplos armiger	1.10	4.25	1.63	9.79	56.15
Nephtys hombergii	0.93	2.83	1.04	6.50	62.65
Eudorella truncatula	0.77	2.65	1.03	6.09	68.74
Chamelea striatula	0.84	1.94	0.71	4.45	73.20
Diplocirrus glaucus	0.67	1.72	0.73	3.97	77.16
Amphiura filiformis	0.91	1.23	0.51	2.83	79.99
Sthenelais	0.52	1.13	0.51	2.59	82.58
Phaxas pellucidus	0.58	1.04	0.51	2.39	84.98
Abra nitida	0.59	0.97	0.51	2.23	87.20
Glycinde nordmanni	0.54	0.95	0.51	2.18	89.38
Ampelisca tenuicornis	0.54	0.91	0.51	2.09	91.47
Group a - Average similarity: 46.24					
Lumbrineris cingulata	2.24	5.30	9.04	11.46	11.46
Spirobranchus	1.27	3.15	8.45	6.82	18.28
Amphiura filiformis	1.53	3.14	3.02	6.79	25.08
Spirobranchus lamarcki	1.50	2.91	4.47	6.30	31.38
Harmothoe	1.13	2.73	6.22	5.90	37.27
Glycera alba	1.13	2.73	6.22	5.90	43.17
Euspira nitida	1.17	2.73	6.22	5.90	49.07
NEMERTEA	1.06	2.56	15.75	5.53	54.60
Goniada maculata	1.06	2.56	15.75	5.53	60.13
Amphictene auricoma	1.11	2.56	15.75	5.53	65.66
Hydroides norvegica	1.00	2.56	15.75	5.53	71.19
Gnathia (Type I)	1.06	2.56	15.75	5.53	76.72
Ophiothrix fragilis	1.67	1.81	0.58	3.91	80.63
Sphaerodorum gracilis	0.94	1.19	0.58	2.57	83.20
Ebalia cranchii	0.92	1.02	0.58	2.21	85.40
Pholoe baltica	0.73	0.90	0.58	1.95	87.36
Magelona alleni	0.73	0.90	0.58	1.95	89.31
Verruca stroemia	0.77	0.90	0.58	1.95	91.26