Norfolk Boreas Offshore Wind Farm

Appendix 10.2

Benthic Ecology Data Analysis

Environmental Statement

Volume 3

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Table of Contents

Tables

Figures

Plates

Glossary of Acronyms

MDS	Multi-Dimensional Scaling
PRIMER	Plymouth Routines in Multivariate Ecological Research
PSD	Particle Size Distribution
SIMPER	Similarity Percentages
SIMPROF	Similarity Profile Analysis
ZEA	Zone Environmental Appraisal
PSD	Particle Size Distribution

Glossary of Terminology

Dendrogram	A method for arranging samples to show how they relate to each other.
Diversity index	Indication of how diverse a sample is.
Fractional Composition [of sediment]	The percentage of three fractional components (Mud, Sand and Gravel) that make up each sediment sample.
Multivariate statistical analyses	Analysis which considers more than one variable in the same test.
Infaunal	Organisms that live within the sediment
Infaunal Community	The range of different species which occur in a set area.

10 Benthic Ecology Data Analysis

10.1 Introduction

1. This appendix contains the results of analysis that was conducted to characterise the infaunal communities which exist across the former East Anglia Zone and within the Norfolk Boreas offshore project area.

2. As outlined in Chapter 10 Benthic Ecology, data from separate survey campaigns have been used to inform the benthic ecology baseline. These include: Zone Environmental Appraisal (ZEA) surveys undertaken in 2010/11; surveys of the former East Anglia FOUR site undertaken in 2013; surveys of the Norfolk Vanguard offshore project area (herein referred to as offshore cable corridor surveys) undertaken in 2016 and site specific surveys undertaken within the Norfolk Boreas site undertaken in 2017. Data have been collected using three different methodologies:

    - Grab samples to characterise the infauna (animals living within the sediment);
    - Video footage to identify the presence and extent of biogenic reefs (reef structures created by organisms); and
    - Beam trawls during the ZEA surveys to characterise the epifauna (animals living attached to the sea bed).

3. The analysis reported within this appendix was conducted on the grab sample data only as, of the three sample techniques this is the only one where samples are of a quantifiable and equivalent size.

4. There are two main types of analysis that are reported in this appendix:

    - Section 10.2 provides comparison of the broad make up of community structure in terms of the overall taxa within the samples; and
    - Section 10.3 provides statistical analysis of the different communities found within the data using species level analysis.

5. Table 10.1 illustrates the number of grab samples which were included in the different analysis.

Table 10.1 Sample numbers included within the analyses

Study Area	Number of grab samples (Infauna and sediment)	
	Taxonomic comparison	Statistical analysis
2011 ZEA Surveys	566	566
2013 East Anglia FOUR surveys	5	Not used
2016 Offshore cable corridor surveys	65	65
2017 Norfolk Boreas site surveys	10	10
Total	**636**	**631**

6. The strategy taken for the Norfolk Boreas site survey was to collect 35 grab samples across the Norfolk Boreas site and analyse an initial subset of 10 (see Appendix 10.1 for further detail) for Benthic species. The results of the analysis from the subset were then presented to Natural England and the MMO in a draft report in October 2017. Following some additional work requested by the MMO an updated report was submitted in November 2017. Following the updated report the MMO and Natural England agreed that the initial analysis of the subset of 10 samples was sufficient to characterise the site.

10.2 Taxonomic comparison

7. A total of 566 benthic grabs samples were collected during the ZEA survey for characterisation purposes, 65 during the offshore cable corridor surveys, five samples collected during the East Anglia FOUR survey as well as 10 samples collected during the Norfolk Boreas site surveys. From these, 527 taxa were identified, with an average of 97 individuals and 16 taxa recorded per sample. Of these grab samples, 105 were taken within Norfolk Boreas site, 43 from within the offshore cable corridor and 44 from within the project interconnector search area.

8. Analyses of the ZEA data along with the site specific data show that across the former Zone, polychaete worms were the most abundant class of taxa contributing to 62.7% of the abundance (Plate 10.1) and were the most diverse group, making the largest contribution (45.2%) to the taxonomic richness (Plate 10.2). The ZEA report (EAOW, 2012) shows that echinoderms (brittlestars, starfish and sea urchins) represent the largest contribution to biomass across the former Zone (as ash-free dry weight (AFDW) in grams) (37%) followed by annelids (32%).

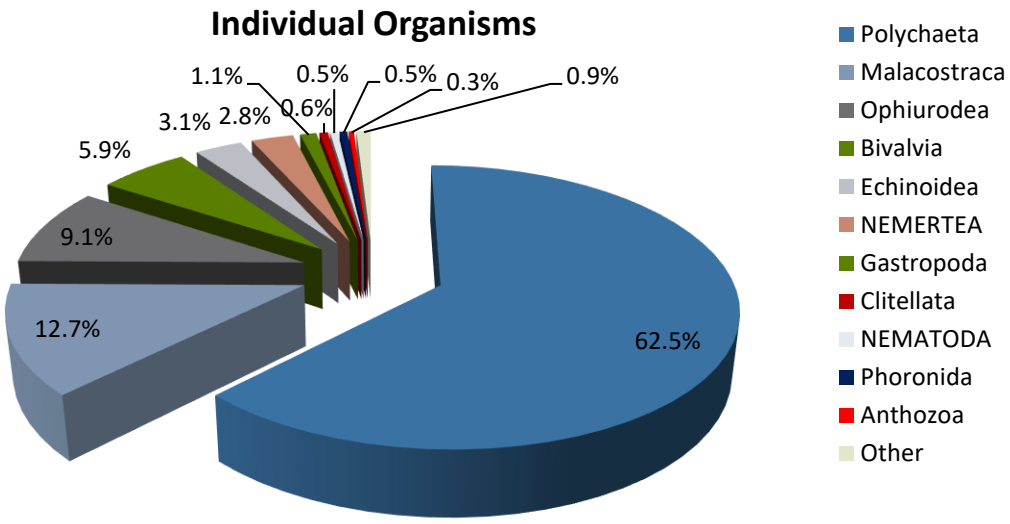

Plate 10.1 Infaunal breakdown for the former East Anglia Zone area (Includes data from Zone, Norfolk Boreas site, offshore cable corridor and East Anglia FOUR surveys): Number of individuals by class. Where species identification to class is not possible, species are displayed by phylum (for example Nemertea and Nematoda).

9. Within the top ten taxa recorded across the former Zone (using combined data), the most abundant were the Ross worm *Sabellaria spinulosa* (20114 individuals recorded), the polychaete worm *Spiophanes bombyx* (3813 individuals recorded), unidentified species from the class Ophiuroidea (brittlestars) and the long-clawed porcelain crab *Pisidia longicornis*. Together these accounted for nearly 45% of the total abundance. Overall abundance across the former Zone was low with the majority of samples containing less than 200 individuals. 11 samples contained 1,000 or more individuals.

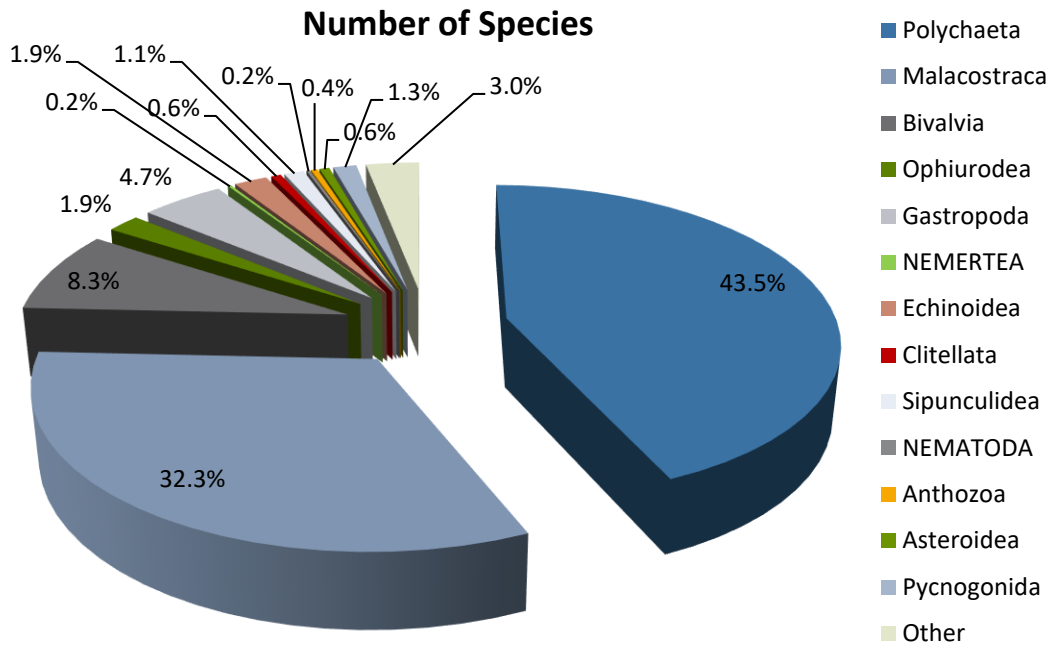

Plate 10.2 Infaunal breakdown for the former East Anglia Zone area (Includes data from Zone, Norfolk Boreas, Norfolk Vanguard and East Anglia FOUR surveys): Number of species by class. Where species identification to class is not possible, species are displayed by phylum (for example Nemertea and Nematoda)

10.2.1 The Norfolk Boreas site

10. The infaunal communities within the Norfolk Boreas site are dominated by many of the same species groups as the former Zone (Plate 10.3 and Plate 10.1). Polychaete worms are the most numerous class in terms of individuals followed by Malacostraca (a class of Crustacea), representing 63.1% and 9.5% respectively of all individuals recorded within the Norfolk Boreas site.

11. 90 polychaete worms were recorded in the Boreas site representing 45.2% of all species recorded (taxanomic richness). 59 Malacostraca species were recorded in the Norfolk Boreas site representing 29.6% of all species recorded (Plate 10.4).

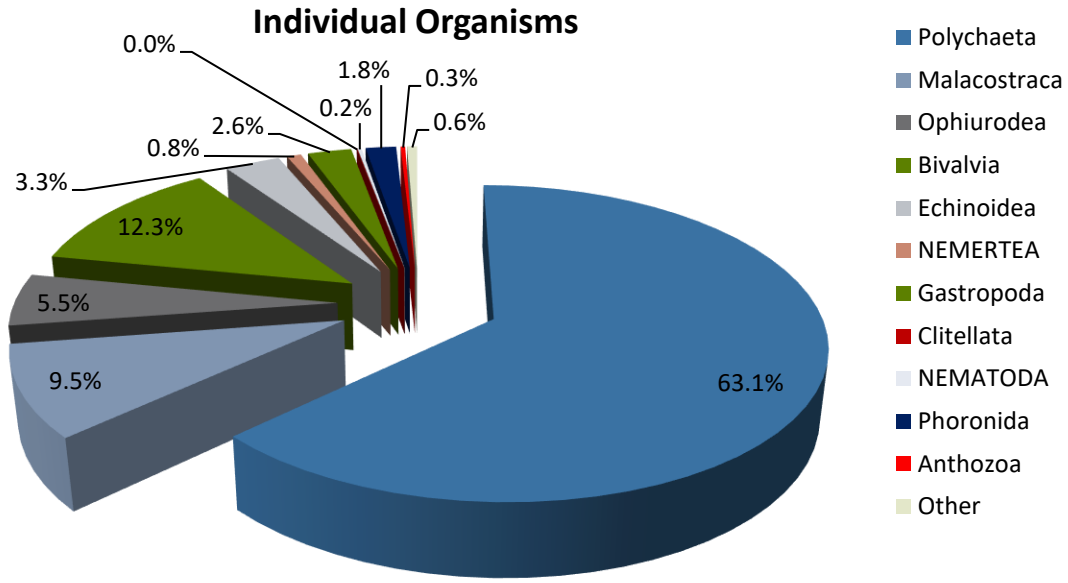

Plate 10.3 Infaunal breakdown for the Norfolk Boreas Site (Includes data from Zone, Norfolk Boreas site specific): Number of individuals by class. Where species identification to class is not possible, species are displayed by phylum (for example Nemertea and Nematoda)

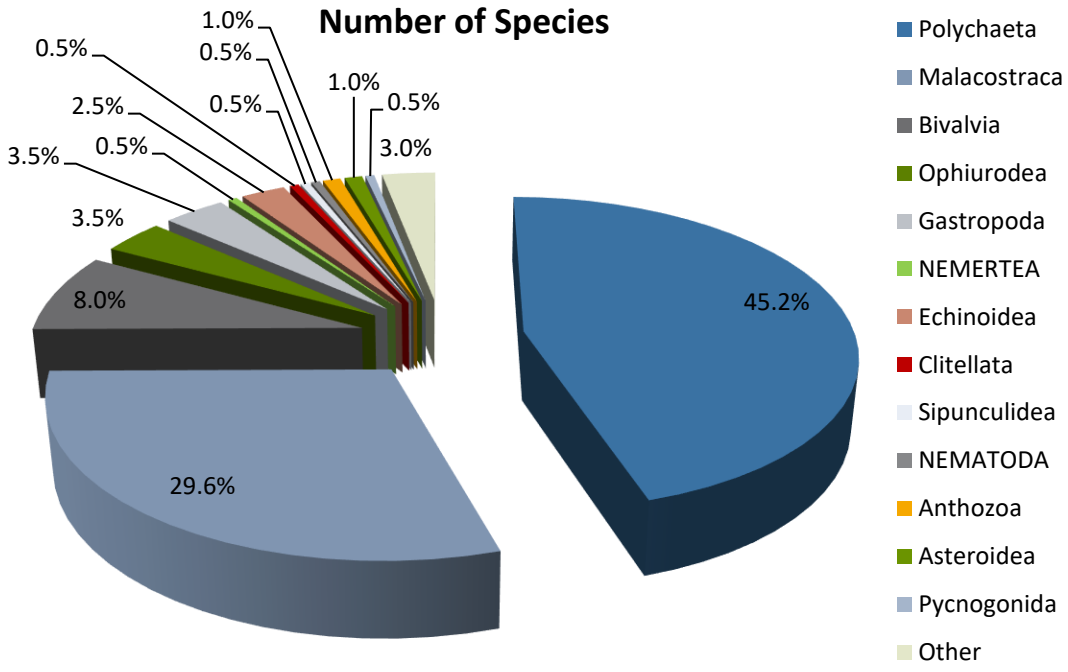

Plate 10.4 Infaunal breakdown for the Norfolk Boreas Site (Includes data from Zone, Norfolk Boreas site specific): Number of species by class. Where species identification to class is not possible, species are displayed by phylum (for example Nemertea and Nematoda)

10.2.2 Offshore cable corridor

12. The offshore cable corridor was also dominated by polychaetes and Malacostraca (Plate 10.5), with Ophiuroidea (brittlestars) also contributing. In terms of species diversity in the offshore cable corridor, the most diverse group were again the polychaetes and Malacostraca, with gastropods, Ophiuriodea and bivalves also contributing (Plate 10.6).

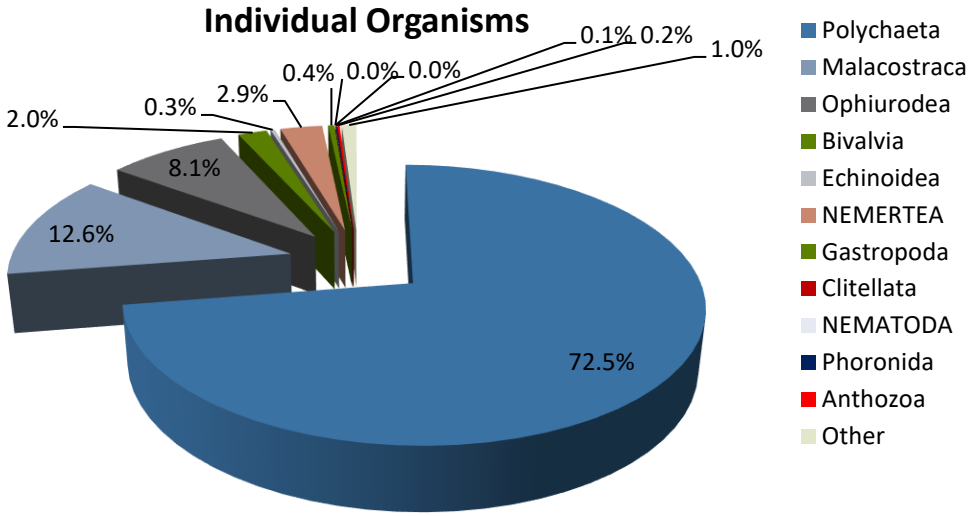

Plate 10.5 Infaunal breakdown for the offshore cable corridor (Includes data from Zone and offshore cable corridor surveys): Number of individuals by class. Where species identification to class is not possible, species are displayed by phylum (for example Nemertea and Nematoda).

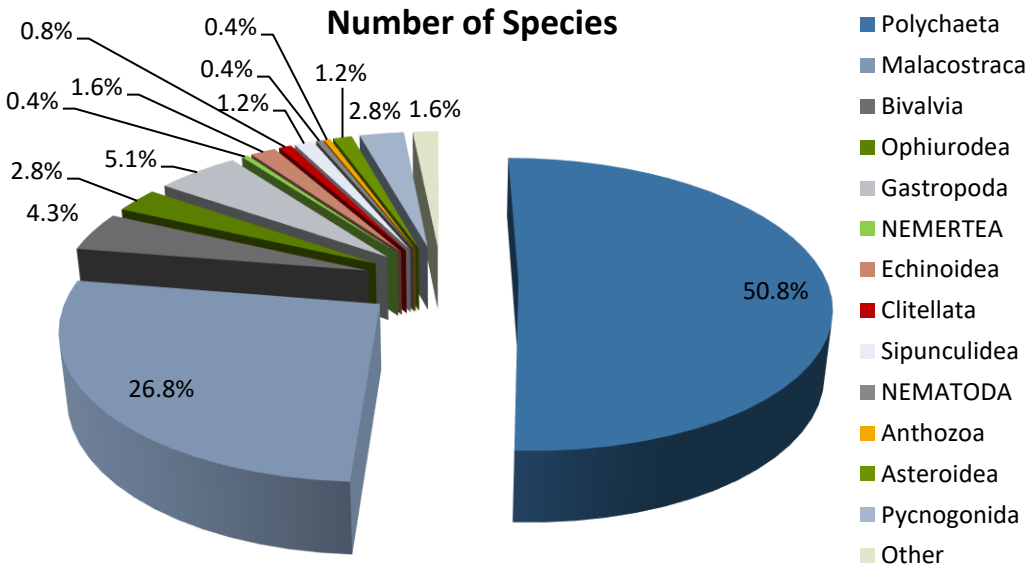

Plate 10.6 Infaunal breakdown for the offshore cable corridor (Includes data from Zone and offshore cable corridor surveys): Number of species by class. Where species identification to class is not possible, species are displayed by phylum (for example Nemertea and Nematoda).

10.2.3 Project interconnector search area

13. The Project interconnector search area was also dominated by polychaetes and Malacostraca (Plate 10.7), with bivalves and Nemertea also contributing. In terms of species diversity in the project interconnector search area, the most diverse group were again the polychaetes and Malacostraca, with bivalves also contributing (Plate 10.8).

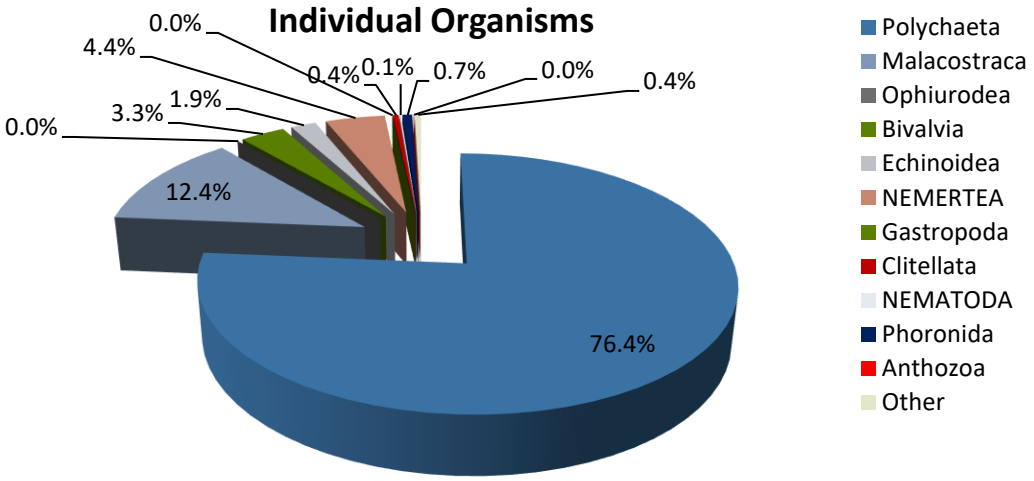

Plate 10.7 Infaunal breakdown for the project interconnector search area (Includes data from Zone and offshore cable corridor surveys): Number of individuals by class. Where species identification to class is not possible, species are displayed by phylum (for example Nemertea and Nematoda).

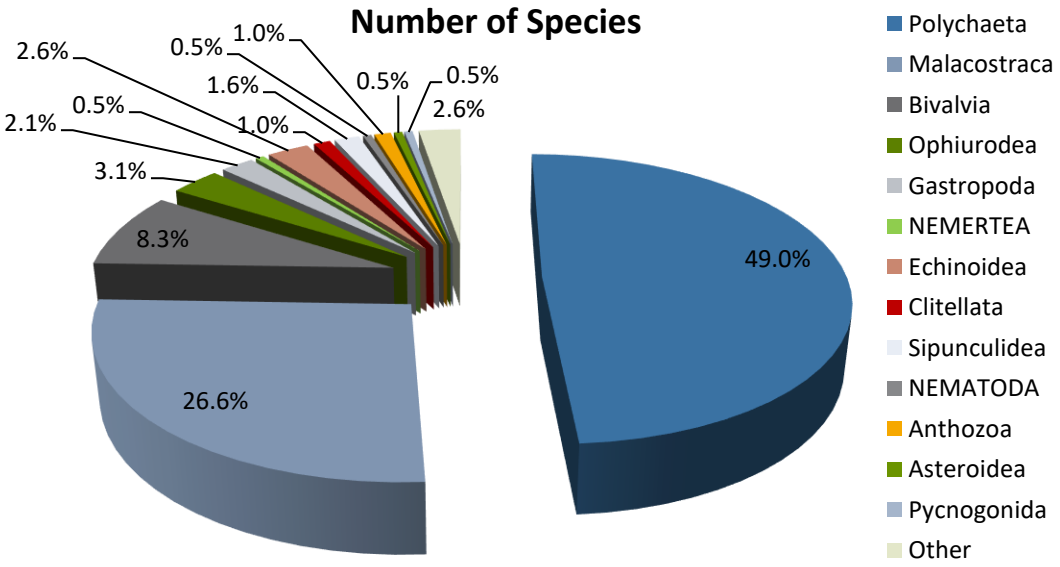

Plate 10.8 Infaunal breakdown for the project interconnector search areas (Includes data from Zone and offshore cable corriodor surveys): Number of species by class. Where species identification to class is not possible, species are displayed by phylum (for example Nemertea and Nematoda).

14. In conclusion, Plate 10.1 to Plate 10.8 illustrate that the benthic species composition of the Norfolk Boreas site, the offshore cable corridor and the project interconnector search area is broadly similar to that found across the ZEA.

10.3 Statistical Analysis of the Benthic Infaunal Communities

15. Table 10.1 shows the number of samples which have been acquired from three survey campaigns. Further detail regarding the different surveys is provided in Chapter 10 Benthic Ecology (section 10.5.2) and in Appendix 10.1 of the PEIR chapter. The five samples from East Anglia FOUR surveys were not included in the statistical analysis as these samples were significantly different to both the ZEA and Norfolk Boreas samples. This was attributed to different methods for processing the samples rather than actually reflecting different communities.

10.3.1 Methods

10.3.2 Diversity indices

16. The following univariate diversity index tests were conducted using the Plymouth Marine Laboratories PRIMER v6 (Plymouth Routines in Multivariate Ecological Research) suite of programs (Clarke and Warwick, 2001; Clarke and Gorley, 2006):

- Shannon Wiener diversity index;
  - The Shannon Wiener diversity index is a measure of biodiversity based on the number of species present and the number of individuals of each species. If a few species dominate, the index value is low. A greater number of species or a more even distribution of individuals of each species both result in an increase in Shannon's diversity.
- Simpson’s dominance index.
  - Simpson’s dominance index is a measure of the probability that two individuals randomly selected from a sample will belong to the same species. Simpson's dominance index ranges from 0 (all taxa are equally present) to 1.0 (one taxon dominates the community completely).

10.3.3 Multivariate analysis

17. Multivariate statistical analyses were also conducted using the Plymouth Marine Laboratories (PRIMER) v6 suite of programs (Clarke and Warwick, 2001; Clarke and Gorley, 2006).

18. Particle size distribution (PSD) data were imported into PRIMER as environmental data and was then normalised. The transformed data were then subjected to hierarchical clustering to identify sample groupings based on the Euclidean distance. The process ends with a single cluster containing all stations and is best expressed as

a dendrogram showing the sequential clustering of stations against relative similarity. To best describe the environmental differences between samples, the groups were identified on the basis of a slice at a Euclidean distance of 8.74, as indicated by the SIMPROF test in PRIMER.

19. Sediment data were also provided as a Fractional Composition (the percentage of Mud, Sand and Gravel components of each sample). This data were also subjected to the same analysis as the PSD data.

20. The approach to the Norfolk Boreas benthic sample collection relied on the fact that the ZEA data which was collected in 2011 were still valid. In order to assess whether the data collected during the Norfolk Boreas survey were broadly comparable to the ZEA data, an MDS (further detail provided below) plot was produced with samples identified by survey.

21. As part of the Norfolk Boreas Evidence Plan Process (EPP) (see Chapter 7, Technical consultation) Norfolk Boreas Limited consulted with Natural England and the MMO on the number of samples that had been analysed from the Norfolk Boreas site. As part of this consultation the MMO requested that further analysis be undertaken to compare the ZEA and Norfolk Boreas survey data on a site specific basis. This included selecting only the ZEA and Norfolk Boreas survey samples taken from within the Norfolk Boreas site and undertaking cluster analysis with a 30% slice (as determined by a SIMPROF test) and MDS analysis (see further details below on the methodology for these analyses). The objective being to reduce the number of samples thereby increasing the similarity slice and reducing the stress within the MDS plots. Thus further detail on the comparability of the two data sets is provided.

22. In November 2017 agreement between the MMO and Norfolk Boreas Limited was reached that data collected from the Norfolk Boreas site was compatible with the ZEA data and therefore not further samples would require analysis.

23. Once agreement had been reached the full infaunal data set including ZEA, offshore cable corridor and Norfolk Boreas surveys were subjected to multivariate analysis. These data were imported into PRIMER and initially subjected to fourth root transformation to reduce the influence of any highly abundant taxa allowing less abundant species a greater role in driving the emergent multivariate patterns. The transformed data were then organised into a resemblance matrix using a Bray Curtis index of similarity.

24. The full data set was then subjected to hierarchical clustering to identify sample groupings based on the same Bray Curtis index of similarity. This process combines samples into groups starting with the highest mutual similarities and then gradually lowers the similarity level at which groups are formed. The process ends with a

single cluster containing all stations and is best expressed as a dendrogram showing the sequential clustering of stations against relative similarity.

25. To best describe the ecological differences between sites, the groups were identified on the basis of a slice at 20% similarity for the infaunal communities. This was informed by a SIMPROF test which confirmed that a 20% slice was a reasonable cut off. Similarity slices at around 20% are commonly used for a data set of this size and the multivariate analysis for the original ZEA data used a 20% cut off point as did the East Anglia THREE multivariate assessment (EATL, 2015).

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

27. Similarity Percentage (SIMPER) analyses were applied to the data to rank species in terms of their contribution to both the within (internal) group similarity and "between" group dissimilarity and thereby assist the assessment of the distinctiveness of each community identified and the identification of the characterising taxa.

10.4 Results

10.4.1 Diversity Indices

28. Values for the Shannon Wiener diversity index test ranged from 0.487 to 3.536 (with a mean of 2.13) and values for the Simpson's dominance index ranged from 0.2096 to 1 (with a mean of 0.85).

29. Sample 042CR contained only 1 organism (*Nephtys cirrosa*) and therefore a diversity index cannot be calculated for this sample.

10.4.2 Particle size distribution

30. Nine distinct sediment groups were identified from the PSD data with a slice at a Euclidean distance of 8.74. At this level five groups (a, b, c,d and e) only contained one sample and therefore could be counted as outliers. The resultant dendrogram which contains all 661 samples was very large and therefore it is not possible to display within this report, the MDS plot is displayed below. The stress revealed by 2–dimensional representation (Plate 10.9) is given as 0.1 (top right corner of the MDS plot). This indicates that the 2-Dimensional image of the multi-dimensional space is a good representation.

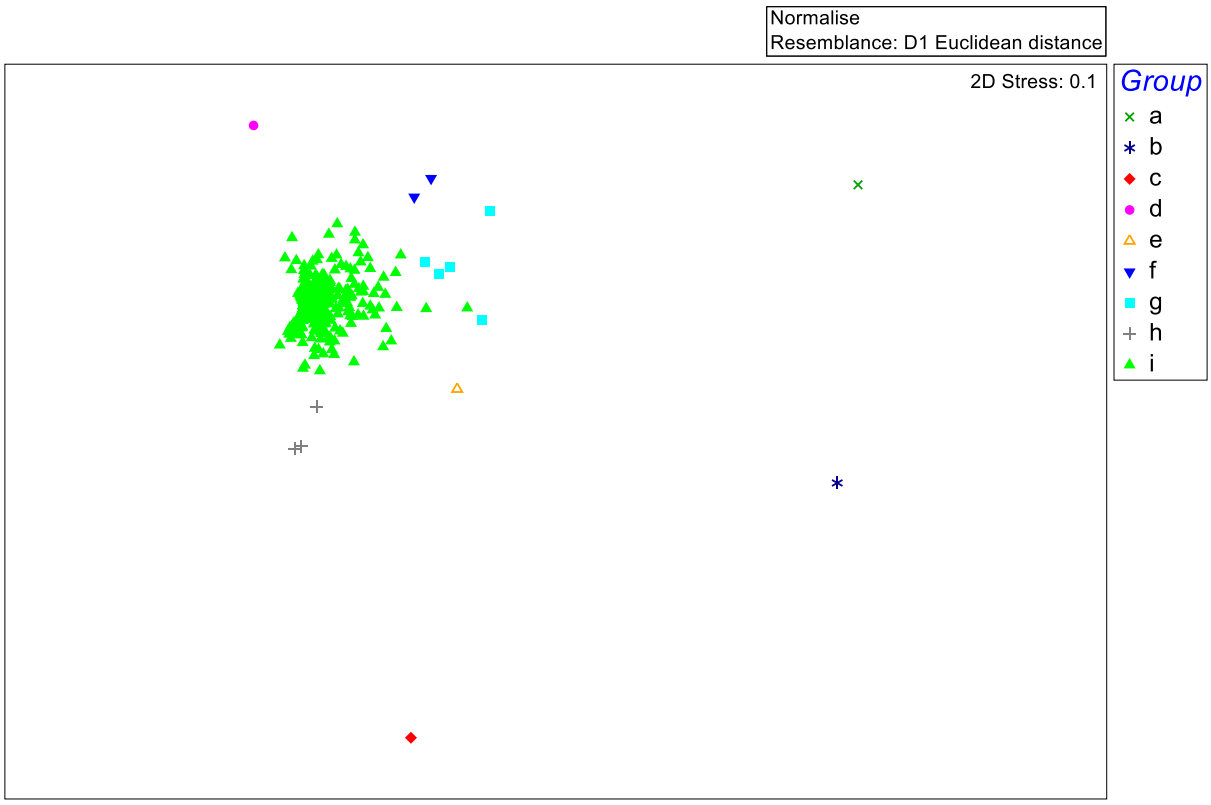

Plate 10.9 MDS 2D Dimensional Plot Showing PSD data groupings based on a Euclidean distance of 8.74.

31. Plate 10.9 shows that the vast majority of samples (over 97%) fell within group i with 5 in group g, 3 in group h and 2 in group f.

10.4.3 Fractional Composition

32. Analysis of the Fractional Composition data identified three distinct groups at a Euclidean distance of 4.5. The resultant dendrogram which contains all 661 samples was very large and therefore it is not possible to display within this report, the MDS plot is displayed below. The stress (Plate 10.10) is given as 0.01 indicating that the 2-demensional image of the multi-dimensional space is a good representation.

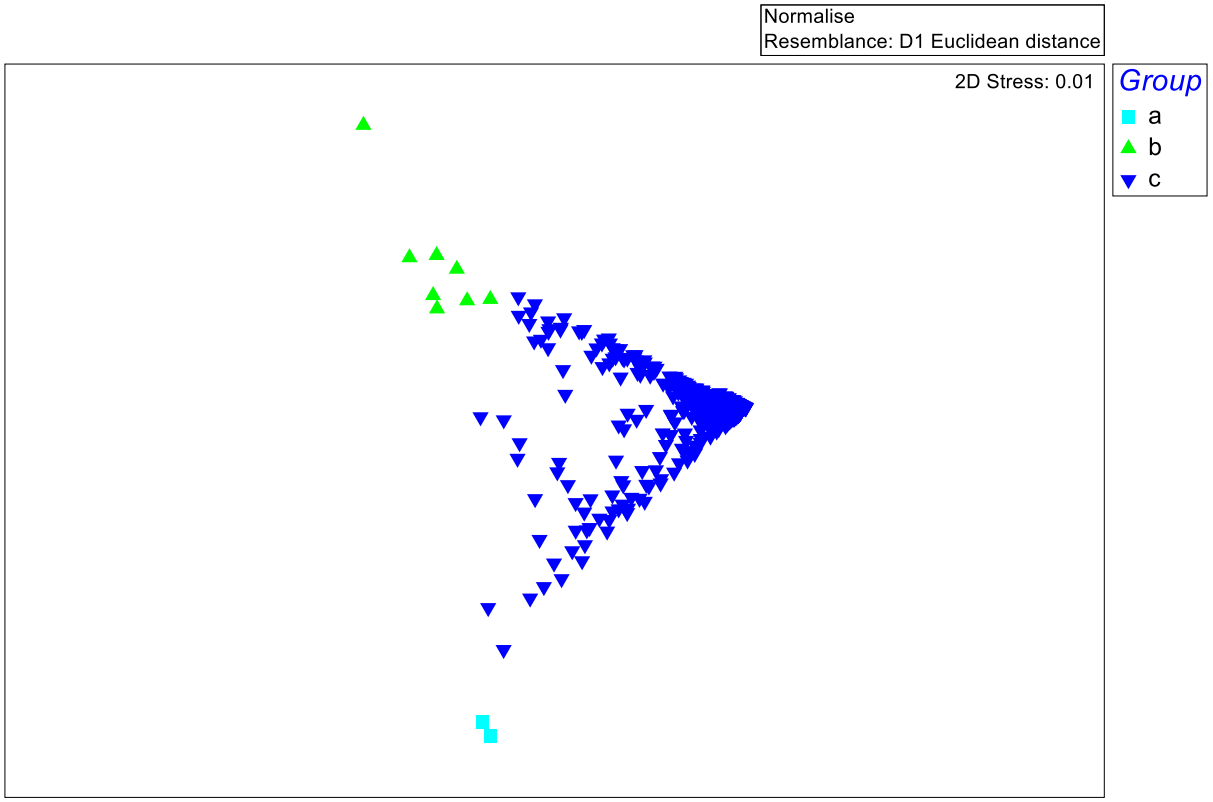

Plate 10.10 MDS 2-Dimensional Plot Showing Fractional Component data groupings based on a Euclidean distance of 4.50.

33. Plate 10.10 shows that the vast majority of samples (over 98%) fell within group c, with seven in group b and 2 in group f. Group a have higher mud content and group b have higher gravel content. Group a is comprised of samples from the offshore cable corridor surveys which are all are located within the offshore cable corridor. Group b is comprised of five samples from the offshore cable corridor survey and two from the ZEA surveys, to the north of the offshore cable corridor and to the east of the Norfolk Boreas site.

10.4.4 Infaunal communities

34. Some data rationalisation was undertaken before performing multivariate analysis on the full grab sample dataset. Only the enumerated components of the species recorded in the grabs was included. Where a presence or number of species per volume (i.e. 3per cm^2) was recorded a value of 1 was used in the data.

35. The MDS plots displayed below (Plate 10.11 and Plate 10.12) show infaunal communities identified within the combined data set. Samples collected during the offshore cable corridor surveys and Norfolk Boreas surveys are well interspersed with the ZEA samples indicating that the samples are broadly similar and suitable for analysis as combined data set. It also indicates that there has been little change in benthic https://royalhaskoningdhv.app.box.com/folder/5076244866 communities between the ZEA surveys, Norfolk Vanguard and Norfolk Boreas surveys.

36. 2 and 3-dimensional plots are displayed as the stress level on the 2-demensional plot is relatively high (0.25) indicating that the two-dimensional image is a relatively poor representation of the multidimensional space.

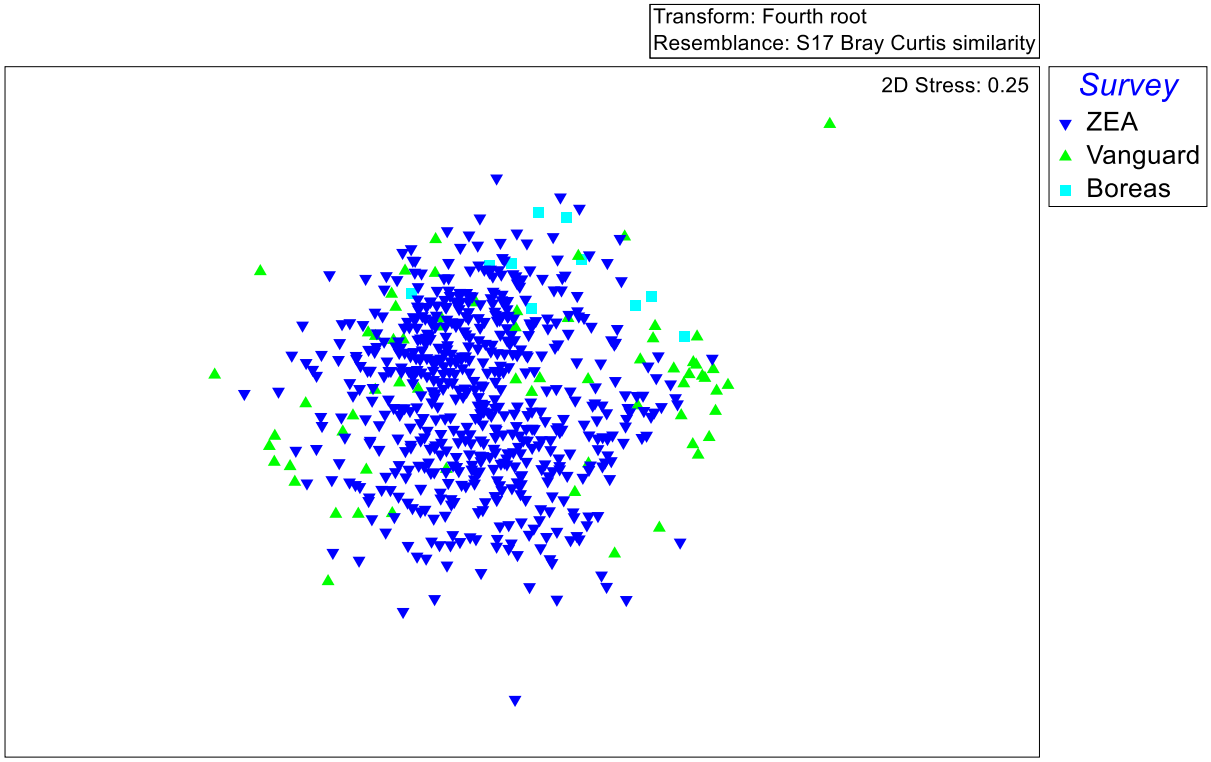

Plate 10.11 MDS 2D Dimensional Plot showing the relationship between samples collected during the Norfolk Boreas, Norfolk Vanguard and ZEA surveys.

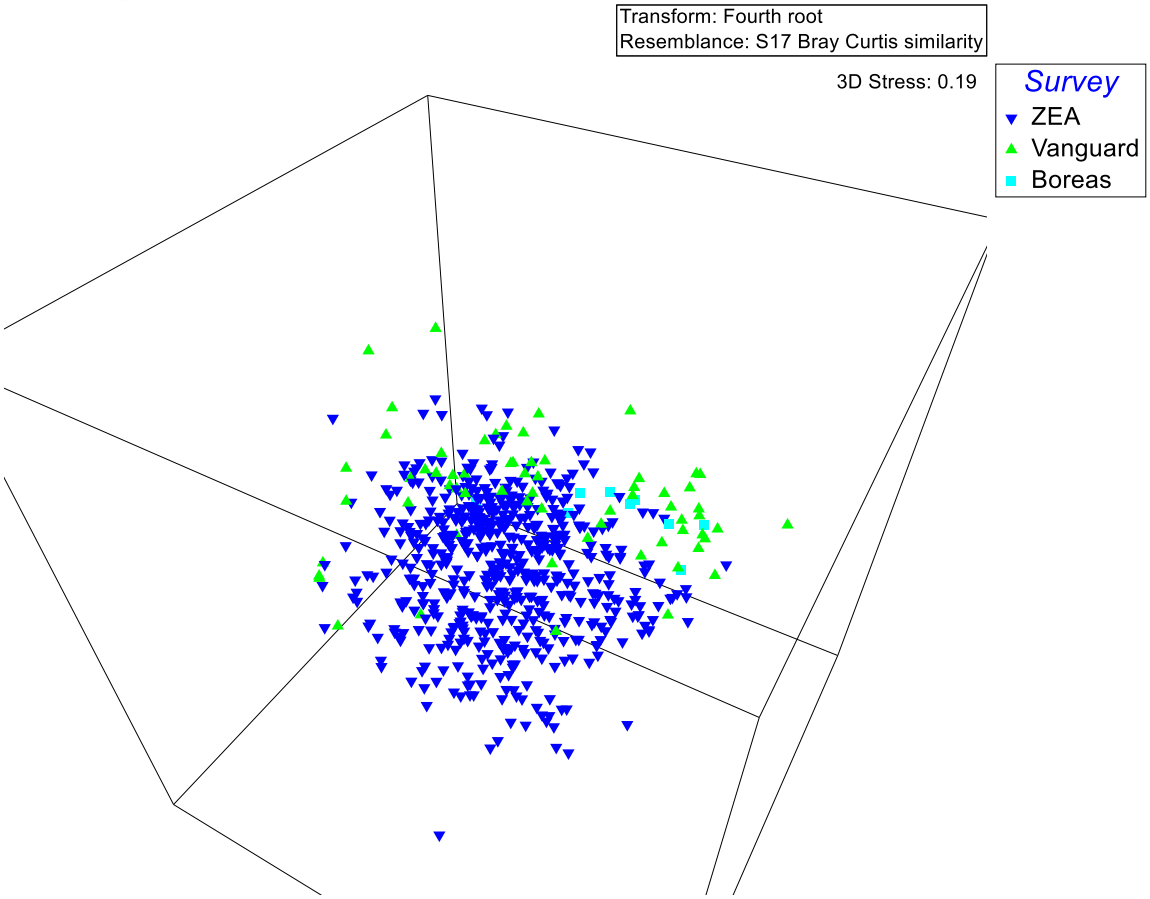

Plate 10.12 MDS 3D Dimensional Plot showing the relationship between samples collected during the Norfolk Boreas, Norfolk Vanguard and ZEA surveys.

37. As part of the consultation on the number of benthic samples which had been analysed, the MMO requested further evidence to be provided that the data collected during the Norfolk Boreas surveys are comparable to the data collected during the ZEA surveys. Plate 10.13 shows the resultant dendrogram from the cluster analysis which was undertaken on those samples which were collected from both surveys, within the Norfolk Boreas site only. This shows the samples are well distributed within the dendrogram and are therefore comparable. Further evidence of this comparability is provided in the MDS plots in Plate 10.14 and Plate 10.15.

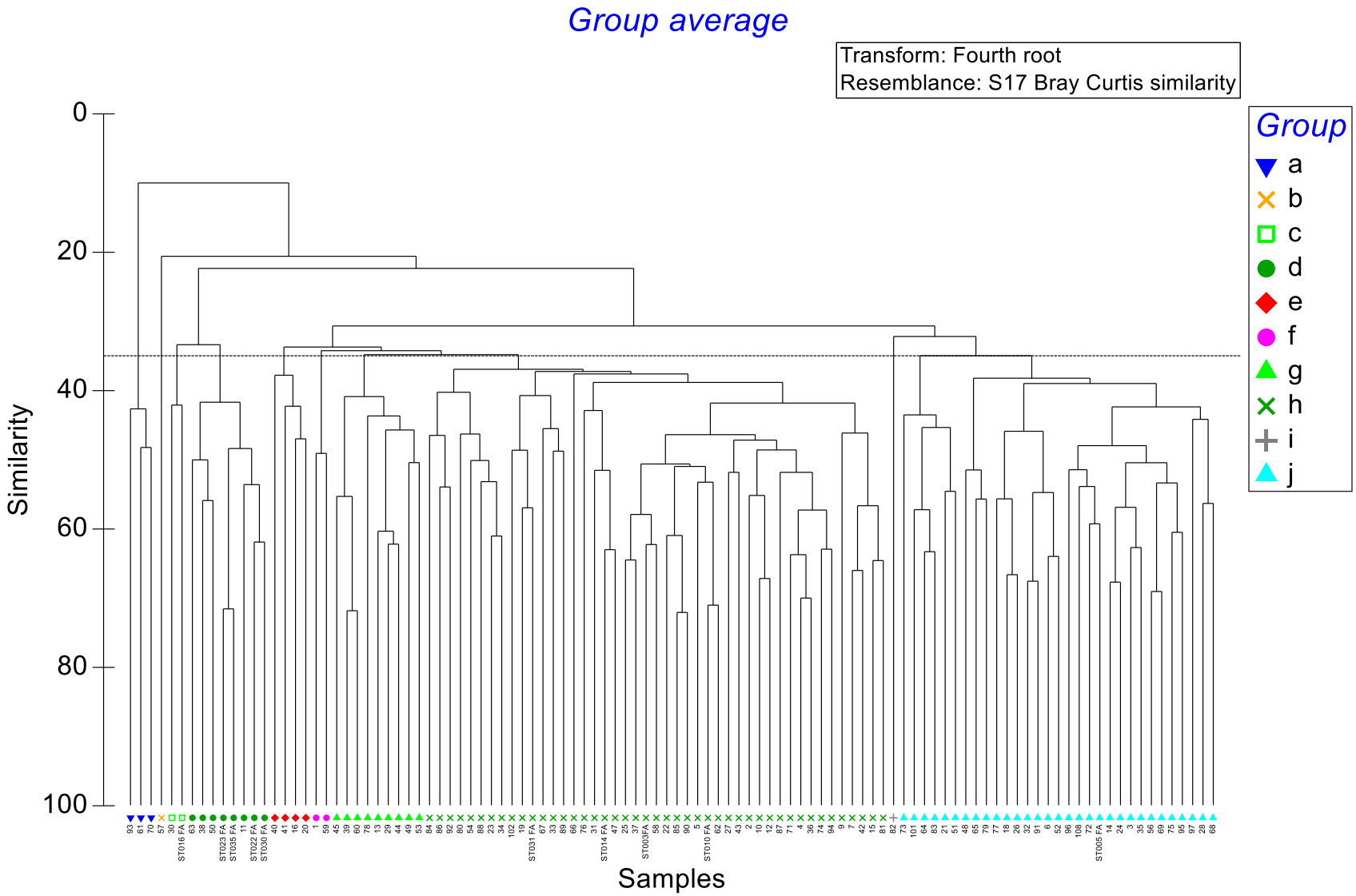

Plate 10.13 Dendrogram showing the results of the infaunal cluster analysis groupings based on 30% similarity slice for samples (ZEA, Norfolk Boreas and Vanguard Survey) within the Norfolk Boreas sites (Norfolk Boreas samples can be identified by the ST preffix)

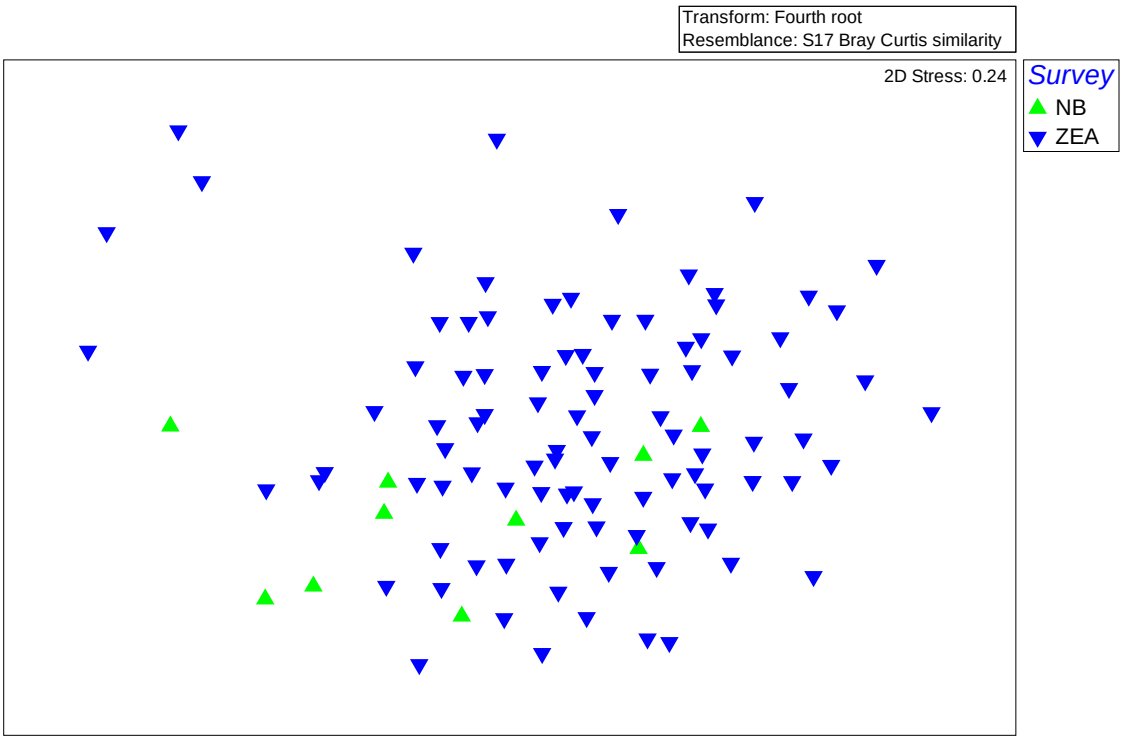

Plate 10.14 MDS 2-Dimensional plot showing the relationship of infaunal communities sampled from within the Norfolk Boreas site and ZEA surveys.

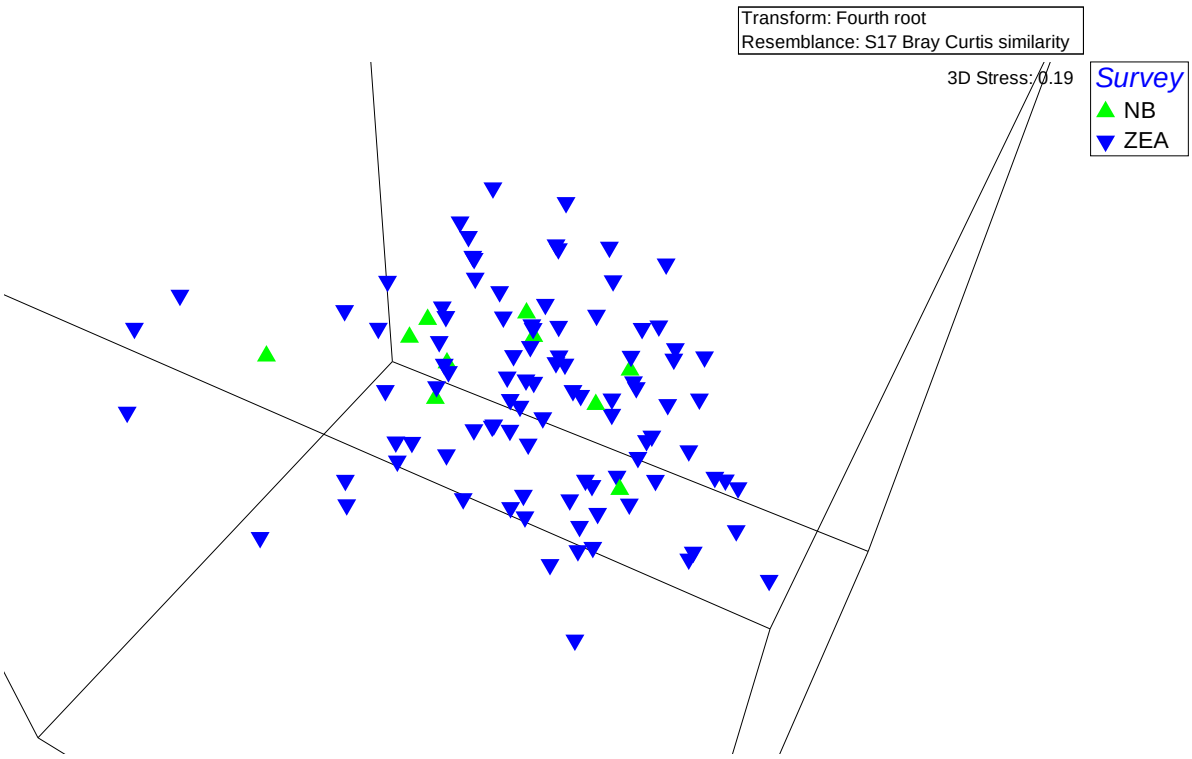

Plate 10.15 MDS 3- Dimensional plot showing the relationship of infaunal communities sampled from within the Norfolk Boreas site from Norfolk Boreas and ZEA surveys.

38. Once it was established that the Norfolk Boreas survey data were comparable to the ZEA data and the Norfolk Vanguard data all data sets were combined and cluster analysis was undertaken on the combined data set.

39. The resultant dendrogram which contains all 661 samples was very large and therefore it is not possible to display within this report, the MDS plots are displayed below.

40. Eighteen distinct infaunal communities were identified at a 20% similarity slice. At this level seven groups (a, b, c, f, h and q) only contained one sample and therefore can be viewed as outliers. A summary of these groups is provided in Table 10.2. The outliers occurred as a result of either very few or no organisms being present in the grab sample or an aggregation of one species dominating that sample.

Table 10.2 description of groups which contained only one sample

Group	Description
a	Sample 046CR is distinct from all other groups as it only contained 5 individuals (1 *Corophium volutator*, 1 *Glycera alba*, 2 *Barnea candida* and 1 *Amphipholis squamata*)
b	Sample 254 is distinct from all other groups as it only contained 5 individuals (1 *Aonides paucibranchiata*, 2 unidentified copepods and 2 *Pontocrates altamarinus*).
c	Sample 355 is distinct from all other groups and was dominated by Nemertea (7 individuals) and *Pisione remota* (8 individuals). 21 individuals across 7 species were identified in this sample compared with an average of 96.4 individuals and 15.8 species across all samples.
f	Sample 448 is distinct from all other groups as it only contained 4 individuals (1 *Nephtys longosetosa*, 1 *Gastrosaccus spinifer*, 1 *Eurydice spinigera* and 1 unidentified Ophiuroidea).
h	Sample 103 is distinct from all other groups and is dominated by *Capitella* (48 of the 54 individuals) with 1 Ophiuridae, 1 *Lagis koreni*, 3 *Spiophanes bombyx* and 1 *Spio decoratus* also present .
q	Sample 470 is distinct from all other groups. It contains 13 species, 30 individuals and is dominated by brittle stars the majority of which are either identified to the class Ophiuridae (6 individuals) or to the family Ophiuroidea (8 individuals).

41. The MDS plots provided in Plate 10.16 and Plate 10.17 illustrate the relationship between the 18 groups. The stress revealed by 2–dimensional representation (Plate 10.16) is 0.25 (top right corner of the MDS plot). This indicates that although still potentially a useful representation of the multi-dimensional space the image is stretched and could be misinterpreted. For this reason, Plate 10.17 presents a 3-dimensional representation of the same MDS plot, which shows at lower stress level (0.2). 0.19 is still considered to be a relatively high stress level and is a consequence of the high number of samples within the data. Therefore the Plate 10.16 and Plate 10.17 should be interpreted with caution as some of the relationships between infaunal communities will not be apparent.

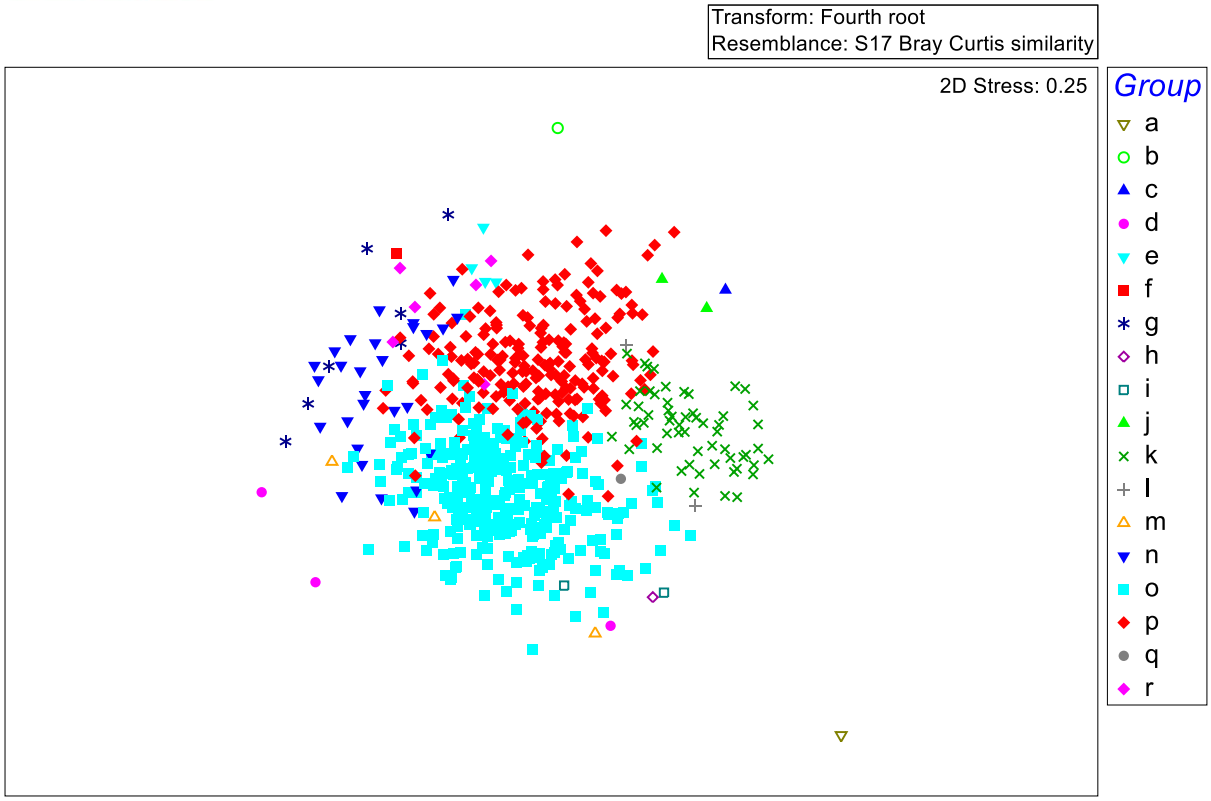

Plate 10.16 MDS 2D Dimensional Plot Showing Groupings Based on 20% Similarity Slice of Faunal Data.

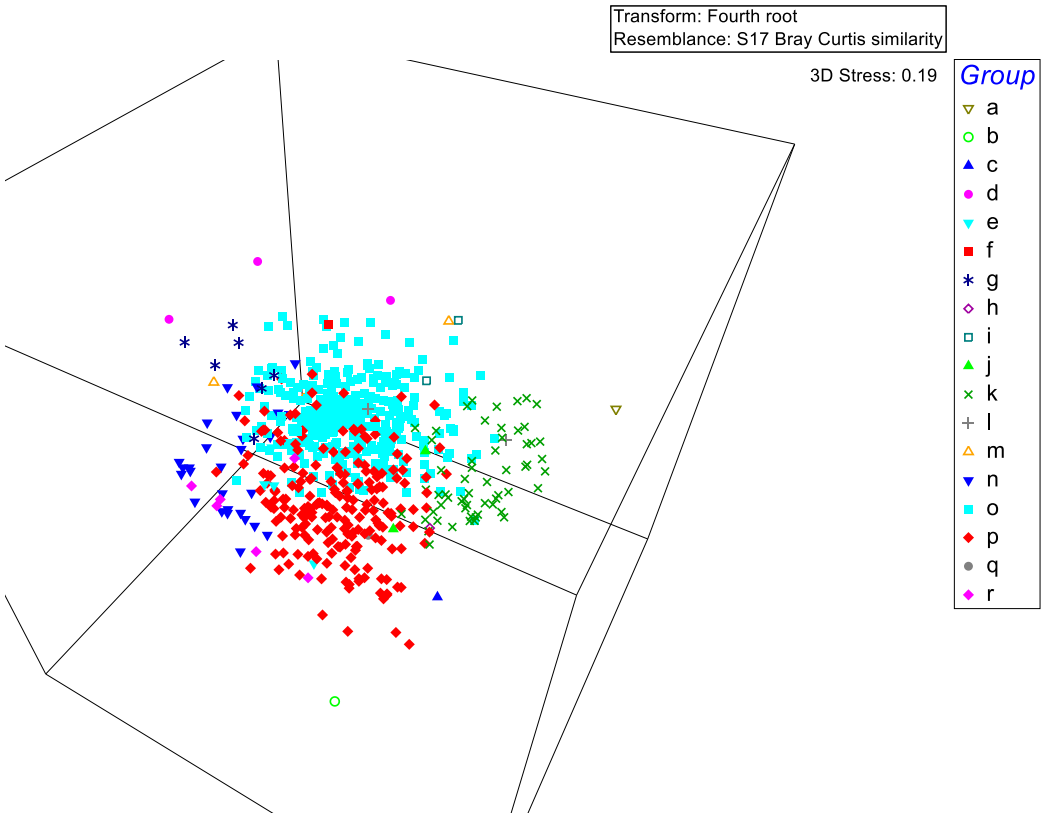

Plate 10.17 MDS 3D Dimensional Plot Showing Groupings Based on 20% Similarity Slice of Faunal Data.

10.4.4.1 Norfolk Boreas site

42. Four groups (k, i, n, and o) were found within the Norfolk Boreas site (Volume 2, Figure 10.6) all of which apart from i were common across the former Zone. Group i was found at 1 location within the Norfolk Boreas site and on the northern boundary of the offshore cable corridor.

43. The main defining taxa of the groups found within Norfolk Boreas were:

- Group i, *Goniada maculata* and *Spiophanes bombyx* (39.00)
- Group k: Nemertea, and the polychaete worms *S.spinulosa* and *S.bombyx*;
- Group n: the polychaete worm N. cirrosa; and
- Group o: the polychaete worm *S.bombyx*, *N. cirrosa* and *Polinices pulchellus*

44. The Norfolk Boreas site was dominated by group o (Volume 2, Figure 10.6).

45. Through the Norfolk Vanguard EPP and as part of the consultation on the number of samples analysis across the Norfolk Boreas site (see section 10.1) the MMO requested that the infaunal groups be plotted by separately for the separate surveys. Therefore Figure 10.1 presents the infaunal groups from the 2011 ZEA surveys and Figure 10.2 presents the infaunal groups from the 2017 Norfolk Boreas survey. By comparing these two figures it can be seen that the faunal groups are broadly similar across the different data sets, adding weight to the argument that the data set is appropriate to analysis as one and that the communities have not noticeably changed between the 2011 and 2017 surveys. Figure 10.6 in Volume 2 of the PEIR shows both data sets on one single figure. Similar figures were presented to the MMO during the consultation undertaken in 2017 (see section 10.1) as evidence that sufficient benthic samples had been analysed.

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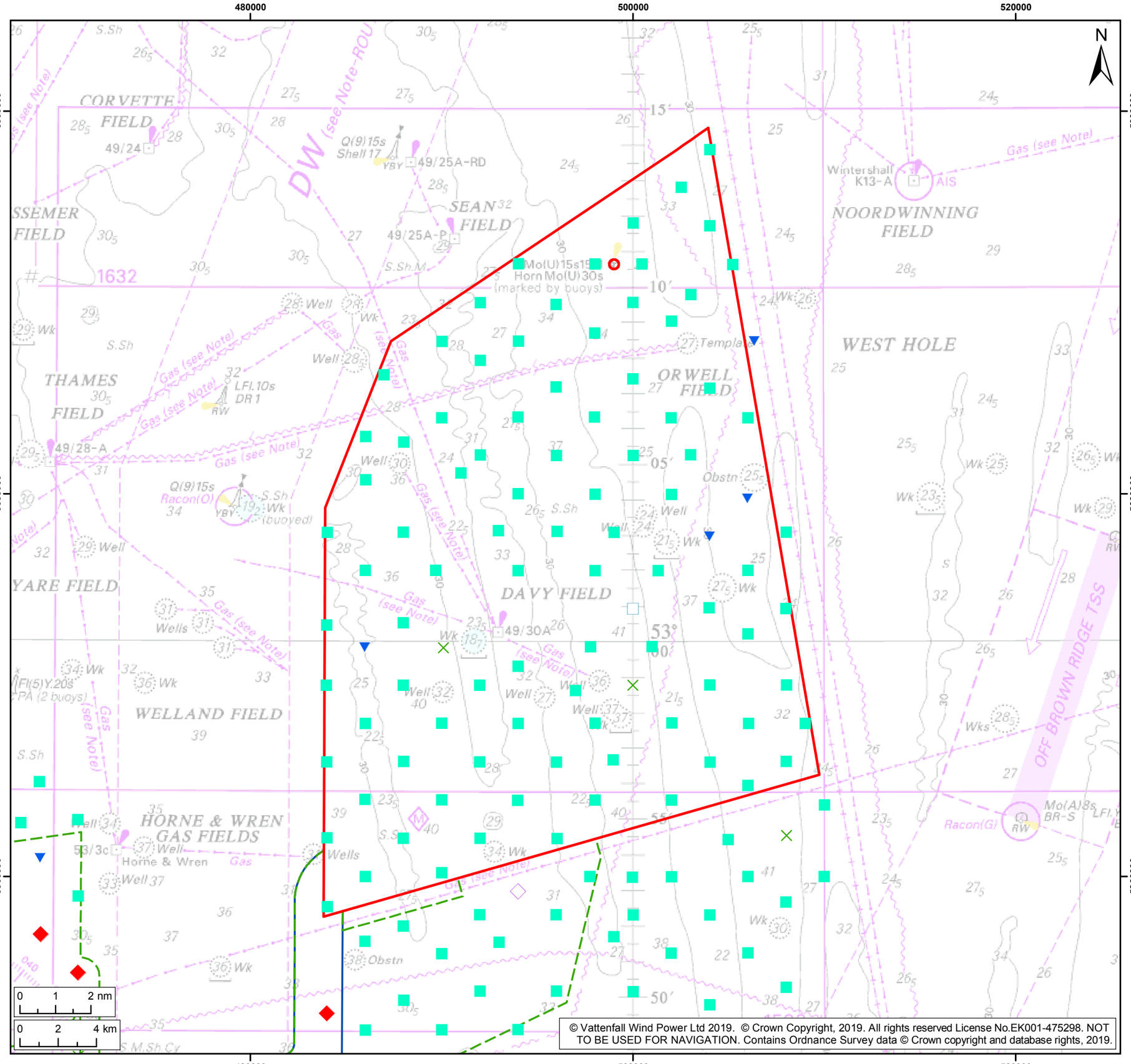

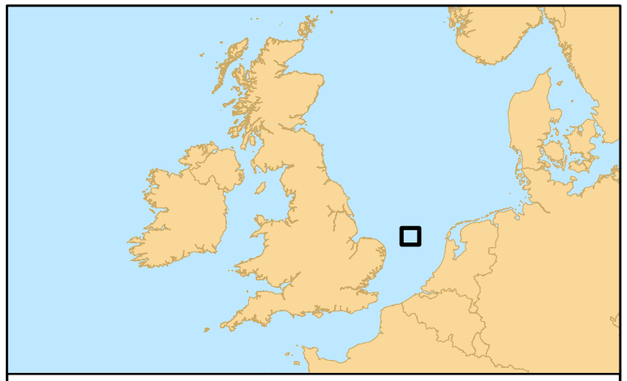

Legend:

- Norfolk Boreas site
- Offshore cable corridor
- Project interconnector search area

Infaunal group[1]

- Infaunal group h
- Infaunal group i
- Infaunal group k
- Infaunal group n
- Infaunal group o
- Infaunal group p

NOTE: Infaunal group defined using multivatirate analysis
[1] MESL, 2011.

Project:	Report:
Norfolk Boreas	Benthic Ecology Data Analysis

Title:

Infaunal groups - 2011 survey

Figure: 10.2.1 | Drawing No: PB5640-006-0102-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	01/02/2019	JT	DT	A3	1:200,000

Co-ordinate system: ETRS 1989 UTM Zone 31N **EPSG:** 25831

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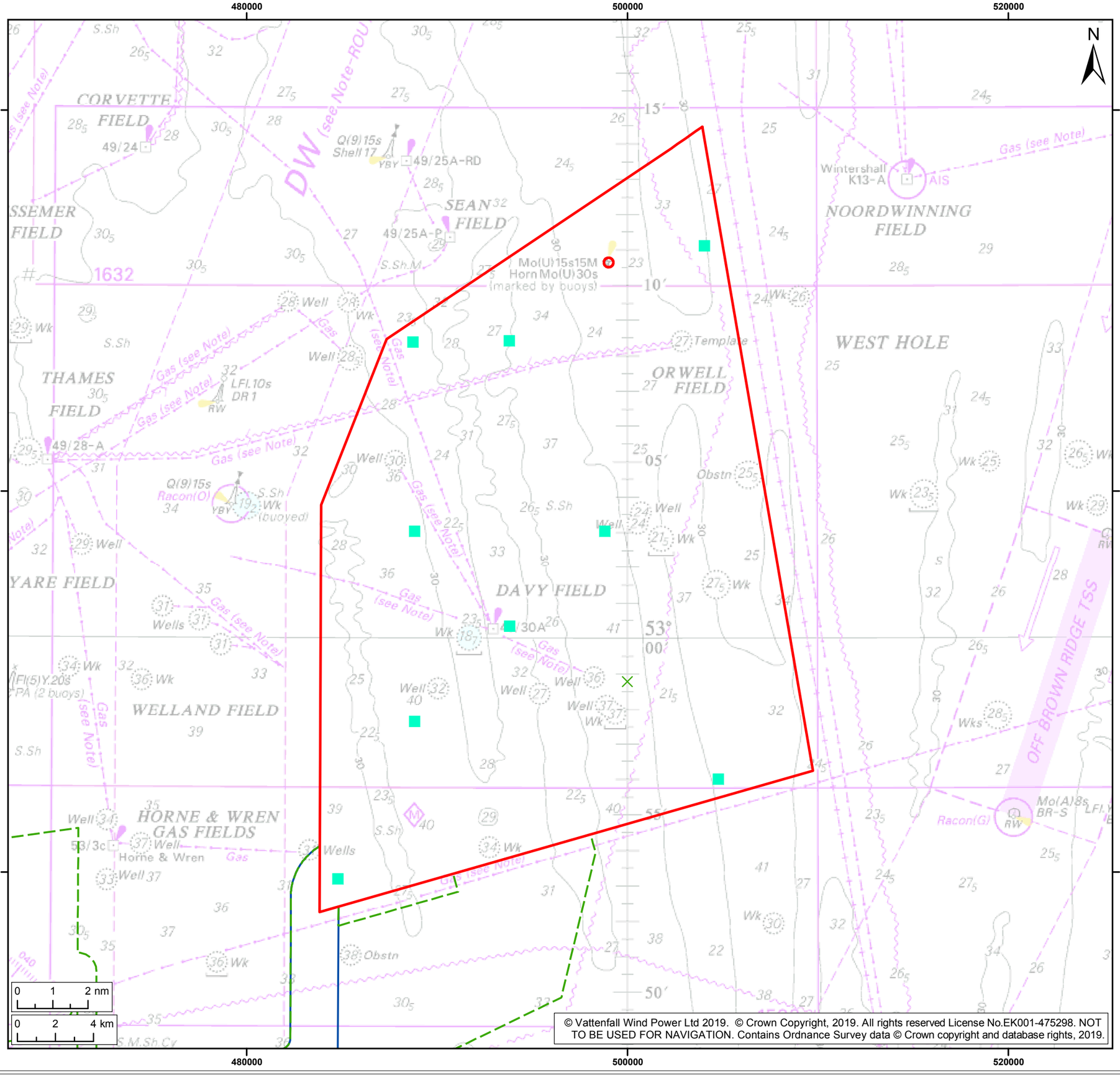

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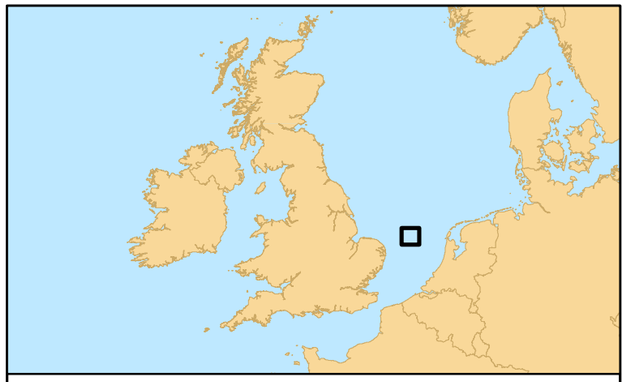

Legend:

- Norfolk Boreas site
- Offshore cable corridor
- Project interconnector search area

Infaunal group[1]

- Infaunal group k
- Infaunal group o

NOTE: Infaunal group defined using multivatirate analysis
[1] MESL, 2017.

Project:	Report:
Norfolk Boreas	Benthic Ecology Data Analysis

Title:

Infaunal groups - 2017 survey

Figure: 10.2.2 | Drawing No: PB5640-006-0102-002

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	01/02/2019	JT	DT	A3	1:200,000

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10.4.4.2 The Offshore cable corridor

46. The offshore cable corridor contains 11 different faunal communities. The greater range of faunal communities is to be expected as the depth range across the offshore cable corridor is far greater than that within the offshore wind farm sites (Chapter 8 Marine Geology, Oceanography and Physical Processes). The groups identified within the offshore cable corridor are described in Table 10.3.

Table 10.3 description of groups within the offshore cable corridor (OCC = Offshore Cable corridor)

Group	No. of samples in OCC	No. samples in full data set	Description
a	1	1	Outlier as described above in Table 10.2
d	1	1	Outlier as described above in Table 10.2
g	3	7	This was characterised by *Ophelia borealis*, *Urothoe brevicornis* and *Eurydice spinigera* (Table 10.4). It was identified at two locations in the nearshore part of the offshore cable corridor and 1 location in the mid-section of cable corridor. It was also identified at 3 locations close to the offshore cable corridor (Figure 10.6) as well as 1 location in the south west of the former Zone.
i	1	2	This community featured very few individuals (14 and 9) and very few species (8 in each sample). Species common across both samples included *Goniada maculata*, *Spiophanes bombyx* and *Chaetozone sp* (See Table 10.4). The community was identified in the eastern side of the cable corridor
k	10	58	This community which is characterised Nemertea, *S.spinulosa* and *S. bombyx* (Table 10.4) by was common within the former Zone (Figure 10.6).
l	1	1	This community was identified from one sample within the near shore section of the offshore cable corridor, a description is provided in Table 10.2.
j	1	2	This community which was dominated by Nemertea, *Amphipholis squamata* and *Glycera lapidum* was found at 1 location in the mid-section of the offshore cable corridor an one location to the south of the offshore cable corridor (Figure 10.6). Both sample were identified from the offshore cable corridor survey and both were located to west of the furthest extent of the ZEA surveys.
m	1	3	This community which is characterised by *Scoloplos armiger*, *Nephtys cirrosa* and *Abra alba* (Table 10.4) was identified in the site specific survey data at one location in the midshore section of the offshore cable corridor (Figure 10.6) it was also identified two other locations within the ZEA data, one just to the south of the offshore cable corridor and the other in near the southern extent of the ZEA survey.
n	6	28	This community was very common across the former zone (see Figure 10.6 and Table 10.4 for further detail).
o	11	308	This community was the most common across the former zone (see Figure 10.6 and Table 10.4 for further detail).
p	4	308	This community was also common across the former zone (see Figure 10.6 and Table 10.4 for further detail).

10.4.4.3 The project interconnector search area

47. The main groups found within the project interconnector search area were h, k, n, o and p) defining taxa of the groups were:

- Group h, was distinct from all other groups and was dominated by *Capitella* (48 of the 54 individuals within the sample)
- Group k: Nemertea, and the polychaete worms *S.spinulosa* and *S.bombyx;*
- Group n: the polychaete worm *N. cirrosa*
- Group o: the polychaete worm *S.bombyx, N. cirrosa* and *Polinices pulchellus*;
- Group p: the polychaete worm *N. cirrosa*, *S. bombyx* and Nemertea

10.4.4.4 Community/group definition

48. The SIMPER Analysis was used to identify which species were responsible for the between group similarity, which is displayed in Table 10.4 .

Table 10.4 Within Group similarity results of the SIMPER analysis (showing the top three species responsible for the similarity)

Group	Average Similarity (%)	Top 3 species responsible for similarity (% contribution to similarity)	Group	Average Similarity (%)	Top 3 species responsible for similarity (% contribution to similarity)
a	Only one sample in group so no between group similarity		j	44.71	Nemertea (22.38) *Amphipholis squamata* (18.38) *Glycera lapidum* (16.17)
b	Only one sample in group so no between group similarity		k	31.40	Nemertea (7.51) *Sabellaria spinulosa* (7.00) *Spiophanes bombyx* (5.37)
c	Only one sample in group so no between group similarity		l	23.75	Nemertea (22.11) *Amphipholis squamata* (22.11) *Spiophanes bombyx* (18.59)
d	30.18	*Urothoe brevicornis* (79.83) *Goodallia triangularis (*20.17)	m	27.09	*Scoloplos armiger* (63.12) *Nephtys cirrosa* (19.39) *Abra alba* 17.49
e	37.37	*Polycirrus* (38.12) *Ophelia borealis* (20.31) *Spisula* sp.(17.72)	n	28.25	*Nephtys cirrosa* (72.33) *Gastrosaccus spinifer* (7.08) *Nephtys* sp. (4.52)
f	Only one sample in group so no between group similarity		o	29.03	*Spiophanes bombyx* (16.38) *Nephtys cirrosa* (12.56) *Polinices pulchellus* (7.22)
g	37.31	*Ophelia borealis* (42.24) *Urothoe brevicornis* (28.78) *Eurydice spinigera* (13.48)	p	26.47	*Nephtys cirrosa* (15.67) *Spiophanes bombyx* (12.33) Nemertea (10.32)
h	Only one sample in group so no between group similarity		q	Only one sample in group so no between group similarity	
i	23.38	*Goniada maculata* (50.00) *Spiophanes bombyx* (39.00)	r	30.57	*Moerella pygmaea* (21.41) *Spisula* sp. (17.79) *Ophiocten affinis* (12.05)

10.5 References

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