Centre for Environment Fisheries & Aquaculture Science

Cefas

Dredged Material Disposal Site Monitoring Round the Coast of England: Results of Sampling (2021-2022)

Lyme Bay 2

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Executive Summary

This report presents the scientific findings of, and implications for subsequent monitoring based on the results from, a dredged material disposal site survey conducted at Lyme Bay 2 (PO050) under a Cefas / Marine Management Organisation Service Level Agreement (SLA 1.2) project (C6794 hereafter) during 2021-2022.

The main aims of this report are:

- to aid the dissemination of the survey results;
- to assess whether observed changes resulting from dredged material disposal are in line with predictions; and,
- to facilitate our improved understanding of the impacts of dredged material disposal at both a site-specific and a national (i.e. non site-specific) level.

Two disposal sites were targeted for assessment under C6794 during 2021-22: Outer Tees and Lyme Bay 2. The outcomes of the survey at Outer Tees have been published in a preceding report (Bolam et al., 2022). The scientific findings of the survey conducted at Lyme Bay 2, which was undertaken later in the reporting year (December 2021), are presented herein.

Seabed sampling at 10 stations (three replicates being obtained at each) within (one station), and in the vicinity of (nine stations), the Lyme Bay 2 (PO050) dredged material disposal site during December 2021 revealed that the seabed in the area comprises predominantly very poorly sorted, gravelly muddy sand. The sediments relate to EUNIS habitats ‘mixed sediments’, although one station to the western limit of the survey area corresponds to ‘mud and sandy mud’. Sediment organic carbon values are somewhat low, as one might expect based on the silt/clay fractions, ranging between 0.22 to 0.67%.

A total of 225 taxa (including colonial epifauna) from 2,408 countable individuals were recorded from the 30 grab samples. The most ubiquitous taxa were the Ribbon worm Nemertea spp., the polychaete worms *Melinna palmata*, *Heteromastus filiformis* and *Notomastus* sp., and the gastropod mollusc *Turritellinella tricarinata*,

while the most abundant taxa were the polychaete worm *Lumbrineris cingulata* (agg.) and *T. tricarinata*. Several notable taxa were also identified, including the non-native bryozoan *Fenestrulina delicia* and two polychaete worms not formally recorded from the UK: *Paradoneis ilvana* and *Spio symphyta*. The macrofaunal assemblages across the survey area showed a general west to east gradient, both in terms of univariate metrics of community structure (both number of taxa per grab (S) and total abundance (N) increased eastwards) and multivariate taxonomic structure based on numerical abundance. Notably, with respect to particle size and organic carbon of the seabed sediments and their associated macrofaunal assemblages, the single station sampled within the licenced boundary of the Lyme Bay 2 disposal site showed no detectable alteration and its sediments aligned with the west to east gradient regarding these variables.

The successful survey of the Lyme Bay 2 dredged material disposal site during December 2021 under C6794 acquired sediment particle size, organic carbon and macrofaunal data that may be used as a baseline from which any potential impacts associated with the ongoing use of the site in subsequent years may be gauged. As such, subsequent sampling, following the methods undertaken during 2021, should be conducted in future years depending on the magnitude, frequency and physical nature of ensuing deposits to the site. Any changes to the sampling conducted here, or the rationale to include additional environmental parameters, such as sediment samples for contaminants assessment, should be considered in light of contemporary information regarding the site.

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1. Introduction

1.1 Regulation of disposal activity in England

Disposal of waste at sea is strictly regulated through the licensing requirements of the Marine and Coastal Access Act 2009 (MCAA). The MCAA provides the principal statutory means by which England complies with EU law, such as the Water Framework Directive (WFD, 2000/60/EC), the Habitats and Species Directive (92/43/EEC), the Wild Birds Directive (79/409/EEC) and international obligations such as under the OSPAR Convention and the London Convention and London Protocol (LCLP), in relation to disposals at sea. Following the UK's departure from the EU at the end of 2020, the UK legislation transposing these EU Directives was amended to ensure it operated effectively following the UK's departure.

Pursuant to the OSPAR Convention and LCLP, only certain wastes or other matter are permitted for disposal at sea. During the 1980s and 1990s, the UK phased out sea disposal of most types of waste, including industrial waste and sewage sludge. Since then, dredged material from ports and harbours, and a small amount of fish waste, has been the only type of material routinely licensed for disposal at sea.

The Marine Management Organisation (MMO) regulates, and is responsible for, licensing activities in the marine environment around England including the disposal of dredged material at sea. The MMO assesses the suitability of dredged material for disposal at sea in line with the OSPAR guidelines for the management of dredged material (OSPAR, 2014). These guidelines provide generic guidance for determining the conditions under which dredged material may (or may not) be deposited at sea, and involve the consideration of alternative uses, disposal sites, and the suitability of the dredged material for aquatic disposal, including the presence and levels of contaminants in the material, along with perceived impacts on any nearby sites of conservation value.

One of the roles of Cefas is to provide scientific advice to the MMO on the suitability of the material for sea disposal at the application stage and, once a licence is granted, to provide technical advice on any monitoring undertaken as a result of licence conditions. Advice on the licensing of dredged material disposal at sea is provided by Cefas' Evidence for Marine Management and Policy (EMMP) team, and work conducted under C6794 helps underpin the scientific rationale for such advice (see Section 1.3).

1.2 Disposal sites around England

There are currently approximately 110 open sites (numerous sites are opened and closed every year) designated for dredged material disposal round the coast of England, not all of which are used in any one year. While the majority of these are located along the coast of the mainland, generally within a few miles of a major port or estuary entrance, a significant number are positioned within estuaries (e.g. Humber) or on intertidal mudflats as part of beneficial use schemes (Bolam et al., 2006).

Although total quantities vary year to year, approximately 40 Mt (wet weight) are annually disposed to coastal sites around England. Individual quantities licensed may range from a few hundred to several million tonnes, and the nature may vary from soft silts to stiff clay, boulders or even crushed rock according to origin, although the majority consists of finer material (Bolam et al., 2006).

1.3 Overview of Cefas / MMO project C6794 'Monitoring of dredged material disposal sites'

The dredged material disposal site monitoring project C6794, funded by the MMO, falls under a service level agreement (or SLA) between the MMO and Cefas. Operationally, this project represents a continuation of the disposal site monitoring programme SLAB5 which was a component of a former SLA between Defra and Cefas; this SLA formerly ceased at the end of March 2015. C6794 was initiated on 1st April 2015, and, thus, while the project and work planned under this project are termed here under C6794, any reference to its predecessor project is inevitable (i.e. to its survey work, reports or other scientific outputs), and will continue to be referenced herein as SLAB5.

In summary, C6794 provides field evaluations (‘baseline’ monitoring and ‘trouble-shooting’ surveys) at dredged material disposal sites around the coast of England. A major component of the project is, therefore, the commissioning of sea-going surveys at targeted disposal sites. Such field evaluations under C6794 are designed to ensure that:

- environmental conditions at newly designated sites are suitable for the commencement of disposal activities;
- predictions for established sites concerning limitations of effects continue to be met; and,
- disposal operations conform with licence conditions.

The outcomes of such surveys contribute, either directly or indirectly, to the licensing process by ensuring that any evidence of unacceptable changes or practices is rapidly communicated and acted upon by the MMO. As such, there are inherently strong links and ongoing discussions between the approaches and findings of this project with the work carried out by Cefas’ EMMP team and the licensing team within the MMO. The scientific outcomes of the work undertaken within C6794 are circulated to the Cefas EMMP team and the MMO *via* a number of routes including peer-reviewed publications (including both activity-specific and site-specific findings), reports, direct discussions and internal and external presentations. The production of this report forms an important element of such scientific communication. The current report, which presents the findings of work undertaken during 2021-22, constitutes the 14th in the series. The previous reports are accessible *via* the Defra website:

https://www.gov.uk/government/publications?departments%5B%5D=centre-for-environment-fisheries-and-aquaculture-science

It is not the purpose of this report to present a detailed appraisal of the processes giving rise to impacts (see Section 1.5) but to encapsulate the essence of the impacts associated with this activity at specific sites targeted within year.

1.4 Sites monitored

To aid with determining which disposal sites should be selected for sampling in any one year, Cefas has derived a tier-based approach that classifies a number of possible issues or environmental concerns that may be associated with dredged material disposal into a risk-based framework (Bolam et al., 2009; Birchenough et al., 2010). The issues that pertain to a disposal site, and where these lie within the tiering system (i.e. their perceived environmental risk), depict where that site lies within the tiered system. This ultimately determines whether that site is considered for sampling during a particular year. It is intended that this approach increases the transparency of the decision-making process regarding disposal site selection for C6794 monitoring, i.e. it establishes a model for site-specific decisions regarding sampling.

A tiered survey design and site assessment system, therefore, facilitates the prioritisation of dredged material disposal sites in terms of the need for, and the scale of, monitoring required at each site. In practice, this method provides a scientifically valid rationale for the assessment of risks associated with relinquished, current and proposed disposal sites to the surrounding environment and amenities.

Two disposal sites were targeted for Cefas monitoring during 2021-22: Outer Tees (northeast coast) and Lyme Bay 2 (South Devon coast). These sites were identified following consultation between Cefas' EMMP team, Cefas scientists in a number of key disciplines (e.g. benthic ecology, sediment contaminants), together with a significant involvement from the MMO

1.5 Aims of this report

The scientific outcomes following the sampling conducted at the Outer Tees dredged material disposal site are presented in a separate report (Bolam et al., 2022). This report, therefore, focuses solely on the findings based on the Lyme Bay 2 survey, which was conducted during December 2021. As with all preceding reports under the project, the aim is not to present a critique of the processes leading to any observed changes that might be observed within the disposal site: such appraisals are conducted *via* other reporting routes, either *via* discussions with Cefas' EMMP team, presentations and subsequent publications at national and international conferences, and *via* papers in peer-reviewed journals (e.g. Bolam and Whomersley, 2005; Bolam et al., 2006; Birchenough et al., 2006; Bolam, 2014; Bolam et al., 2014a; Rumney et al., 2015; Bolam et al., 2016a; Bolam et al., 2021a). The aims of this report are:

- to present the results of sampling undertaken at the Lyme Bay 2 disposal site under C6794, thereby aiding the dissemination of the findings under this project;
- to indicate whether the results obtained are in line with those expected for the disposal site, or whether subsequent investigations should be conducted;
- to facilitate our improved understanding of the impacts of dredged material disposal at both a site-specific level and a national level; and,
- to promote the development of scientific (or other) outputs under C6794.

2. Outcomes

2.1. Lyme Bay 2 (PO050)

2.1.1. Background

The Lyme Bay 2 (PO050) dredged material disposal site lies within Lyme Bay, South Devon. The spherical shaped (1,850 m diameter) site has a depth primarily in the region of 21-23 m, although a maximum depth of 30 m is found at its southern limit. Tides within Lyme Bay, and in the vicinity of PO050, have a mean spring range of 4 m or less and maximum tidal streams are generally less than 0.5 m s^{-1}. Although the disposal site does not lie within the boundaries of any designated nature conservation site, it is in proximity to a number of designated nature conservation sites, the closest of which (6.7 km away) is the Torbay MCZ.

Lyme Bay 2 is a relatively new site which, since its opening, has been receiving material from Exmouth Marina. There have been concerns raised by local stakeholders that the site is resulting in smothering of benthic assemblages. However, as the site was characterised using a desk-based data source for seabed habitats and associated benthic assemblages, the confidence of the health of such assemblages is regarded as relatively low compared to that which may be based on targeted, empirical sampling data. In view of this, Cefas conducted a seabed survey of the sediment habitats within and surrounding the disposal site to assess the benthic infaunal assemblages. These data will be used to assess the current ecological characteristics of the seabed, and will be used as a baseline to which future data may be compared to assess any ongoing ecological impacts associated with the site. The survey focused only on the sediment habitats in the vicinity, the ecological characteristics of any rocky habitats that may later be found to be present in the region are not addressed as part of this survey.

2.1.2. Survey Design

The Lyme Bay 2 survey comprised 10 seabed sampling stations, nine generally to the north and west of the disposal site with a single station within the site boundary (Figure 1).

The design was designed primarily to provide a baseline from which sediment (particle size and organic carbon) and ecological (macrofaunal) changes associated with the long-term use of the relatively new disposal site may be gauged. Should impacts associated with disposal activity extend beyond the licenced boundary of the site, these are anticipated to be observed initially and/or to a greater magnitude at the stations closer to the site (e.g., LB04, LB06, LB07) relative to those further afield. Although this is a recently licenced site, it has received some dredged material so the design assumes that any disposal to date has not resulted in changes outside the licenced boundary.

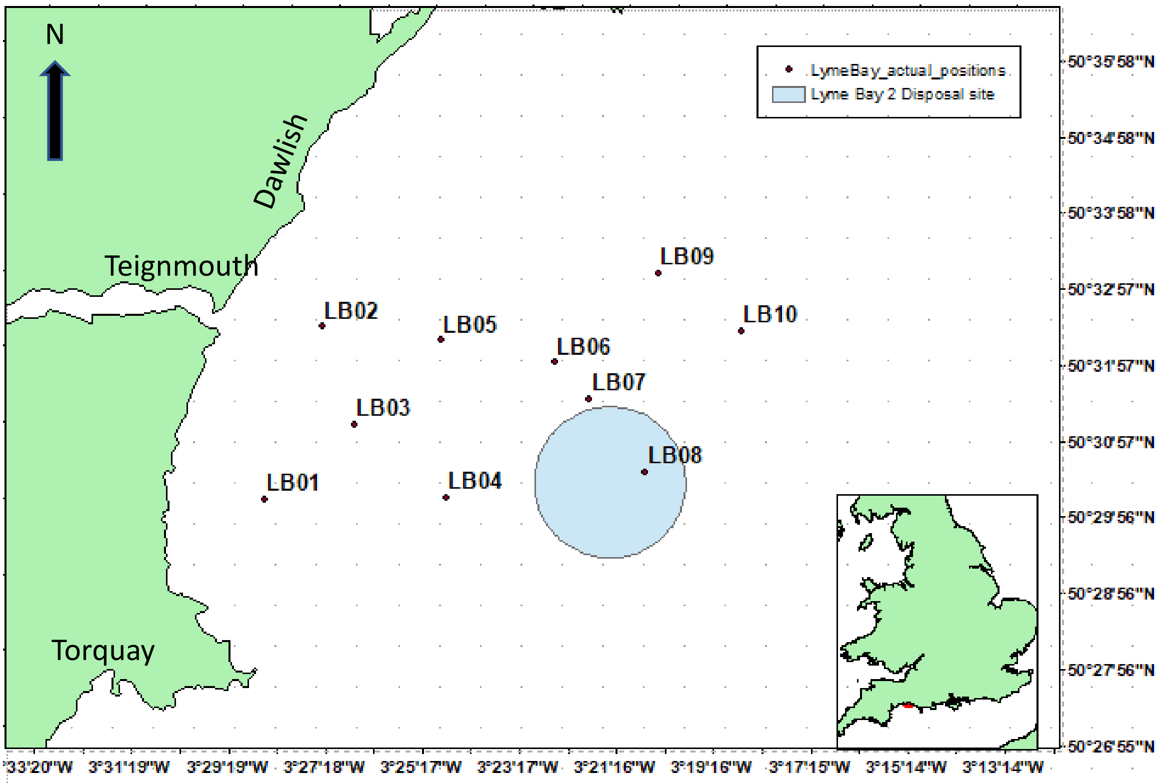


Figure 1. Locations of the 10 seabed stations sampled at Lyme Bay 2 under C6794 during December 2021.

The 10 stations were sampled during December 2021 using a mini-Hamon grab (three replicates at each station). A representative 500 ml sub-sample was removed from each sample (and frozen) prior to sieving on a 1 mm mesh sieve. All material retained was photographed, placed in a suitable container, and fixed and preserved by the addition of buffered 10% formaldehyde solution. The geographical position of each sampling location was recorded and, along with visual field notes (sediment description, sample volume), noted on deck logsheets.

All subsequent processing of the particle size analysis (PSA) and macrofaunal samples was conducted in accordance with the National Marine Biological Analytical Quality Control (or NMBAQC) scheme (Mason, 2016; Worsfold et al., 2010). The macrofaunal samples were audited as per the ‘own sample’ methodology (Worsfold and Hall, 2017). While all three replicates from each station were processed and the resulting data analysed for macrofauna, only one randomly selected replicate from each station was processed for PSA and organic carbon.

The undisturbed surficial sediment of each station was also sampled using a Shipek grab and placed in glass jars for storage. These samples, which were frozen immediately after sampling, were opportunistically taken as an insurance should it later be decided by the MMO that baseline contaminants data for the site are required.

2.1.3. Results

2.1.3.1. Sediment particle size

The seabed sampled at the 10 stations at Lyme Bay 2 predominantly comprises mixed sediments, being gravelly (mostly shells) muddy sands, with muddy sandy gravel at LB09 and slightly gravelly muddy sand at LB01 (

Table 1,

Table 2). Pie charts showing proportion of gravel, sand and mud (silt/clay) across the site are presented in Figure 2 and silt/clay content as a bubble plot in Figure 3. Sediments on the east side of the disposal site (particularly at LB09: 8.01% silt/clay (

Table 2)) are the least muddy, while sediment on the west (LB01: 46.42% silt/clay) is the muddiest. LB08, the only station located within the disposal site boundary, displays a particle size breakdown in commensurate with that of the surrounding environment.

Table 1. Sediment descriptions and statistics derived using Gradistat (Blott and Pye, 2001) and modified Folk and EUNIS sediment group classification (Long, 2006) for all replicates sampled at Lyme Bay 2, December 2021.

Sample code	Sample Type	Sediment Description	Mode 1 (µm)	Mode 2 (µm)	Mode 3 (µm)
LB01_A1	Bimodal, Very Poorly Sorted	Slightly Gravelly Muddy Sand	106.70	6.67	
LB02_B1	Bimodal, Very Poorly Sorted	Gravelly Muddy Sand	106.70	9600.00	
LB03_A1	Bimodal, Very Poorly Sorted	Gravelly Muddy Sand	106.70	9600.00	
LB04_C1	Trimodal, Extremely Poorly Sorted	Gravelly Muddy Sand	106.70	9600.00	6.67
LB05_C1	Bimodal, Very Poorly Sorted	Gravelly Muddy Sand	106.70	9600.00	
LB06_B1	Trimodal, Very Poorly Sorted	Gravelly Muddy Sand	853.55	106.70	1700.00
LB07_C1	Bimodal, Very Poorly Sorted	Gravelly Muddy Sand	106.70	853.55	
LB08_A1	Bimodal, Very Poorly Sorted	Gravelly Muddy Sand	106.70	9600.00	
LB09_B1	Bimodal, Very Poorly Sorted	Muddy Sandy Gravel	13600.00	603.55	
LB10_A1	Polymodal, Very Poorly Sorted	Gravelly Muddy Sand	426.80	106.70	1700.00

Table 2. Sediment compositions and EUNIS sediment group classification (Long, 2006) for all replicates sampled at Lyme Bay 2, December 2021.

Sample code	Gravel (%)	Sand (%)	Silt/clay (%)	Folk symbol	EUNIS group
LB01_A1	1.73	51.86	46.42	(g)mS	mud and sandy mud
LB02_B1	18.15	55.52	26.33	gmS	mixed sediments
LB03_A1	5.61	56.90	37.49	gmS	mixed sediments
LB04_C1	17.74	51.00	31.25	gmS	mixed sediments
LB05_C1	7.70	69.04	23.26	gmS	mixed sediments
LB06_B1	12.76	69.48	17.75	gmS	mixed sediments
LB07_C1	9.63	66.38	23.99	gmS	mixed sediments
LB08_A1	17.45	58.12	24.44	gmS	mixed sediments
LB09_B1	44.51	47.49	8.01	msG	mixed sediments
LB10_A1	9.41	68.24	22.35	gmS	mixed sediments

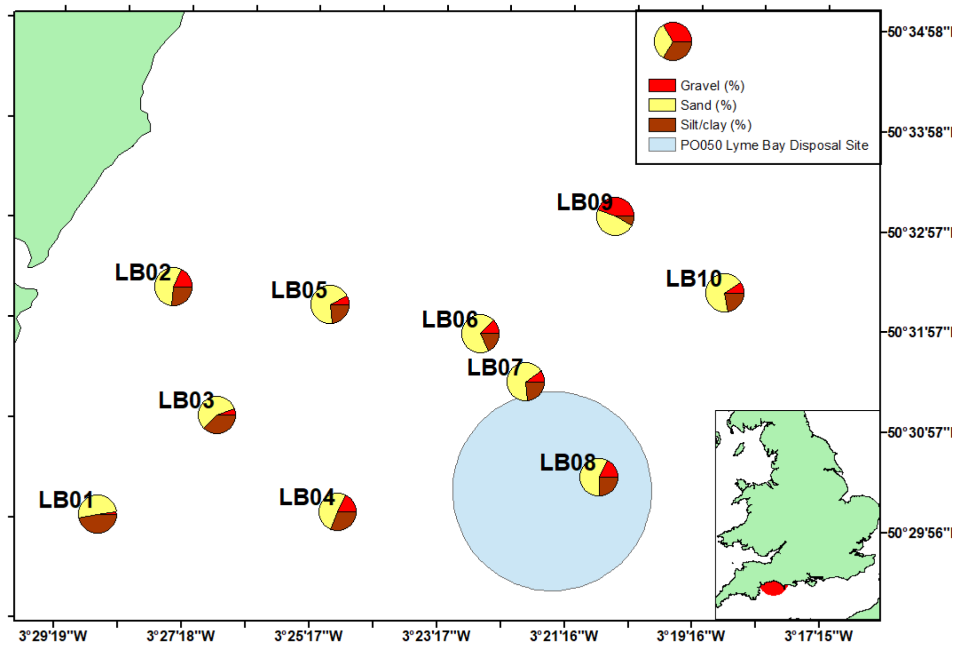


Figure 2. Pie charts of gravel, sand and silt/clay (average of three replicates) at Lyme Bay 2, December 2021.

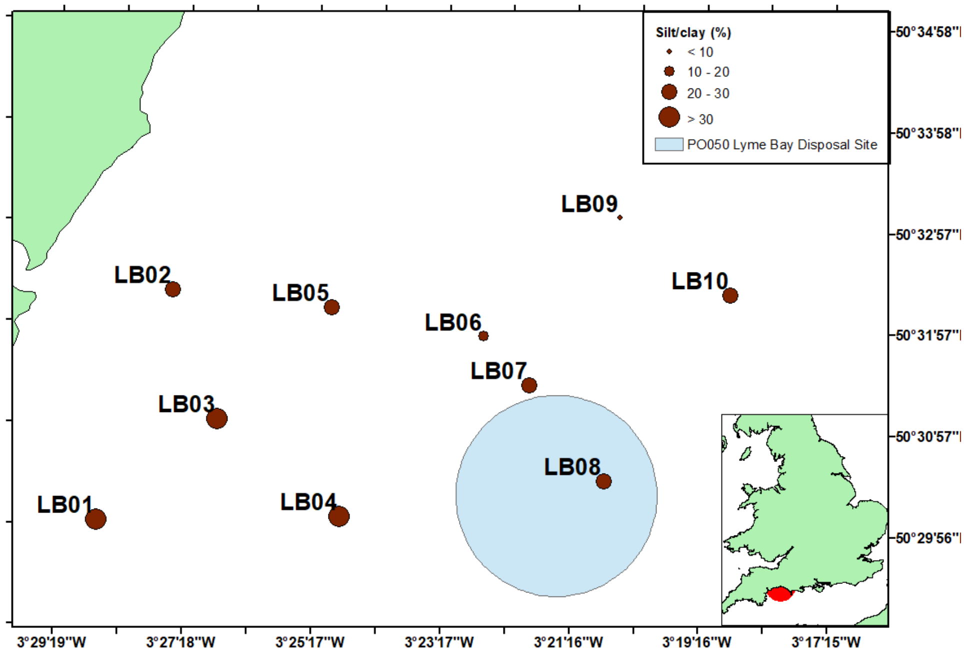


Figure 3. Silt/clay content (%) (average of 3 replicates) of sediments sampled at Lyme Bay 2, December 2021.

2.1.3.2. Sediment organic carbon (OC)

Organic carbon values range from 0.22 to 0.67% m/m in the <2 mm sediment fraction (Figure 4). The values are relatively low, as might be expected given the relatively low sediment silt/clay content present, with the highest organic carbon of 0.67% observed at LB01 where the highest mud content (~46%) was found.

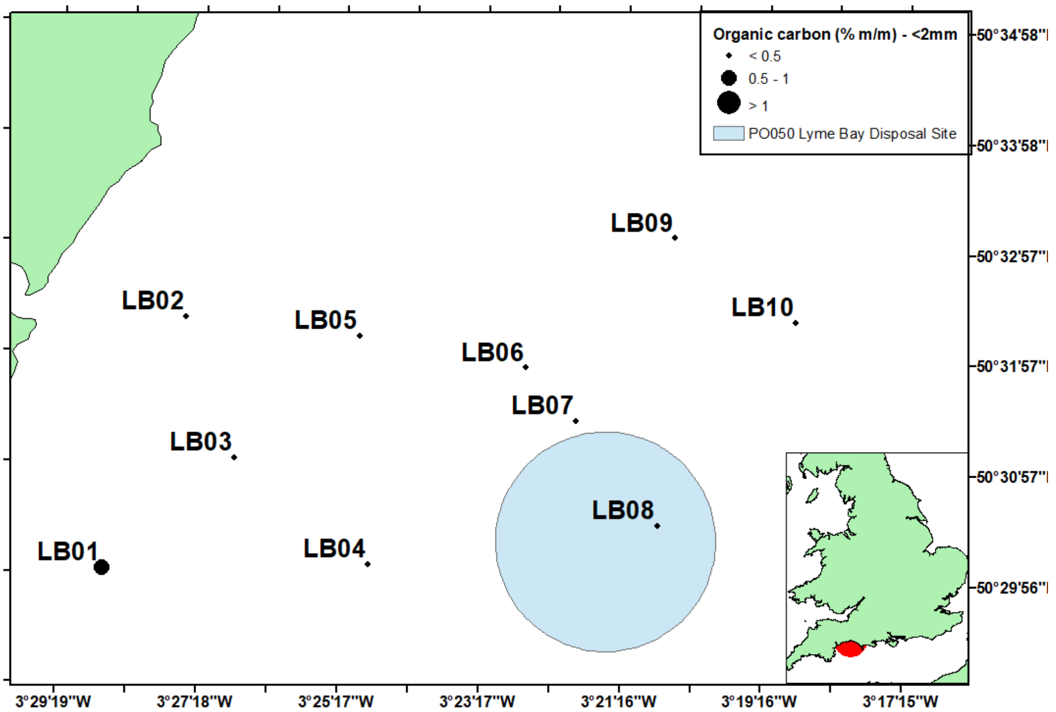


Figure 4. Sediment organic carbon content (% m/m in the <2 mm fraction) at the 10 stations sampled at Lyme Bay 2, December 2021.

2.1.3.3. Sediment Macrofaunal assemblages

A total of 225 taxa (including colonial epifauna) were recorded from the 30 samples (all three replicates from each of the 10 stations), with a total of 2,408 individuals identified and counted. There were 22 occurrences of colonial animals recorded from the samples. The most common taxa across the survey were: the Ribbon worm Nemertea spp., which was sampled at 80% of stations; the polychaete worm *Melinna palmata* observed at 73%

of stations; and the polychaete worms *Heteromastus filiformis* and *Notomastus* sp. and the gastropod mollusc *Turritellinella tricarinata* were all observed at 70% of stations. The most abundant taxa were the polychaete worm *Lumbrineris cingulata* (agg.) and the gastropod mollusc *T. tricarinata,* with 222 and 204 individuals recorded respectively. Several notable taxa were also identified within the survey (Table 3) including the non-native bryozoan *Fenestrulina delicia* and two polychaete worms not formally recorded from the UK: *Paradoneis ilvana* and *Spio symphyta*. Annelid worms were numerically dominant across the site (

Figure 5), being the most abundant phyla at nine of the 10 stations, while Mollusca, which was numerically dominant at LB03, was the next most abundant phyla overall. Colonial taxa were witnessed at all stations except LB02 (

Figure 5), being marginally more diverse in the four easternmost stations (LB07-LB10) including LB08 within the disposal site.

Table 3. Notable species identified from the 2021 macrofaunal samples across Lyme Bay 2, December 2021.

Species	Notes
Paradoneis ilvana	(Previously recorded as *Paradoneis* type B); Not formally recorded from UK
Spio symphyta	(Previously recorded as *Spio filicornis* agg.); Not formally recorded from UK
Sternaspis scutata	Nationally rare
Sabellaria spinulosa	Represents priority habitat if reef-forming
Sarsinebalia urgorrii	Only recently published as a UK species
Tritia varicosa	Possibly close to northern limit of distribution
Mytilus edulis	Commercially important
Arctica islandica	OSPAR listed; Long lived
Fenestrulina delicia	Non-native in the UK

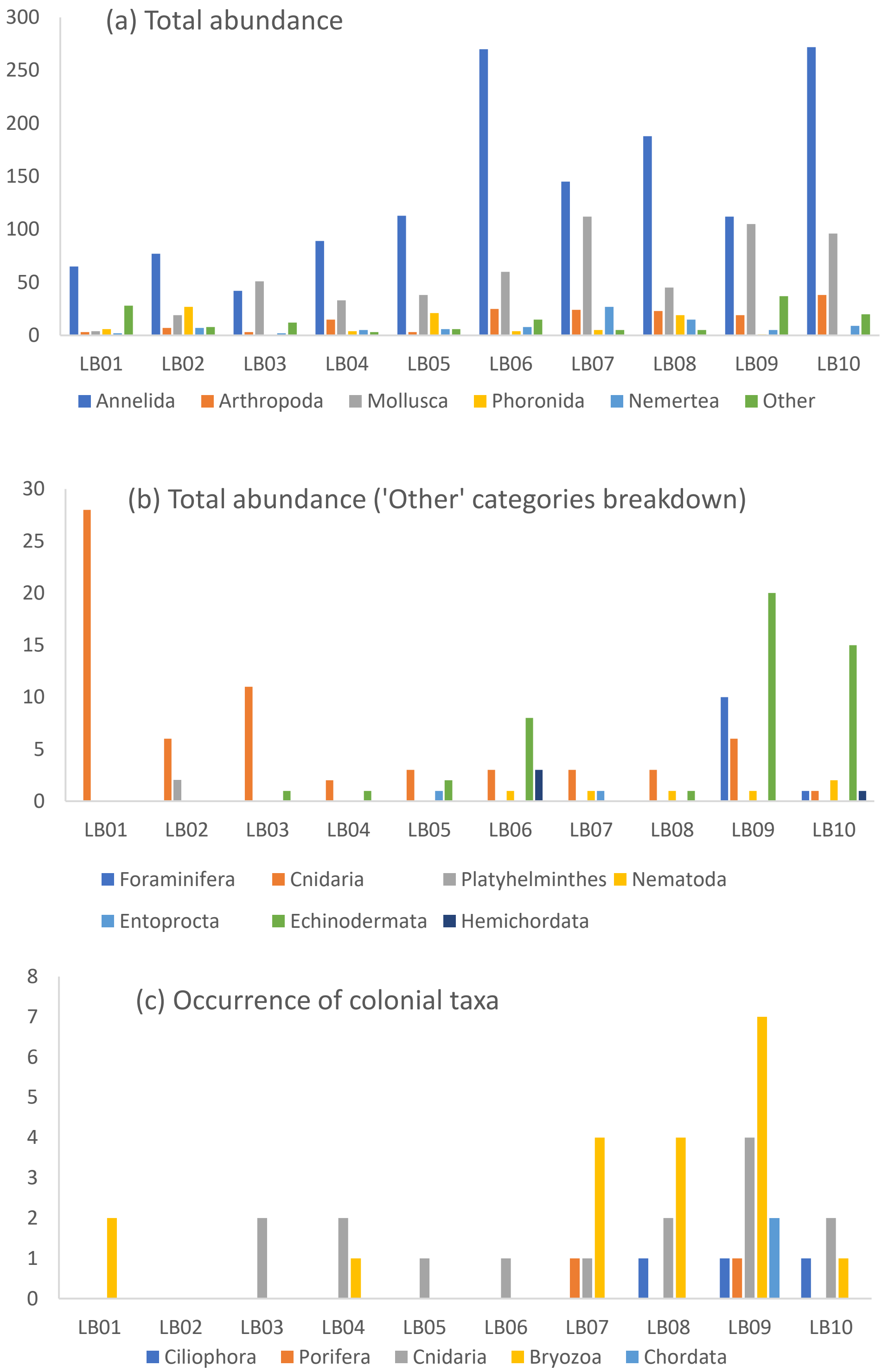


Figure 5(a-c). Bar charts showing the breakdown of abundance (N) of the taxonomic major groups for each sample taken across Lyme Bay 2, December 2021.

The macrofaunal dataset was assessed to quantify differences in univariate metrics and community structure over the survey area. The mean species richness (number of taxa per grab, S) and the total abundance (number of individuals per grab, N) showed a general increase across the stations, with LB01 having the lowest S and N and LB10 the highest (

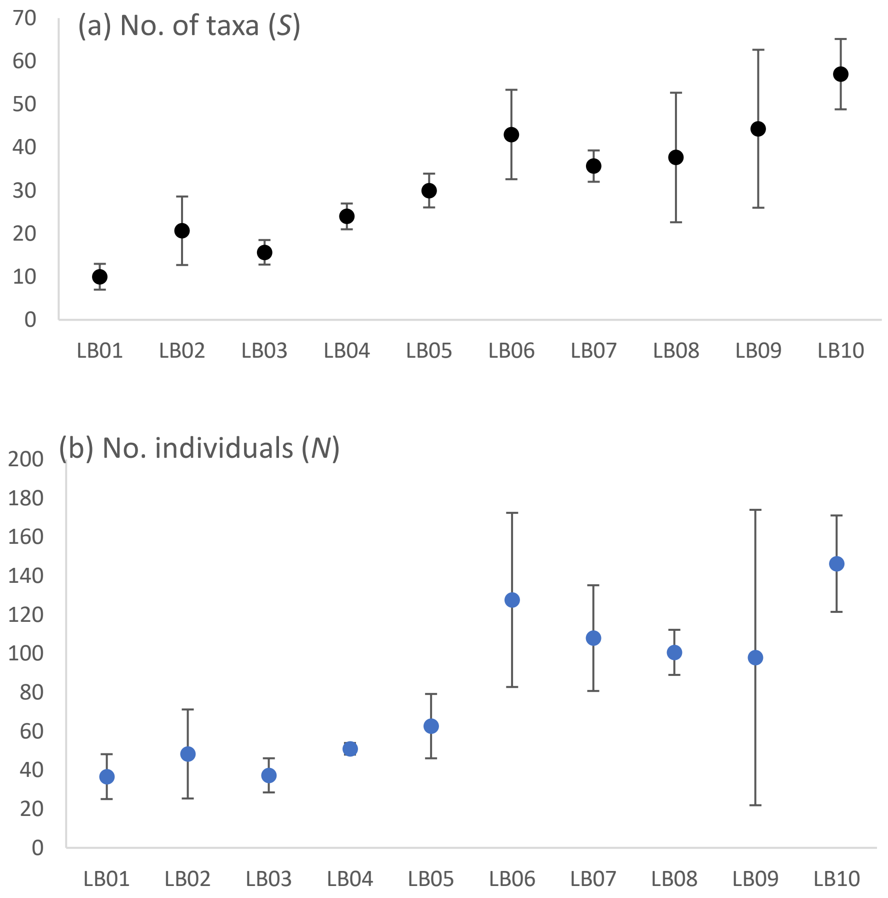
Figure 6(a & b)). Figure 7(a & b) discerns this spatial pattern more evidently with stations LB01-05 in the west having lower values of these two metrics relative to those to the east. Total biomass (g) per grab does not show a corresponding spatial pattern, with most stations possessing approximately 10 g (or less) of macrofauna (

Figure 6), Figure 7(c)). Stations LB03 and LB07 observed higher total biomass values, although, for LB07, this was the result of higher numbers of the gastropod mollusc *T. tricarinata* across the replicates, while for LB03, it reflected 41.3 g of this mollusc in one replicate. The mean values of S, N and total biomass values observed for the macrofaunal assemblage inside the Lyme Bay 2 disposal site at LB08 were comparable to those of the stations sampled across the whole survey area.

Multivariate numerical analyses were conducted on the taxonomic structure of the faunal data in Primer V7. Dispersion weighting was applied to downweigh highly variable taxa, followed by square root-transformation to reduce the influence of dominant taxa in the dataset and allow variation in the densities of rarer taxa to be detected. A non-hierarchical flat clustering method, whereby group allocation is redefined iteratively and maximised through the ANOSIM R statistic, was performed in PRIMER to identify statistically different faunal groups. In total eight groups (A-H) were identified (R = 0.89) which differ in their overall community structure (

Figure 8). Station abundance values were summed by their group allocation to help define their characteristics, and the macrofaunal metrics (species richness (S), total abundance (N), and total biomass (g)) were calculated (

Table 4). Group B and F had the highest diversity (highest S) and abundance, with group B representing nine of the replicate stations, and group F representing five replicate stations. Group B also had the greatest total biomass.


(a) No. of taxa (*S*)
70
60
50
40
30
20
10
0
LB01
LB02
LB03
LB04
LB05
LB06
LB07
LB08
LB09
LB10
(b) No. individuals (*N*)
200
180
160
140
120
100
80
60
40
20
0
LB01
LB02
LB03
LB04
LB05
LB06
LB07
LB08
LB09
LB10

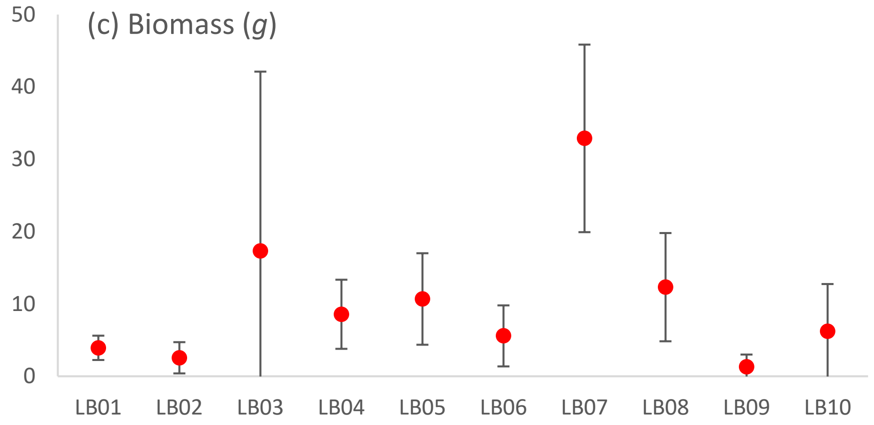


Figure 6(a-c). Taxonomic richness (number of taxa S), density (total abundance N) and total biomass (g) per grab of the Lyme Bay 2 macrofaunal assemblages from the December 2021 survey. Error bars depict 95% confidence intervals of the mean values.

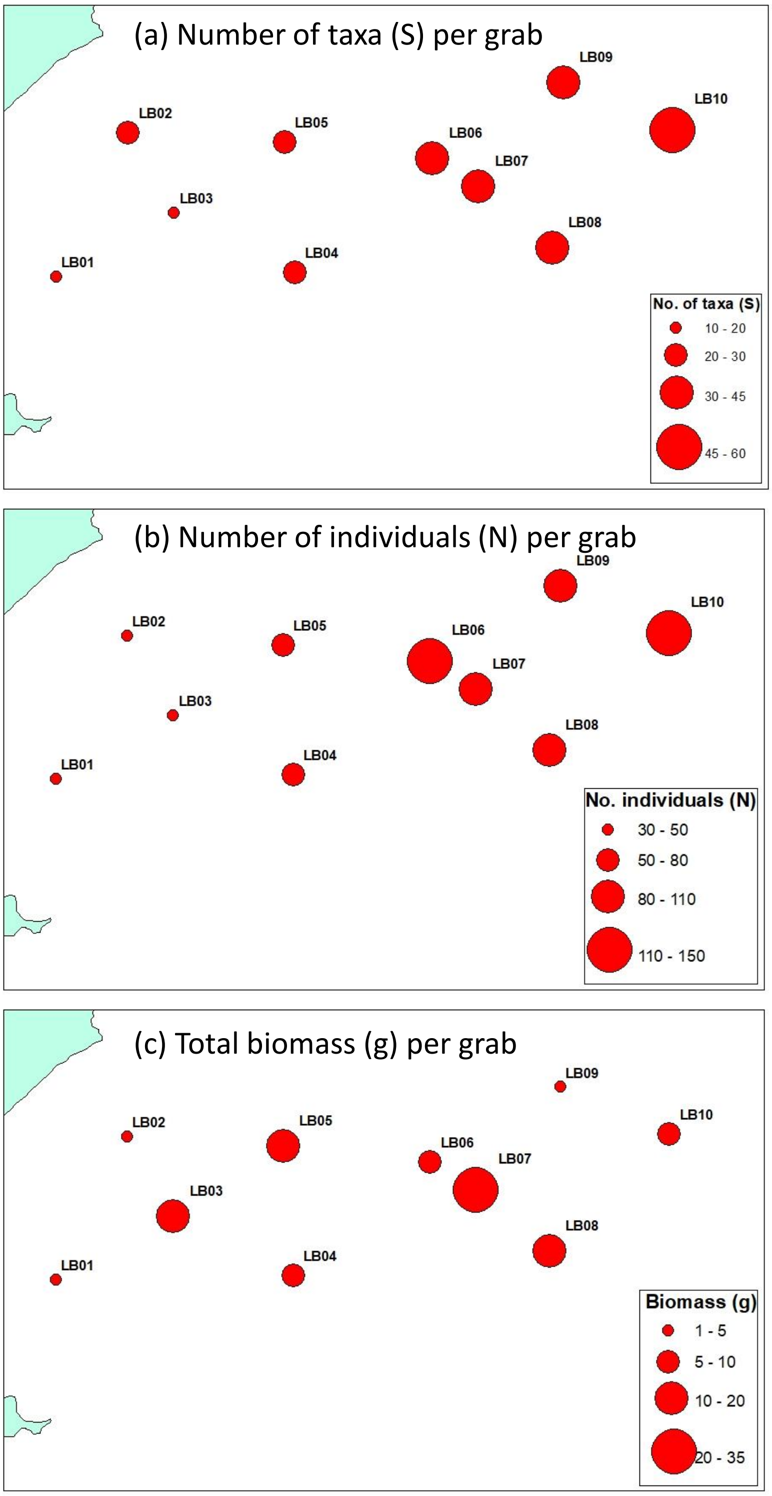


Figure 7(a-c). Spatial assessment of the taxonomic richness (number of taxa S), density (total abundance N) and total biomass (g) per grab of the Lyme Bay 2 macrofaunal assemblages across the December 2021 survey.

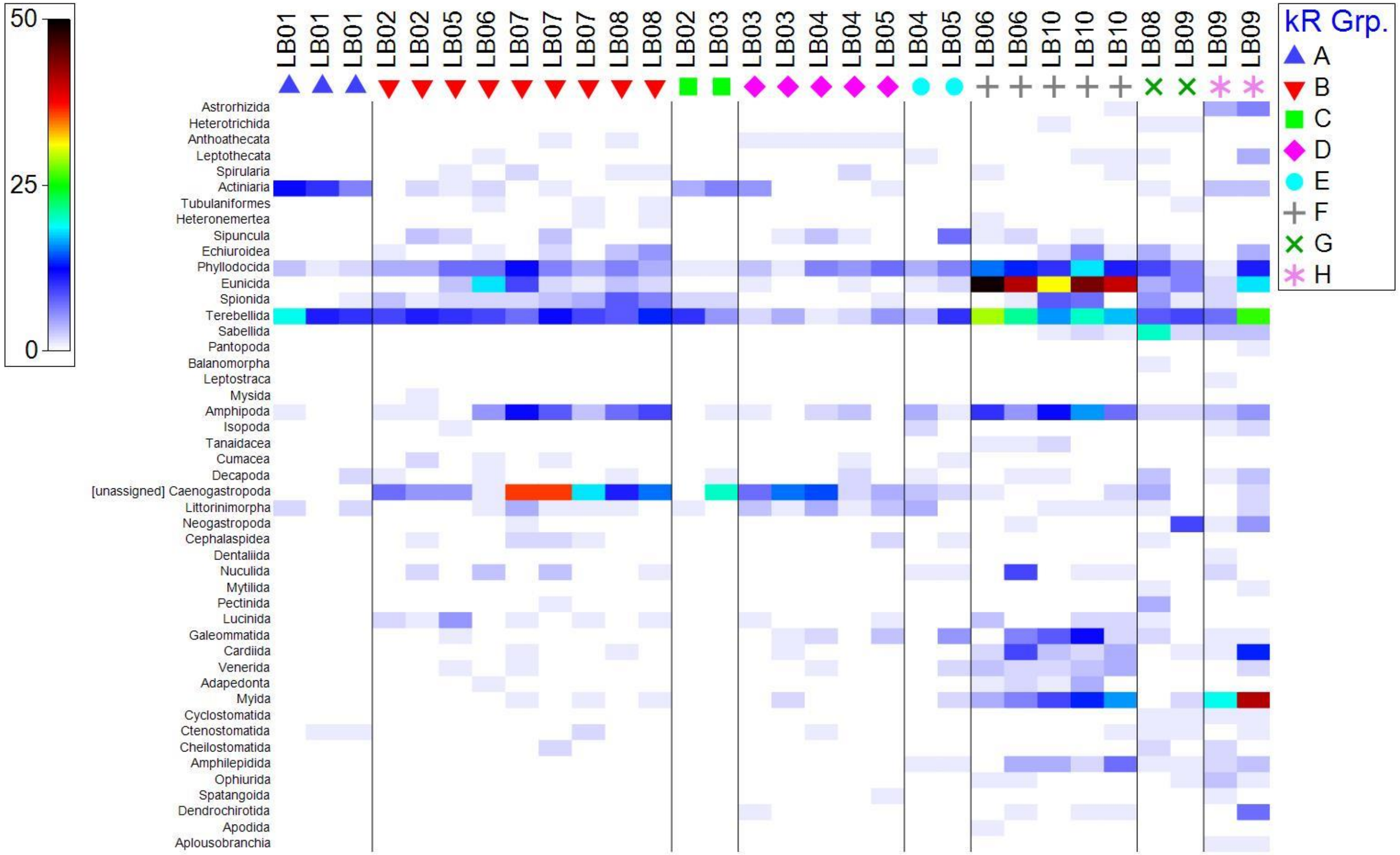


Figure 8. Shade plot showing the summed abundance values of macroinvertebrates (Order) by k-R cluster group. Data based on the Lyme Bay 2 survey, December 2021.

Table 4. Species richness (S), total abundance (N) and total biomass (g) of the samples allocated to each of eight macrofaunal k-R cluster groups. Data based on the 30 grabs (three replicates at 10 stations) sampled across Lyme Bay 2, December 2021.

Macrofaunal group	Total number of taxa (S)	Total abundance (N)	Biomass (g)
A (n=3)	**19**	**110**	**11.7904**
B (n=9)	**100**	**785**	**148.3009**
C (n=2)	**21**	**78**	**43.9791**
D (n=5)	**58**	**214**	**44.7424**
E (n=2)	**46**	**117**	**11.5843**
F (n=5)	**119**	**740**	**33.6774**
G (n=2)	**79**	**163**	**6.3569**
H (n=2)	**78**	**243**	**3.4911**

The relative similarities in assemblage structure of each station (replicates shown separately) are plotted using Non-parametric Multidimensional Scaling (nMDS) in Figure 9. The nMDS plot infers that the stations nearest each other geographically tend to be the more similar. Adding the k-R cluster groups to the plot also shows the change across the plot from group A to group G and H. Meanwhile, plotting the station replicate k-R cluster groups on a map (Figure 10) further exemplifies the west to east faunal gradient.

In summary, a general trend was observed across the survey site with an increase in species richness and total abundance from west to east, which was supported by a gradient in taxonomic structure (k-R cluster groups). No apparent trends in biomass were observed across the sites, with just a few ‘hot spots’ caused by the presence of the gastropod mollusc *T. tricarinata*. All stations sampled were dominated by annelid worms and molluscs in a number of taxa, abundance and biomass. Finally, it is evident that any disposal activity to Lyme Bay 2 to date has not had any detectable effect on its macrofaunal communities, albeit this conclusion is based on sampling a single station within the site.

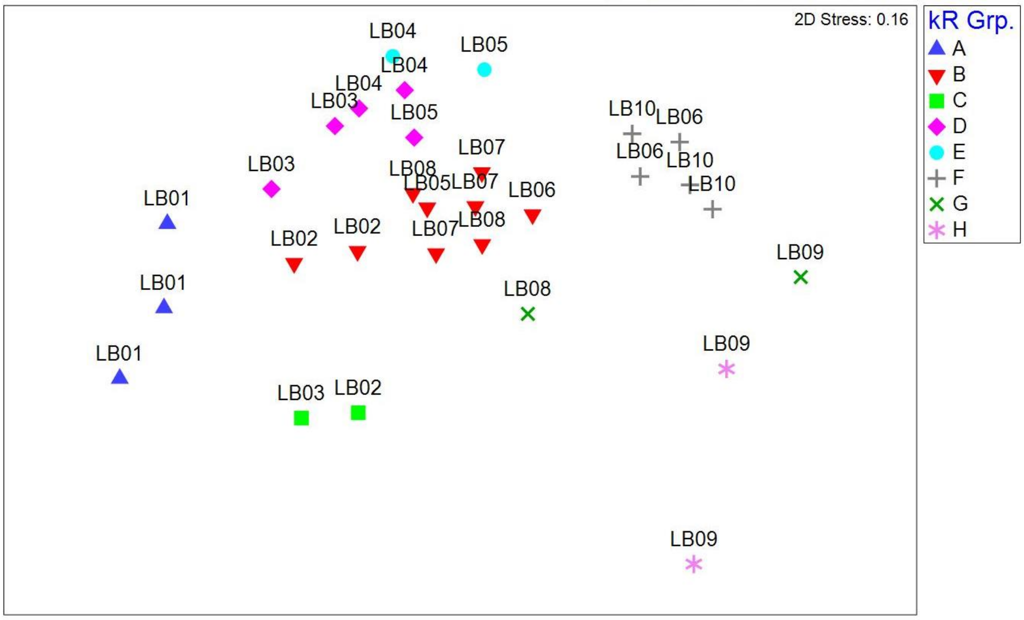


Figure 9. Non-parametric Multi-Dimensional Scaling ordination of the Bray-Curtis similarity scores (based on square root-transformed abundance data) showing the relative benthic assemblage similarity among samples collected across Lyme Bay 2, December 2021, and their faunal group allocation (kRGroup).

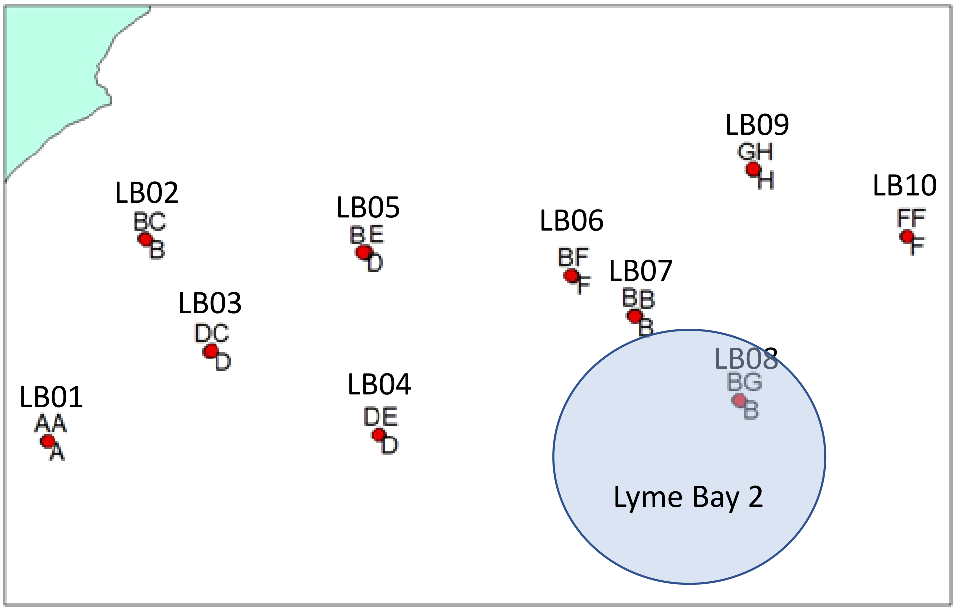


Figure 10. Spatial trend of the faunal group allocation (kRGroup) of each sample (three replicates at each station) identified through multivariate analysis, based on data from the Lyme Bay 2 survey, December 2021.

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