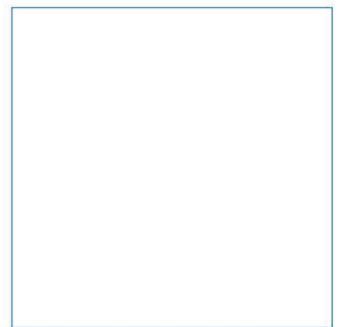
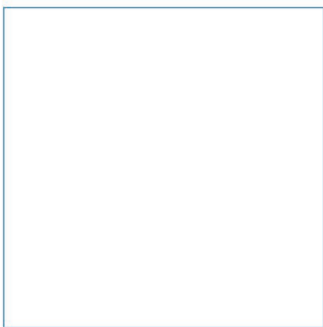
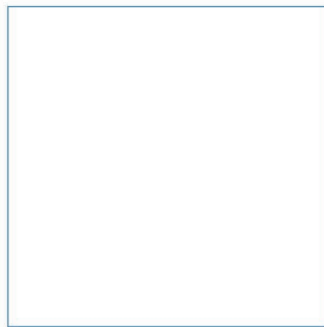


Associated British Ports

Port Talbot Marine Ecology Surveys

Summary Report

January 2024



Innovative Thinking - Sustainable Solutions



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Port Talbot Marine Ecology Surveys


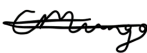

Summary Report

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1 Introduction

This report has been prepared by ABPmer for Associated British Ports (ABP) and provides a summary of the results of the following baseline marine ecology surveys undertaken to inform the Future Port Talbot project. The proposed project is located at Port Talbot on the south coast of Wales, on the east side of Swansea Bay (Figure 1). The project involves the development of a base for the manufacture, assembly, load-out, commissioning and storage of floating offshore wind turbines – to support wind farms to be developed in the Celtic Sea from the year 2030 onwards.

The results of the following marine ecological surveys are presented within this report:

- **Phase 1 Intertidal habitat survey:** A Phase 1 Intertidal Habitat Survey was undertaken in April 2023 to characterise the intertidal habitats and species present within the footprint of the proposed development. The purpose of the survey was to map the intertidal habitats present, identify the main characterising species and also the presence of any habitats/species of conservation interest;
- **Intertidal benthic sampling:** Core sampling of the intertidal sediments was undertaken in July 2023 to determine the intertidal faunal communities present within and near to the footprint of the proposed development; and
- **Subtidal benthic sampling:** A subtidal benthic ecology survey was undertaken in July 2023 to understand the subtidal faunal communities present within and near to the footprint of the proposed development.

The survey methodologies are detailed in Section 2 and the results of the intertidal and subtidal surveys are presented in Sections 3. Overall summary conclusions are then provided in Section 4.



Figure 1. Port Talbot location in Swansea Bay

2 Methodology

2.1 Phase 1 intertidal habitat survey

A Phase 1 intertidal habitat survey was undertaken on the 20 and 21 April 2023 to characterise the intertidal habitats and species present within and adjacent to the proposed development. The survey covered the foreshore in the Port Talbot Tidal Harbour between the breakwaters. The survey was undertaken over a spring tidal phase.

The survey approach was based on the standardised Phase 1 mapping methodology as detailed in the Marine Monitoring Handbook, Procedural Guidance No 3-1 (Wyn and Brazier, 2001) and Countryside Council for Wales (CCW) Handbook for Marine Intertidal Phase 1 Survey and Mapping (Wyn *et al.*, 2000). Habitats in the area were mapped using the Marine Habitat Classification for Britain & Ireland (MHCBI) v22.04) to biotope Class Levels 4 or 5 (JNCC, 2022).

The boundaries of habitats were mapped to their full extent using Global Positioning System (GPS) and detailed notes on species present were recorded. Following the completion of the survey, the biotope extents across the area were mapped into Geographical Information System (GIS) layers using ArcGIS and the positional information derived from the GPS readings.

Anecdotal ornithology and marine mammals observations were also recorded during the survey.

2.2 Intertidal benthic sampling

The intertidal benthic sampling survey was undertaken on foot on the 4 and 5 July 2023.

In total, 18 stations were sampled (Figure 2). At each of these stations a sample was collected using a 0.01 m² hand-held corer (to a depth of approximately 15 cm) for macrofaunal analysis (faunal composition, abundance and biomass). An additional core sample was also collected at each station for Particle Size Analysis (PSA) and Total Organic Carbon (TOC).

Field notes were also made about the nature of the habitats at each of the sampling points. Information recorded included details on the sediment type, evidence of bird feeding (e.g. footprints), the specific characteristics of the habitat at the precise point where the samples were retrieved and general characteristics of the wider habitat. A photographic record of the sediment type and the broader habitat appearance was also taken.

All infaunal samples were immediately delivered to the laboratory once the survey was complete, where samples were sieved (using a 0.5 mm sieve) and fixed ahead of analysis.

Anecdotal ornithology and marine mammal observations were also recorded during the survey.



Figure 2. The location of the intertidal core and subtidal grab sample stations

2.3 Subtidal benthic sampling

The subtidal grab sampling survey was undertaken on the 20 July 2023. The sampling methods followed the established and recognised procedures outlined in the Recommended Operational Guidelines (ROG) for Grab Sampling and Sorting and Treatment of Samples (Guerra and Freitas, 2013) and the Marine Monitoring Handbook, Procedural Guideline No 3-9 (Thomas, 2000).

Twelve stations were sampled (Figure 2). At each station, a benthic sample was collected using a 0.1 m² Day Grab for macrofauna analysis (faunal composition, abundance and biomass). An additional sample was also taken at each station for determination of PSA and TOC.

At each site, up to three attempts were made to retrieve a suitable sample (i.e. a grab containing sufficient volume of sediment for analysis). The sediment depths within the grab which were used for sample acceptance were a minimum of 7 cm for muddy or soft sediments and 5 cm for hard packed or coarse sediments. Anything less than these values was only retained if no other viable sample was collected.

Each grab sample was photographed upon successful retrieval and transferred into a labelled plastic bucket. All infaunal samples were immediately delivered to the laboratory once the survey was complete, where samples were sieved (using a 0.5 mm sieve) and fixed ahead of analysis.

2.4 Laboratory analysis

The benthic macrofaunal analysis was undertaken by Ocean Ecology Ltd. The laboratory is National Marine Biological Analytical Quality Control Scheme (NMBAQC) accredited.

Faunal samples were sorted from the sieve residue using low power binocular microscopes. All of the macroinfaunal specimens were identified to species level (where practicable) and enumerated. This work was undertaken in adherence with ISO 16665 standards and the NMBAQC Scheme Guidelines.

The PSA sample analysis was undertaken using the NMBAQC standardised methodology. The analysis was carried out using a Mastersizer laser diffractor which produces detailed sedimentary profiles for fine sediments (clay, sand and silts). TOC was undertaken using Loss-on-Ignition (LOI) analysis with a muffle furnace and oven. Samples were oven dried before being weighed and placed in the muffle furnace for 4 hours at 475 °C and re-weighed.

3 Results

3.1 Phase 1 intertidal habitat survey

The habitats recorded in the survey based on the MHCBI are described in more detail below. The section has been structured so that habitats and species on the foreshore recorded in the northern section of the Port Talbot Tidal Harbour (South Breakwater to the Jetty) are described first in Section 3.1.1. Habitats observed in the southern section of foreshore between the Jetty and Main Breakwater are then described in Section 3.1.2. Finally, ornithology and marine mammal observations made during the survey are summarised in Section 3.1.3. The spatial distribution of intertidal habitats recorded are shown in Figure 3.

3.1.1 Northern section of the Port Talbot Tidal Harbour

Upper shore habitats

Much of the top of the upper foreshore below the high water mark consists of barren shingle, pebbles and cobble (LS.LCS.Sh.BarSh: Barren littoral shingle). Clean sand habitat (which was also dry in appearance) was also present, particularly near to the jetty (LS.LSa.MoSa: Barren or amphipod-dominated mobile sand shores). Within this zone there were several strandline areas characterised by sand hoppers (talitrid amphipods) on decomposing seaweed (LS.LSa.St.Tal: Talitrids on the upper shore and strandline) (Image 1).



Image 1. Barren shingle, strand line and clean sand on the upper shore

Areas of cobbles, boulders and pebbles on the upper shore colonised by spiralled wrack *Fucus spiralis* (LR.LLR.F.Fspi.X: *Fucus spiralis* on full salinity upper eulittoral mixed substrata) was recorded with gutweed *Ulva intestinalis* and purple laver *Porphyra umbilicalis* also present (Image 2). Fauna recorded in this habitat included the periwinkle *Littorina littorea*, barnacles, dog whelk *Nucella lapillus* and beadlet anemone *Actinia equina*. In several areas of freshwater run off, the habitat LR.FLR.Eph.Ulv: *Ulva* spp. on freshwater-influenced and/or unstable upper eulittoral rock was present in small patches.



Image 2. ***Fucus spiralis* colonising cobbles, boulders and pebbles on the upper shore**

Large areas of sandy habitat with abundant lugworm (*Arenicola* spp.) casts and more occasionally sand mason worms *Lanice conchilega* were recorded (LS.LSa.FiSa.Po: Polychaetes in littoral fine sand).

Mid shore habitats

Peat and clay habitats

The majority of the mid shore consisted of exposed fossilised peat (with some clay exposures also present) (Image 3).



Image 3. **Eroding peat edge (right) and exposed clay (left)**

Both living and shell debris of piddocks (*Barnea candida*) were recorded boring into the peat and clay. Spiralled wrack *F. spiralis* was also attached covering large areas of higher elevation peat. The red seaweed *Ceramium* spp was occasionally present. Ragworm *Hediste diversicolor* were also abundant in the peat (often occurring in association with old piddock holes). This habitat is most appropriately assigned to LR.HLR.FR.RPid (*Ceramium* sp. and piddocks on eu littoral fossilised peat). In the exposed clay areas, piddocks were also evident in patches along with cockles *Cerastoderma edule* recorded in softer clay that had a veneer of silt.

Large pools had also formed in the peat (with patches of sand, cobble, gravel and pebbles on the bottom) which had been colonised by false Irish moss *Mastocarpus stellatus*, red seaweeds *Ceramium* spp and sea lettuce *U. lactuca* and non-native Japanese wireweed *Sargassum muticum* (Image 4). Fauna such as the green urchin *Psammechinus miliaris* was recorded under larger boulders in the pools and mobile epifauna such as common prawn *Palaemon serratus* and shore crab *Carcinus maenas* were also present. Piddock shells and holes were also present. This habitat is considered to be a mixture of the biotopes LR.FLR.Rkp.SwSed: Seaweeds in sediment-floored eu littoral rockpools and LR.HLR.FR.RPid: *Ceramium* sp. and piddocks on eu littoral fossilised peat).

Intertidal peat and clay habitat is a Section 7 Priority Habitat (Peat and Clay Exposures) listed under the Environment (Wales) Act 2016.



Image 4. Large pool formed in the clay

Mixed sediment habitats

Extensive areas of mixed sediment (pebbles, gravel, cobbles and small boulders) were also present throughout the mid-eu littoral zone (Image 5). The upper sections of the boulder fields were sparse in terms of algal species with spiral wrack *F. spiralis* occasionally recorded. Barnacles were abundant and the periwinkle *L. littorea* was also frequently recorded. The thick top shell *Phorcus lineatus* and more occasionally flat top shell *Steromphala umbilicalis* were also recorded in this habitat. Gammarids were present underneath the pebbles and cobbles. This habitat is most appropriately assigned to LR.FLR.Eph.BLitX (Barnacles and *Littorina* spp. on unstable eu littoral mixed substrata).



Image 5. Cobbles/small boulders on the mid shore

The honeycomb worm *Sabellaria alveolata* was commonly recorded encrusting the cobbles and small boulders in in this area with one area in which more notable biogenic growth was present (Image 6). This more distinct areas were mapped separately as LS.LBR.Sab.Salv (*Sabellaria alveolata* reefs on sand-abraded eulittoral rock). *S. alveolata* reefs is a Section 7 Priority Habitats listed under the Environment (Wales) Act 2016.



Image 6. Honeycomb worm *Sabellaria alveolata* reef

Large boulder habitats

An extensive boulder sea defence was present seaward of the peat exposures (Image 7). The majority of the boulders were colonised by the barnacle *Semibalanus balanoides* and periwinkle *L. littorea* (LR.HLR.MusB.Sem.LitX *Semibalanus balanoides* and *Littorina* spp. on exposed to moderately exposed eulittoral boulders and cobbles). Other species recorded included the limpet *Patella vulgata* and the dog whelk *N. lapillus*.

Two distinct zonation bands were present along the breakwater. The lower zone consisted of the biotope LR.HLR.MusB.Sem.Sem (*Semibalanus balanoides*, *Patella vulgata* and *Littorina* spp. on exposed to moderately exposed or vertical sheltered eulittoral rock). Above this zone the biotope, LR.LLR.F.Fspi: *Fucus spiralis* on sheltered upper eulittoral rock was present. Channel wrack *Pelvetia canaliculata* was also occasionally present round the upper splash zone.



Image 7. Boulder sea defence with breakwater in distance

Lower shore habitats

The lower shore sections of the boulder sea defence were covered in serrated wrack *Fucus serratus* along with other algae including false Irish moss *M. stellatus* and red seaweeds. The native oyster *Ostrea edulis* (a Section 7 listed species listed under the Environment (Wales) Act 2016) and non-native slipper limpet *Crepidula fornicata* were frequently recorded attached to rocks. The netted dog whelk *Tritia reticulata* and common whelk *Buccinum undatum* were also recorded on the boulders.

The under-boulder habitat in this area provided habitat for a rich variety of epibenthic species (Image 8). This included the variegated scallop *Chlamys varia*, barnacles, spotted cowrie *Trivia monacha*, oyster drill *Ocenebra erinaceus*, the green urchin *Psammechinus miliaris*, chitons, sponges, sea squirts (including *Ciona intestinalis*), keel worms, hydroids and bryozoans. Mobile crustacean species recorded under boulders included, broad-clawed porcelain crab *Porcellana platycheles*, velvet swimming crabs *Necora puber*, juvenile edible crabs *Cancer pagurus* and bristly crab *Pilumnus hirtellus*. This habitat is most appropriately assigned to R.MLR.BF.Fser.Bo: *Fucus serratus* and under-boulder fauna on exposed to moderately exposed lower eulittoral boulders.

The habitat recorded under the boulders in this area is characteristic of the Section 7 Priority Habitat 'Intertidal boulder communities' listed under the Environment (Wales) Act 2016 (although noting the boulders are of anthropogenic rather than natural origin).



Image 8. Epifauna recorded in lower shore boulder areas including the variegated scallop *Chlamys varia* (top left), spotted cowrie *Trivia monacha* (top middle), the green urchin *Psammechinus miliaris* (top right), broad-clawed porcelain crab *Porcellana platycheles* (bottom left), native oyster *Ostrea edulis* (bottom middle) and oyster drill *Ocenebra erinaceus* (bottom right)

Lower shore sandy habitat with lugworm (*Arenicola* spp.) casts and sand mason worms *L. conchilega* were recorded (LS.LSa.FiSa.Po: Polychaetes in littoral fine sand) near to the breakwater.

3.1.2 Southern section of the Port Talbot Tidal Harbour

Upper and mid shore habitats

Along the upper sections of the breakwater, boulders were covered in the algae *F. spiralis* (LR.LLR.F.Fspi: *Fucus spiralis* on sheltered upper eulittoral rock). Below this zone, much of the lower sections of the breakwater boulders were covered in the algae *Ascophyllum nodosum* (LR.LLR.F.Asc.X: *Ascophyllum nodosum* on full salinity mid eulittoral mixed substrata).

Seaward of the breakwater and extending along much of upper to mid-section of the foreshore was clean sand habitat with limited fauna observed (LS.LSa.MoSa: Barren or amphipod-dominated mobile sand shores) (Image 9).



Image 9. Clean sand on the upper shore and sandy mud/mud habitat on lower sections of the foreshore

Lower shore habitats

Large areas of the lower foreshore consisted of muddy sand habitat with a range of infaunal species recorded including lugworms (*Arenicola* spp.), ragworms *Hediste diversicolor* and occasionally sand mason worms *L. conchilega* (LS.LSa.MuSa: Polychaete/bivalve-dominated muddy sand shores) (Image 10). Towards the jetty, sediment consisted of patches of sand (LS.LSa.FiSa.Po: Polychaetes in littoral fine sand) and muddier sediment (LS.LMu: Littoral mud). These biotopes are characteristic of the Section 7 Priority Habitat 'Intertidal mudflat' listed under the Environment (Wales) Act 2016.



Image 10. Lugworms *Arenicola* spp (left) ragworm *Hediste diversicolor* (middle) and sand mason worms *Lanice conchilega* (right) recorded on foreshore

Several areas of boulders and cobbles overlying sand were also present at mid shore elevations (LR.HLR.MusB.Sem.LitX: *Semibalanus balanoides* and *Littorina* spp. on exposed to moderately exposed eulittoral boulders and cobbles or LR.LLR.F.Fspi.X: *Fucus spiralis* on full salinity upper eulittoral mixed substrata). Small patches of barren shingle were also observed (LS.LCS.Sh.BarSh Barren littoral shingle).

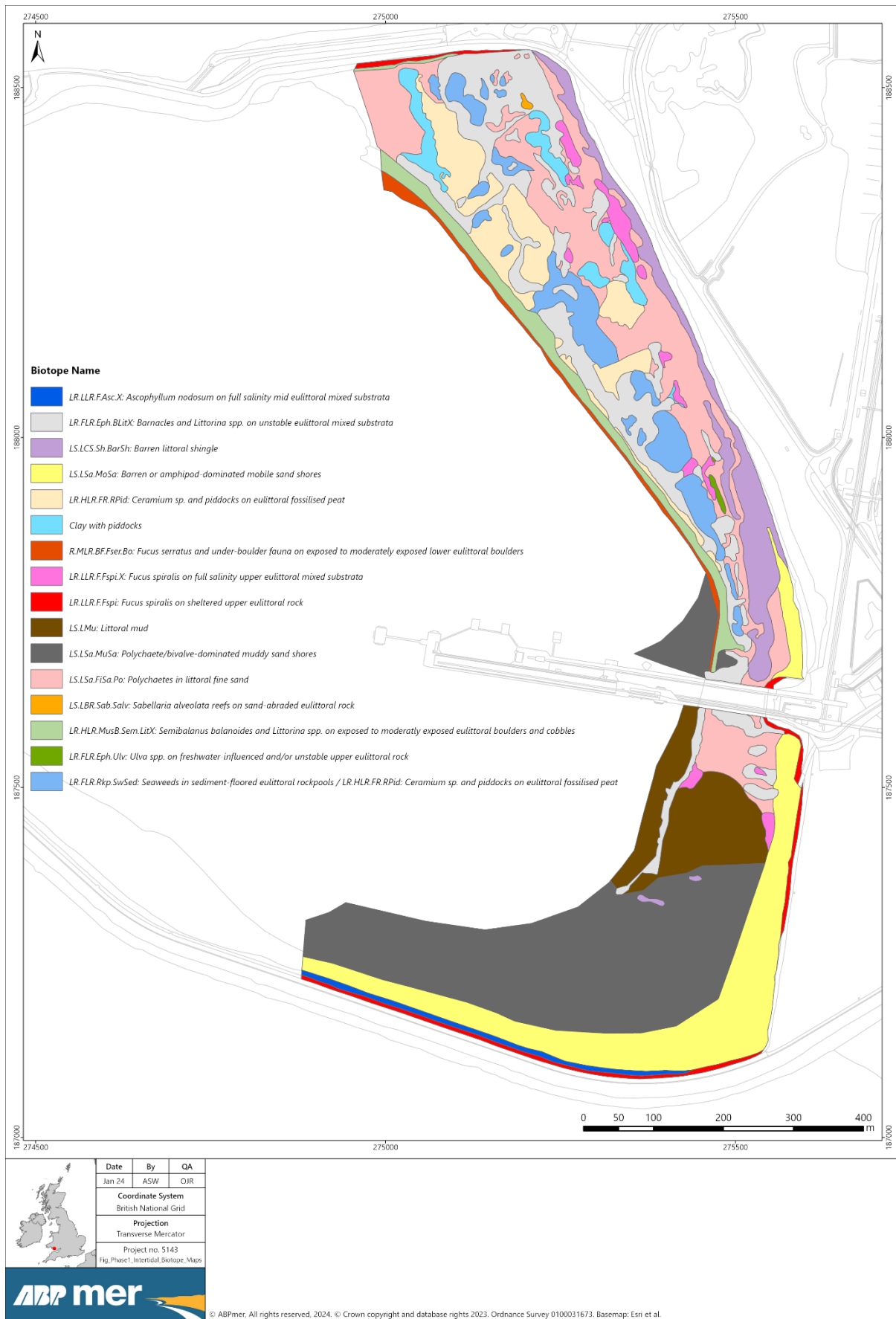


Figure 3. Intertidal habitats recorded in the Phase 1 habitat survey

3.1.3 Ornithology and marine mammal observations

Approximately 50 to 70 Oystercatcher and 10 Whimbrel were recorded roosting on upper shore shingle habitat during a count undertaken when conducting the Phase 1 intertidal habitat survey on the 20 April 2023. In addition, Herring Gulls *Larus argentatus* and low numbers of other species (including Ringed Plover *Charadrius hiaticula* and Shelduck *Tadorna tadorna*) were recorded during the same count.

A harbour porpoise *Phocoena phocoena* was recorded foraging at the entrance to the Port Talbot Tidal Harbour during the Phase 1 intertidal habitat survey on the 20 April 2023.

3.2 Benthic sampling

The species recorded in the samples collected from the intertidal and subtidal surveys are summarised below in Section 3.2.1 and Section 3.2.2 respectively, including key characterising species and any species of particular note (such as protected species or non-native species).

The laboratory results are presented in Appendix A (macrofauna) and Appendix B (sediment analysis). Summary information on the sedimentary and ecological conditions at the sites based on these results is presented in Table 1 and Table 2.

3.2.1 Intertidal samples

The number of taxa in the samples ranged from 1 to 25 (Stations 3 and 9 respectively) and the number of individuals from 100 to 91, 800 organisms per m² (Station 3 and 17 respectively). Biomass ranged from 0.7 (Station 3) to 3187.6 grams per m² (Station 11). Sites with the greatest biomass (Station, 11, 6 and 14) was largely attributable to the presence of molluscs (particularly cockle *C. edule*). The TOC in the samples ranged between approximately 0.1 % and 1.4 % (Table 1).

The majority of intertidal samples collected consisted of sand /slightly gravelly sand (Stations 1-3, 7-8, 10,12,14-16). Samples from these stations contained over 85 % sand fractions and were from areas classified as clean sand biotopes in Section 3.1 (LS.LCS.Sh.BarSh or LS.LSa.FiSa.Po). These samples were generally characterised by a relatively impoverished community consisting of polychaetes (such as *Scolecopsis (Scolecopsis) squamata*, *Owenia* spp, *Nephtys* spp, *Chaetozone gibber*, non-native *Boccardia proboscidea* and *L. conchilega*), the amphipod *Bathyporeia sarsi* and nematodes.

Muddy sand/slightly gravelly muddy sand samples (Stations 6, 9,11 and 13) were characterised by a wide range of infauna including cockles *C. edule*, mudsnail *Peringia ulvae*, polychaetes (such as *B. proboscidea*, *Owenia* spp, *C. gibber*), the oligochaete *Tubificoides pseudogaster*, amphipods (*Gammarus* spp) and nematodes. These stations were predominately located in areas defined as the biotope LS.LSa.MuSa: Polychaete/bivalve-dominated muddy sand shores in Section 3.1.

Mud/sandy mud samples, with over 80 % silt content (Stations 4,5 and 17) were also characterised by a wide range of infauna including mud shrimp Corophiidae including *Corophium volutator*, polychaetes (such as *Boccardia proboscidea*, *Polydora ciliata*, *Eteone longa*, *Pygospio elegans* and ragworms (Nereididae) including *H. diversicolor*), the mudshrimp *P. ulvae* and nematodes. These stations were located in areas consisting of clay or peat as described in Section 3.1.

These species are all considered commonly occurring, not protected and typical of intertidal sedimentary habitats in the region.

Table 1. Intertidal benthic survey results

Station	Sediment Type	TOC (%)	No. of Taxa (per m ²)	No. of Individuals (per m ²)	Total Biomass (g per m ²)	Key Characterising Species (Number per m ² shown in brackets)
1	Slightly Gravelly Sand	0.18	5	4100	35.5	<i>Scolelepis (Scolelepis) squamata</i> (3,700) <i>Eteone longa</i> (100) <i>Nephtys cirrose</i> (100) <i>Bathyporeia sarsi</i> (100) <i>Macoma balthica</i> (100)
2	Slightly Gravelly Sand	0.27	2	500	18.0	<i>Scolelepis (Scolelepis) squamata</i> (400) <i>Enchytraeidae</i> (100)
3	Slightly Gravelly Sand	0.11	1	100	0.7	<i>Bathyporeia pilosa</i> (100)
4	Sandy Mud	1.44	10	8800	34.6	<i>Peringia ulvae</i> (3,200) <i>Pygospio elegans</i> (2,400) <i>Boccardia proboscidea</i> (2000) <i>Nereididae</i> (400) <i>Enchytraeidae</i> (200) <i>Hediste diversicolor</i> (200) <i>Bathyporeia Pilosa</i> (100) <i>Eteone longa</i> (100) <i>Polydora ciliate</i> (100) <i>Cyathura carinata</i> (100)
5	Sandy Mud	0.69	9	41100	43.4	<i>Boccardia proboscidea</i> (38,300) <i>Corophiidae</i> (600) <i>Peringia ulvae</i> (500) <i>Eteone longa</i> (500) <i>Pygospio elegans</i> (400) <i>Corophium volutator</i> (400) <i>Hediste diversicolor</i> (200) <i>Nereididae</i> (100) <i>Enchytraeidae</i> (100)
6	Muddy Sand	0.35	11	3600	2205.9	<i>Pygospio elegans</i> (1,200) <i>Peringia ulvae</i> (800) <i>Boccardia proboscidea</i> (400) <i>Cerastoderma edule</i> (400) <i>Cardiidae</i> (200) <i>Syllidia armata</i> (100) <i>Microphthalmus</i> (100) <i>Aphelochaeta</i> (100) <i>Chaetozone gibber</i> (100) <i>Capitella</i> (100)

Station	Sediment Type	TOC (%)	No. of Taxa (per m ²)	No. of Individuals (per m ²)	Total Biomass (g per m ²)	Key Characterising Species (Number per m ² shown in brackets)
7	Sand	0.2	10	1800	14.3	<i>Pygospio elegans</i> (400) <i>Peringia ulvae</i> (400) <i>Spiophanes bombyx</i> (300) <i>Boccardia proboscidea</i> (100) <i>Cardiidae</i> (100) ACARI (100) <i>Nephtys</i> (100) <i>Spio symphyta</i> (100) <i>Tanaissus lilljeborgi</i> (100) <i>Macomangulus tenuis</i> (100)
8	Sand	0.23	6	2400	4.7	<i>Bathyporeia sarsi</i> (1,700) <i>Nephtys</i> (200) <i>Urothoe poseidonis</i> (200) <i>Cardiidae</i> (100) <i>Nephtys cirrosa</i> (100) <i>Spio martinensis</i> (100)
9	Slightly Gravelly Muddy Sand	1.36	25	8200	1136.9	<i>Owenia</i> (2,300) <i>Pygospio elegans</i> (1,200) <i>Peringia ulvae</i> (600) <i>Tubificoides pseudogaster</i> (500) <i>Gammarus locusta</i> (500) NEMATODA (400) <i>Tharyx</i> (300) <i>Cardiidae</i> (200) <i>Chaetozone gibber</i> (200) <i>Scolelepis (Scolelepis) squamata</i> (200)
10	Slightly Gravelly Sand	0.17	14	7300	1545.8	NEMATODA (2,700) <i>Pygospio elegans</i> (1,100) <i>Owenia</i> (800) <i>Tharyx</i> (500) <i>Chaetozone gibber</i> (400) <i>Boccardia proboscidea</i> (300) <i>Glycera</i> (300) <i>Capitella</i> (300) <i>Nephtys</i> (200) <i>Nephtys cirrosa</i> (200)

Station	Sediment Type	TOC (%)	No. of Taxa (per m ²)	No. of Individuals (per m ²)	Total Biomass (g per m ²)	Key Characterising Species (Number per m ² shown in brackets)
11	Slightly Gravelly Muddy Sand	0.75	19	7200	3187.6	<i>Boccardia proboscidea</i> (3,500) <i>Peringia ulvae</i> (700) <i>Chaetozone gibber</i> (500) <i>Owenia</i> (400) <i>Cerastoderma edule</i> (400) <i>Tubificoides pseudogaster</i> (300) <i>Nephtys</i> (200) <i>Pygospio elegans</i> (100) <i>Glycera</i> (100) <i>Eumida sanguinea</i> (100)
12	Slightly Gravelly Sand	0.21	12	4200	143.1	<i>Owenia</i> (1,600) <i>Pygospio elegans</i> (500) <i>Peringia ulvae</i> (300) <i>Chaetozone gibber</i> (300) <i>Nephtys</i> (300) <i>Spio martinensis</i> (300) <i>Cerastoderma edule</i> (200) <i>Cardiidae</i> (200) <i>Eteone longa</i> (200) <i>Boccardia proboscidea</i> (100)
13	Muddy Sand	0.84	8	14600	5.9	<i>Pygospio elegans</i> (13,600) <i>Cerastoderma edule</i> (200) <i>Cardiidae</i> (200) <i>Eteone longa</i> (200) <i>Peringia ulvae</i> (100) NEMATODA (100) <i>Enchytraeidae</i> (100) <i>Bathyporeia pilosa</i> (100)
14	Slightly Gravelly Sand	0.28	13	3800	1971.5	<i>Chaetozone gibber</i> (900) <i>Lanice conchilega</i> (600) <i>Pygospio elegans</i> (300) <i>Owenia</i> (300) <i>Euclymene oerstedii</i> (300) <i>Cerastoderma edule</i> (200) <i>Peringia ulvae</i> (200) <i>Nephtys</i> (200) <i>Boccardia proboscidea</i> (200) <i>Tubificoides pseudogaster</i> (200)

Station	Sediment Type	TOC (%)	No. of Taxa (per m ²)	No. of Individuals (per m ²)	Total Biomass (g per m ²)	Key Characterising Species (Number per m ² shown in brackets)
15	Slightly Gravelly Sand	0.43	9	1300	16.0	<i>Nephtys</i> (300) <i>Nephtys cirrosa</i> (200) <i>Tellininae</i> (200) <i>Lanice conchilega</i> (100) <i>Nucula nitidosa</i> (100) <i>Crangon crangon</i> (100) <i>Sigalion</i> (100) <i>Magelona johnstoni</i> (100) <i>Magelona filliformis</i> (100)
16	Slightly Gravelly Sand	0.86	7	1700	36.7	<i>Nephtys</i> (600) <i>Owenia</i> (500) <i>Cumopsis goodsir</i> (200) <i>Pygospio elegans</i> (100) <i>Peringia ulvae</i> (100) <i>Cardiidae</i> (100) NEMERTEA (100)
17	Mud	0.74	12	91800	75.2	<i>Corophiidae</i> (51,900) <i>Corophium volutator</i> (32,500) <i>Polydora ciliata</i> (4,300) <i>Pygospio elegans</i> (1,700) NEMATODA (500) <i>Peringia ulvae</i> (200) <i>Veneridae</i> (200) NEMERTEA (100) <i>Tharyx</i> (100) <i>Pholoe inornata</i> (100)
18	Slightly Gravelly Sand	0.41	18	7400	8.6	<i>Tharyx</i> (2,400) <i>Corophiidae</i> (700) <i>Peringia ulvae</i> (600) <i>Tubificoides pseudogaster</i> (600) <i>Corophium volutator</i> (500) <i>Pygospio elegans</i> (500) <i>Cardiidae</i> (300) <i>Chaetozone gibber</i> (300) <i>Mytilidae</i> (300) NEMATODA (200)

3.2.2 Subtidal samples

The number of taxa in the samples ranged from 4 (Station 4 and 6) to 3 (Station 3). The number of individuals was variable and ranged from 100 organisms per m² (Station 4 and 6) to 10,660 organisms per m² (Station 8). Biomass ranged from 0.1 (Station 4) to 154.6 grams per m² (Station 1). Sites with the greatest biomass (Station 1, 2 and 3) was largely attributable to the presence of clams (such as *Fabulina fabula* and *Nucula nitidosa*). The TOC in the samples ranged between approximately 0.3 % and 2.6 % (Table 2).

The sediment in samples collected on the subtidal survey consisted predominantly of mud or sandy mud with a high silt content (Stations 4-12). These samples were characterised by polychaetes (including *Chaetozone gibber*, *Tharyx* spp, *Melinna palmata*, *Cossura* spp and *Nephtys* spp), bivalves (such as *Abra nitida* and *Mytilidae* spp), mud shrimp Corophiidae (including *C. volutator*) and nematodes. These stations were also located within the Port Talbot Tidal Harbour with the exception of Station 4.

Samples consisting of predominantly sand or muddy sand (Stations 1 to 3) were characterised by polychaetes (such as *Glycera* spp, *Nephtys* spp, *L. conchilega*, *Magelona johnstoni* and *C. gibber*) and clams including *F. fabula* and *N. nitidosa*. These stations were all located in the approaches to the Port Talbot Tidal Harbour.

The species recorded from the samples are all considered commonly occurring in the region (Callaway, 2016; Calloway *et al.*, 2020; ABPmer, 2010).

Table 2. Subtidal benthic survey results

Station	Sediment Type	TOC (%)	No. of Taxa (per m ²)	No. of Individuals (per m ²)	Total Biomass (g per m ²)	Key Characterising Species (Number per m ² shown in brackets)
1	Muddy Sand	2.30	20	510	154.6	<i>Nephtys</i> (80) <i>Magelona johnstoni</i> (60) <i>Fabulina fabula</i> (60) <i>Glycera</i> (30) <i>Tellininae</i> (30) <i>Nucula nitidosa</i> (30) <i>Glycera tridactyla</i> (30) <i>Spisula</i> (30) <i>Mytilidae</i> (20) <i>Spiophanes bombyx</i> (20)
2	Slightly Gravelly Muddy Sand	2.59	25	790	91.7	<i>Glycera</i> (140) <i>Nephtys</i> (120) <i>Chaetozone gibber</i> (70) <i>Fabulina fabula</i> (40) <i>Spiophanes bombyx</i> (40) <i>Capitella</i> (40) <i>Magelona johnstoni</i> (30) <i>Nucula nitidosa</i> (30) <i>Tellimya ferruginosa</i> (30) <i>Nephtys hombergii</i> (30)
3	Slightly Gravelly Muddy Sand	2.28	28	1230	21.0	<i>Glycera</i> (280) <i>Lanice conchilega</i> (130) <i>Eumida sanguinea</i> (130) <i>Nephtys</i> (100) <i>Glycera tridactyla</i> (80) <i>Chaetozone gibber</i> (60) <i>Notomastus</i> (60) <i>Magelona johnstoni</i> (50) <i>Corophium volutator</i> (50) <i>Amphiuridae</i> (30)
4	Sandy Mud	2.22	4	100	0.1	<i>Chaetozone gibber</i> (50) <i>Mytilidae</i> (30) <i>Spisula</i> (10) <i>Abra</i> (10)

Station	Sediment Type	TOC (%)	No. of Taxa (per m ²)	No. of Individuals (per m ²)	Total Biomass (g per m ²)	Key Characterising Species (Number per m ² shown in brackets)
5	Mud	2.38	10	1230	2.5	<i>Chaetozone gibber</i> (660) <i>Corophiidae</i> (370) <i>Corophium volutator</i> (50) <i>Abra nitida</i> (40) <i>Nephtys</i> (30) <i>Cossura</i> (30) <i>Mytilidae</i> (20) <i>Nephtys hombergii</i> (10) <i>Tubificoides pseudogaster</i> (10) <i>Polydora ciliata</i> (10)
6	Sandy Mud	2.22	4	100	0.8	<i>Chaetozone gibber</i> (60) <i>Cossura</i> (20) <i>Corophiidae</i> (10) <i>Varicorbula gibba</i> (10)
7	Mud	0.71	8	420	1.0	<i>Chaetozone gibber</i> (260) <i>Mytilidae</i> (70) <i>Abra nitida</i> (30) <i>Nephtys</i> (20) <i>Cossura</i> (10) <i>Nephtys hombergii</i> (10) NEMERTEA (10) <i>Scolelepis (Scolelepis) squamata</i> (10)
8	Sandy Mud	1.28	22	10660	10.7	<i>Chaetozone gibber</i> (9,810) <i>Melinna palmata</i> (200) <i>Corophium volutator</i> (90) <i>Tharyx</i> (80) <i>Abra nitida</i> (60) NEMERTEA (60) <i>Ampharete lindstroemi</i> (60) <i>Cossura</i> (40) <i>Tharyx killariensis</i> (40) <i>Pholoe inornata</i> (30)
9	Mud	0.31	10	1140	0.9	<i>Chaetozone gibber</i> (850) <i>Cossura</i> (110) <i>Corophiidae</i> (60) <i>Melinna palmata</i> (30) <i>Corophium volutator</i> (30) <i>Mytilidae</i> (20) <i>Tharyx</i> (10) <i>Tharyx killariensis</i> (10) <i>Terebellides</i> (10) <i>Nephtys</i> (10)

Station	Sediment Type	TOC (%)	No. of Taxa (per m ²)	No. of Individuals (per m ²)	Total Biomass (g per m ²)	Key Characterising Species (Number per m ² shown in brackets)
10	Mud	2.38	17	7980	20.7	<i>Chaetozone gibber</i> (6,570) <i>Abra nitida</i> (390) <i>Corophiidae</i> (320) <i>Tharyx</i> (300) <i>Cossura</i> (110) <i>Corophium volutator</i> (90) <i>Nephtys</i> (40) NEMERTEA (30) <i>Melinna palmata</i> (20) <i>Ampharete lindstroemi</i> (20)
11	Mud	2.53	12	1980	6.3	<i>Chaetozone gibber</i> (1,300) <i>Cossura</i> (360) <i>Tharyx</i> (90) <i>Melinna palmata</i> (70) <i>Nephtys</i> (50) <i>Nephtys hombergii</i> (30) NEMERTEA (20) <i>Terebellides</i> (20) <i>Abra nitida</i> (10) <i>Ampharete lindstroemi</i> (10)
12	Mud	2.46	7	810	0.6	<i>Chaetozone gibber</i> (720) <i>Tharyx</i> (30) <i>Tharyx killariensis</i> (20) <i>Nephtys</i> (10) <i>Podarkeopsis capensis</i> (10) <i>Corophiidae</i> (10) <i>Mytilidae</i> (10)

4 Summary

The Phase 1 intertidal habitat survey recorded a rich mosaic of distinct habitats due to the wide variety of different substrates present on the foreshore in the area (including peat, clay, sand, mud, mixed sediment and large boulders). This was reflected through a diverse range of algae and fauna present on the foreshore within the survey area.

The following Section 7 Priority Habitats under The Environment (Wales) Act 2016 were recorded in the survey:

- **Peat and clay exposures:** Fossilised peat with some clay was present along extensive areas of the northern section of foreshore. The habitat supported piddocks as well as a wide range of other species;
- **Intertidal mudflats:** Sandy mud and muddy sand mudflat (rich in infauna including cockles, lugworms etc) was present predominantly along mid to lower shore in southern section of the Port Talbot Tidal Harbour;
- **Sabellaria alveolata reefs:** A small patch of biogenic reef was observed in the northern section of foreshore; and
- **Intertidal boulder communities:** Along lower shore sections of the boulder sea defence a rich under boulder community characteristic of this habitat was recorded (although noting the boulders are of anthropogenic rather than natural origin).

The native oyster was also frequently recorded along the lower shore on boulders (a Section 7 Priority Species). No other benthic species or habitats which are protected or considered nationally scarce or rare were recorded in the Phase 1 intertidal habitat survey.

The intertidal benthic core samples consisted predominantly of sand with some muddy sand, sandy mud and mud sediment types also recorded. Samples were characterised by a range of commonly occurring species of polychaetes, oligochaetes, amphipods, and nematodes which are considered characteristic of intertidal mudflat in the Swansea Bay region. No intertidal species which are considered nationally rare or protected were recorded in the samples.

The subtidal benthic samples consisted predominantly of mud along with sandy mud and muddy sand. Samples were characterised by nematodes, commonly occurring polychaetes, bivalves and amphipods as well as low numbers of other taxa including echinoderms. No subtidal habitats or species considered nationally rare or protected were recorded, with the assemblages observed considered characteristic of communities found more widely in coastal areas in the region.

Three non-native species were recorded in the surveys (Japanese wireweed *S. muticum*, slipper limpet *C. fornicata* and the polychaete *B. proboscidea*). These species are all considered well established in intertidal habitat in the area.

5 References

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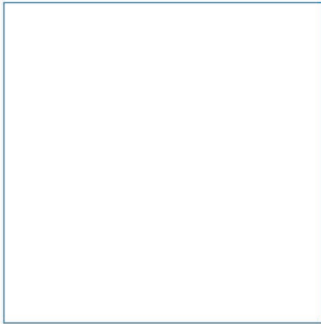
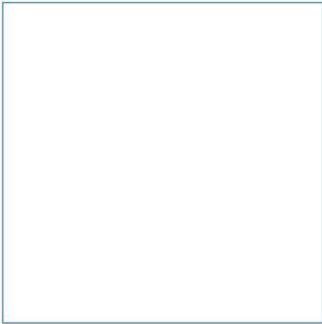
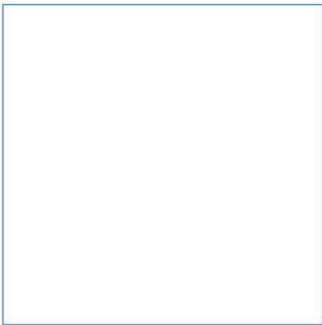
6 Abbreviations/Acronyms

BSH	Broad Scale Habitat
CCW	Countryside Council for Wales
GIS	Geographical Information System
GPS	Global Positioning System
ISO	International Organization for Standardization
JNCC	Joint Nature Conservation Committee
LOI	Loss-on-Ignition
MHCBI	Marine Habitat Classification for Britain & Ireland
NMBAQC	National Marine Biological Analytical Quality Control Scheme
PSA	Particle Size Analysis
ROG	Recommended Operational Guidelines
TOC	Total Organic Carbon

Cardinal points/directions are used unless otherwise stated.

SI units are used unless otherwise stated.

Appendices



Innovative Thinking - Sustainable Solutions

A Macrofauna Results

A.1 Abundance

Taxa	Subtidal Grab Sample Stations												Intertidal Core Sample Stations																	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ACTINIARIA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
NEMERTEA	1	-	-	-	-	-	1	6	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-
NEMATODA	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	27	-	-	1	-	-	-	5	2
<i>Malmgrenia andreapolis</i>	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pholoe inornata</i>	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
<i>Sigalion</i>	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	
<i>Sigalion mathildae</i>	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Sthenelais boa</i>	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	
<i>Eteone longa</i>	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	5	-	-	-	-	-	-	-	2	2	-	-	-	-	-
<i>Eumida</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	
<i>Eumida bahusiensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	
<i>Eumida sanguinea</i>	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	
<i>Glycera</i>	3	14	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	1	1	-	-	-	-	-	1	
<i>Glycera tridactyla</i>	3	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Podarkeopsis capensis</i>	-	-	2	-	-	-	-	2	-	-	1	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	
<i>Syllidia armata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Microphthalmus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nereididae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Hediste diversicolor</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	1	-	-	-	-	-	-	-	
<i>Eunereis longissima</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Perinereis cultrifera</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
<i>Nephtys</i>	8	12	10	-	3	-	2	-	1	4	5	1	-	-	-	-	-	1	2	-	2	2	3	-	2	3	6	-	2	
<i>Nephtys cirrosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	2	-	-	-	-	2	-	-	-	
<i>Nephtys hombergii</i>	-	3	-	-	1	-	1	-	-	-	3	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	
<i>Boccardia proboscidea</i>	-	-	-	-	-	-	-	1	-	1	-	-	-	-	20	383	4	1	-	1	3	35	1	-	2	-	-	-	-	
<i>Polydora ciliata</i>	-	-	-	-	1	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	43	
<i>Pygospio elegans</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	4	12	4	-	12	11	1	5	136	3	-	1	17	5	
<i>Scolelepis (Scolelepis) squamata</i>	-	-	-	-	-	-	1	-	-	-	-	-	37	4	-	-	-	-	-	2	-	-	-	-	-	-	-	-	1	
<i>Spio symphyta</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	
<i>Spio martinensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	3	-	-	-	-	-	-	
<i>Spiophanes bombyx</i>	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	1	-	-	-	-	-	-	-	-	
<i>Magelona johnstoni</i>	6	3	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	
<i>Magelona alleni</i>	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Magelona filiformis</i>	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	
<i>Aphelochaeta</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Chaetozone gibber</i>	-	7	6	5	66	6	26	981	85	657	130	72	-	-	-	-	1	-	-	2	4	5	3	-	9	-	-	-	3	
<i>Tharyx</i>	-	-	-	-	-	-	-	8	1	30	9	3	-	-	-	-	-	-	-	3	5	-	-	-	-	-	-	1	24	
<i>Tharyx killariensis</i>	-	-	-	-	-	-	-	4	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
<i>Cossura</i>	-	1	2	-	3	2	1	4	11	11	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Capitella</i>	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	3	-	1	-	-	-	-	-	2	
<i>Mediomastus fragilis</i>	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Notomastus</i>	-	3	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Arenicolidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	
<i>Euclymene oerstedii</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3	-	-	-	-	-	
<i>Owenia</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23	8	4	16	-	3	-	5	1	
<i>Melinna palmata</i>	-	-	-	-	-	-	-	20	3	2	7	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	
<i>Ampharete lindstroemi</i>	-	-	2	-	-	-	-	6	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Terebellides</i>	-	-	-	-	-	-	-	1	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Lanice conchilega</i>	1	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	6	1	-	-		
<i>Euchone limnicola</i>	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Baltidrilus costatus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	
<i>Tubificoides pseudogaster</i>	-	-	-	-	1	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	5	1	3	-	2	-	-	-	6	
<i>Tubificoides swirencoides</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	

Taxa	Subtidal Grab Sample Stations												Intertidal Core Sample Stations																		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Enchytraeidae	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-
ACARI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-
<i>Urothoe poseidonis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
<i>Ampelisca brevicornis</i>	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Bathyporeia pilosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
<i>Bathyporeia sarsi</i>	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-	-
<i>Gammarus locusta</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-
<i>Abludomelita obtusata</i>	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Microprotopus maculatus</i>	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Parajassa pelagica</i>	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Aora gracilis</i>	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corophiidae	-	-	-	-	37	1	-	2	6	32	-	1	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	519	7
<i>Corophium volutator</i>	-	-	5	-	5	-	-	9	3	9	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	325	5
<i>Pariambus typicus</i>	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Cyathura carinata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Tanaisius lilljeborgi</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
<i>Cumopsis goodsir</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
<i>Crangon crangon</i>	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-
<i>Liocarcinus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Chironomidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Peringia ulvae</i>	-	-	-	-	-	-	-	-	1	-	-	-	-	-	32	5	8	4	-	6	-	7	3	1	2	-	1	2	6	-	-
<i>Tritia reticulata</i>	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Nucula nitidosa</i>	3	3	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-
Mytilidae	2	-	-	3	2	-	7	1	2	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	3	-
<i>Tellimya ferruginosa</i>	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Kurtiella bidentata</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cardiidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	2	1	-	2	2	-	-	1	-	-	3	-
<i>Cerastoderma edule</i>	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	4	-	-	1	1	4	2	2	2	-	-	-	-	-	-
<i>Spisula</i>	3	2	1	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellininae	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
<i>Macomangulus tenuis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
<i>Fabulina fabula</i>	6	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Macoma balthica</i>	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Abra</i>	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Abra alba</i>	-	1	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
<i>Abra nitida</i>	-	-	-	-	4	-	3	6	-	39	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veneridae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2	-	-
<i>Chamelea striatula</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Varicorbula gibba</i>	-	1	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
<i>Phoronis</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amphiuridae	2	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Acrocrida brachiata</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ophiura ophiura</i>	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Echinocardium cordatum</i>	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Number of taxa	20	25	28	4	10	4	8	22	10	17	12	7	5	2	1	10	9	11	10	6	25	14	19	12	8	13	9	7	12	18	
No. of Individuals	51	79	123	10	123	10	42	1066	114	798	198	81	41	5	1	88	411	36	18	24	82	73	72	42	146	38	13	17	918	74	
No. of Individuals (per m²)	510	790	1230	100	1230	100	420	10660	1140	7980	1980	810	4100	500	100	8800	41100	3600	1800	2400	8200	7300	7200	4200	14600	3800	1300	1700	91800	7400	

A.2 Biomass

Taxa Group	Sample Stations																	
Subtidal Grab Sample	1	2	3	4	5	6	7	8	9	10	11	12						
Animalia	0.0083	0.0001	-	-	-	-	0.0068	0.1709	-	0.2761	0.0603	-						
Annelida	0.0134	0.0569	0.5196	0.0015	0.1759	0.0036	0.0423	0.789	0.0891	0.7197	0.4894	0.0582						
Crustacea	0.0063	-	0.0445	0.003	0.0145	0.0001	-	0.0136	0.0011	0.0111	-	0.0003						
Mollusca	0.6059	6.0589	0.1742	0.001	0.0634	0.0772	0.0487	0.0942	0.0001	1.0662	0.081	0.0002						
Echinodermata	14.8238	3.0589	1.3586	-	-	-	-	-	-	-	-	-						
Total Biomass-grams (g)	15.5	9.2	2.1	0.0	0.3	0.1	0.1	1.1	0.1	2.1	0.6	0.1						
Total Biomass (g per m ²)	154.6	91.7	21.0	0.1	2.5	0.8	1.0	10.7	0.9	20.7	6.3	0.6						
Intertidal Core Sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Animalia	-	-	-	-	-	0.001	0.001	-	0.1755	-	-	-	0.0006	-	-	0.0287	0.0123	-
Annelida	0.3506	0.1796	-	0.3109	0.4266	0.0401	0.0144	0.0114	2.1641	0.5846	0.2389	1.4014	0.0344	1.9544	0.0932	0.3132	0.655	0.0631
Crustacea	0.0029	-	0.0068	0.0045	0.0036	-	0.001	0.0342	0.2232	-	-	-	0.0018	-	0.0658	0.0105	0.0731	0.0141
Mollusca	0.0013	-	-	0.0308	0.0037	22.0176	0.1261	0.0018	8.8059	14.8734	31.6373	0.0295	0.0224	17.7601	0.0009	0.0144	0.0116	0.0085
Echinodermata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Biomass-grams (g)	0.4	0.2	0.0	0.3	0.4	22.1	0.1	0.0	11.4	15.5	31.9	1.4	0.1	19.7	0.2	0.4	0.8	0.1
Total Biomass (g per m ²)	35.5	18.0	0.7	34.6	43.4	2205.9	14.3	4.7	1136.9	1545.8	3187.6	143.1	5.9	1971.5	16.0	36.7	75.2	8.6

B Sediment Analysis Results (PSA and TOC)

B.1 Intertidal PSA and TOC

Station	Treatment	Textural Group Classification	Folk and Ward Description	Folk and Ward Sorting	Mean μm	Mean ϕ	Sorting Coefficient	Skewness	Kurtosis	Major Sediment Fractions			BSH	TOC (%)
										% Gravel	% Sand	% Mud		
1	Sediment	(g)S: Slightly Gravelly Sand	Medium Sand	Moderately Well Sorted	315.7	1.664	0.667	-0.050	1.087	0.4%	98.1%	1.5%	A5.2 Sand and Muddy Sand	0.18
2	Sediment	(g)S: Slightly Gravelly Sand	Fine Sand	Moderately Well Sorted	220.5	2.181	0.628	-0.178	1.278	1.8%	96.5%	1.7%	A5.2 Sand and Muddy Sand	0.27
3	Sediment	(g)S: Slightly Gravelly Sand	Medium Sand	Moderately Well Sorted	265.5	1.913	0.603	-0.189	1.327	3.6%	96.4%	0.0%	A5.2 Sand and Muddy Sand	0.11
4	Sediment	sM: Sandy Mud	Medium Silt	Very Poorly Sorted	13.33	6.229	2.686	0.146	1.225	0.0%	17.7%	82.3%	A5.3 Mud and Sandy Mud	1.44
5	Sediment	sM: Sandy Mud	Medium Silt	Very Poorly Sorted	8.02	6.962	2.754	0.278	1.104	0.0%	10.2%	89.8%	A5.3 Mud and Sandy Mud	0.69
6	Sediment	mS: Muddy Sand	Very Fine Sand	Poorly Sorted	94.27	3.407	1.965	0.679	2.056	0.0%	76.7%	23.3%	A5.3 Mud and Sandy Mud	0.35
7	Sediment	S: Sand	Fine Sand	Moderately Well Sorted	217.18	2.203	0.527	-0.020	1.099	0.0%	98.0%	2.0%	A5.2 Sand and Muddy Sand	0.2
8	Sediment	S: Sand	Fine Sand	Moderately Well Sorted	223.97	2.159	0.548	-0.122	1.132	0.0%	100.0%	0.0%	A5.2 Sand and Muddy Sand	0.23
9	Sediment	(g)mS: Slightly Gravelly Muddy Sand	Very Fine Sand	Poorly Sorted	82.24	3.604	1.984	0.513	2.001	0.5%	75.7%	23.9%	A5.3 Mud and Sandy Mud	1.36
10	Sediment	(g)S: Slightly Gravelly Sand	Medium Sand	Moderately Well Sorted	282.52	1.824	0.586	0.009	1.178	0.5%	97.6%	1.9%	A5.2 Sand and Muddy Sand	0.17
11	Sediment	(g)mS: Slightly Gravelly Muddy Sand	Very Fine Sand	Very Poorly Sorted	64.14	3.963	2.308	0.617	1.764	0.8%	71.1%	28.1%	A5.3 Mud and Sandy Mud	0.75
12	Sediment	(g)S: Slightly Gravelly Sand	Fine Sand	Moderately Sorted	192.85	2.374	0.705	-0.031	1.281	0.2%	96.3%	3.5%	A5.2 Sand and Muddy Sand	0.21
13	Sediment	mS: Muddy Sand	Very Fine Sand	Very Poorly Sorted	84.57	3.564	2.015	0.559	1.795	0.0%	76.6%	23.4%	A5.3 Mud and Sandy Mud	0.84
14	Sediment	(g)S: Slightly Gravelly Sand	Fine Sand	Moderately Sorted	232.64	2.104	0.901	-0.092	1.346	1.2%	94.6%	4.1%	A5.2 Sand and Muddy Sand	0.28
15	Sediment	(g)S: Slightly Gravelly Sand	Fine Sand	Moderately Well Sorted	182.33	2.455	0.663	-0.029	1.242	0.4%	96.3%	3.3%	A5.2 Sand and Muddy Sand	0.43
16	Sediment	(g)S: Slightly Gravelly Sand	Fine Sand	Moderately Well Sorted	196.04	2.351	0.697	-0.163	1.344	0.2%	97.6%	2.1%	A5.2 Sand and Muddy Sand	0.86
17	Sediment	M: Mud	Fine Silt	Very Poorly Sorted	5.82	7.425	2.610	0.341	0.997	0.0%	4.3%	95.7%	A5.3 Mud and Sandy Mud	0.74
18	Sediment	(g)S: Slightly Gravelly Sand	Fine Sand	Poorly Sorted	218.97	2.191	1.204	0.053	2.900	4.9%	88.6%	6.5%	A5.2 Sand and Muddy Sand	0.41

B.2 Subtidal PSA and TOC

Textural Group Classification	Folk and Ward Description	Folk and Ward Sorting	Mean μm	Mean ϕ	Sorting Coefficient	Skewness	Kurtosis	Major Sediment Fractions			BSH	TOC (%)
								% Gravel	% Sand	% Mud		
mS: Muddy Sand	Very Fine Sand	Poorly Sorted	64.6	3.952	1.806	0.592	1.355	0.0%	70.6%	29.4%	A5.3 Mud and Sandy Mud	2.30
(g)mS: Slightly Gravelly Muddy Sand	Very Coarse Silt	Very Poorly Sorted	42.9	4.543	2.175	0.474	0.817	0.9%	51.0%	48.1%	A5.3 Mud and Sandy Mud	2.59
(g)mS: Slightly Gravelly Muddy Sand	Fine Sand	Poorly Sorted	157.1	2.670	1.185	0.215	2.178	1.3%	88.0%	10.7%	A5.2 Sand and Muddy Sand	2.28
sM: Sandy Mud	Coarse Silt	Very Poorly Sorted	16.91	5.886	2.118	0.070	1.054	0.0%	17.9%	82.1%	A5.3 Mud and Sandy Mud	2.22
M: Mud	Medium Silt	Poorly Sorted	10.43	6.583	1.803	0.135	1.232	0.0%	3.7%	96.3%	A5.3 Mud and Sandy Mud	2.38
sM: Sandy Mud	Medium Silt	Poorly Sorted	13.90	6.169	1.961	0.115	1.091	0.0%	11.0%	89.0%	A5.3 Mud and Sandy Mud	2.22
M: Mud	Medium Silt	Poorly Sorted	11.09	6.495	1.873	0.117	1.172	0.0%	5.3%	94.7%	A5.3 Mud and Sandy Mud	0.71
sM: Sandy Mud	Coarse Silt	Very Poorly Sorted	17.03	5.876	2.284	-0.008	1.040	0.0%	20.8%	79.2%	A5.3 Mud and Sandy Mud	1.28
M: Mud	Medium Silt	Very Poorly Sorted	8.14	6.941	2.040	0.108	1.182	0.0%	3.7%	96.3%	A5.3 Mud and Sandy Mud	0.31
M: Mud	Medium Silt	Poorly Sorted	9.80	6.673	1.918	0.113	1.211	0.0%	4.4%	95.6%	A5.3 Mud and Sandy Mud	2.38
M: Mud	Medium Silt	Poorly Sorted	8.46	6.885	1.928	0.127	1.195	0.0%	2.1%	97.9%	A5.3 Mud and Sandy Mud	2.53
M: Mud	Medium Silt	Poorly Sorted	8.55	6.870	1.954	0.138	1.193	0.0%	2.7%	97.3%	A5.3 Mud and Sandy Mud	2.46

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