

# Appendix E - Aberaeron Seabed Survey 2019

# Aberaeron Seabed Survey 2019

Technical Report for seabed imaging survey undertaken at  
Aberaeron, West Wales

Produced by Eco Marine Consultants Ltd for Atkins Ltd

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## Non-technical Summary

Eco Marine Consultants Limited (Eco Marine) was commissioned by Atkins Ltd (hereafter referred to as Atkins) to conduct a subtidal remote operated vehicle (ROV) video survey at Aberaeron, west Wales, in support of an Environmental Impact Assessment (EIA) to be undertaken for the installation of a new breakwater and additional flood and coastal defences. The data collected as part of this programme will be used to establish the benthic communities present as a baseline assessment.

The survey, completed on 19<sup>th</sup> September 2019, involved the deployment of a high-performance ROV system to obtain seabed footage of the benthic and epibenthic communities present at the target site. A full survey plan was prepared and approved by Atkins ahead of mobilisation. Footage was collected from seven transects using two separate camera systems. No sediment or faunal samples were collected.

The data collected has allowed identification of the existing habitats and features across the study area, which have been quantified and mapped where possible in line with the agreed methodology. The key findings of this report are as follows:

- Faunal and algal communities observed at Aberaeron in 2019 were relatively complex and diverse and reflected the environmental conditions including substrate type, depth and energy regime.
- The substrates at Aberaeron were dominated by bedrock, boulders and mixed sediments though occasional large patches of fine sand were present. The nature of the sediment type was patchy across the site though sand was largely restricted to the south western portion and a gradient from sand to coarser sediment was evident from shore to sea.
- The presence of bedrock, boulders and cobbles in the Aberaeron site provided a surface on which numerous algal species could establish and provide community structures for epibenthos, thus increasing complexity in local communities.
- A divide in substrate type either side of the breakwater and harbour wall was apparent when reviewing footage collected during the ROV survey; this was most apparent along Transect 3 which was nearest to shore and the most influenced by structural influences.
- A total of 46 faunal taxa were identified from across a range of habitat types in the video analysis. A total of 18 taxa were recorded in the stills collected from the same footage.
- Fauna, macroalgae and sediment data from the footage collected were used to designate biotopes along each of the seven transects surveyed at Aberaeron. A total of 12 biotopes were characterised with the most common being 'Foliose red seaweeds on exposed lower infralittoral rock' and '*Polyides rotundus*, *Ahnfeltia plicata* and *Chondrus crispus* on sand-covered infralittoral rock'.
- Large swaths of the honeycomb worm *Sabellaria alveolata* reef was observed along the lower littoral and upper infralittoral region of the survey area. Biogenic 'Reefs' (1170) are listed under Annex I of the Habitats Directive 92/42/EEC.

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## 1. Introduction

Aberaeron, west Wales, has a legacy of flooding and has been subject to multiple incidents of storm damage in recent years. Sea-level rises associated with climate change are predicted in the area and as such, a scheme to improve existing coastal defences has been proposed by Ceredigion County Council (CCC) (Atkins, 2019). Eco Marine Consultants Limited (Eco Marine) has been commissioned by Atkins to conduct a subtidal drop-down video survey at Aberaeron in support of an environmental impact statement (EIA) to be undertaken for the installation of a new breakwater and additional flood and coastal defences.

A baseline characterisation was required in the study area adjacent to Aberaeron to establish the benthic habitats present as well as any species of conservation importance. The survey was completed on 19<sup>th</sup> September 2019 and involved the deployment of an underwater camera system via a remotely operated vehicle (ROV) to obtain seabed footage and images of the benthic communities present in the study area.

### 1.1. Project Aim and Objectives

The main aim of the Aberaeron subtidal survey was to characterise the epibenthic communities present across the area of interest.

The principal objectives of the survey are as follows:

- To acquire high quality biological data of suitable resolution and to examine the present condition of the seabed;
- To describe the benthic and epibenthic biological communities that occur in the survey area;
- To describe the distribution of sediment types in the survey area and their relation to biological community composition; and
- To identify and document the occurrence of any species or communities of conservation importance.

In order to fulfil the aims and objectives for this project, a subtidal survey was completed across a pre-determined study area using underwater video techniques. This report outlines the findings and implications of the survey.

## 2. Project Design & Methodology

All subtidal sampling was conducted aboard the *'Suldaire'*, a 10m shallow-draft survey vessel on the 19<sup>th</sup> September 2019 during peak spring tides. The vessel was locally operated out of New Quay, was fully insured and fully MCA coded. A full safety audit of the survey vessel was completed by Eco Marine prior to the survey.

A survey plan was prepared by Eco Marine prior to mobilisation (Eco Marine, 2019). All methods for the work were agreed between Atkins and Eco Marine in August 2019.

### 2.1. ROV Survey

An ROV was used to collect seabed footage for this project. The use of an ROV had the benefits of being able to collect quality data using HD video, an in-built lighting system to facilitate the collection of images in low light environments and was highly manoeuvrable and portable, allowing access to all areas of the transects including those areas close to shore. The ROV was operated and supplied by staff from Carcinus Ltd. All survey operations used during this project aligned with those stipulated in the Remotely Operated Vehicles for use in marine benthic monitoring, Marine Monitoring Platform Guidelines No.1.<sup>1</sup>

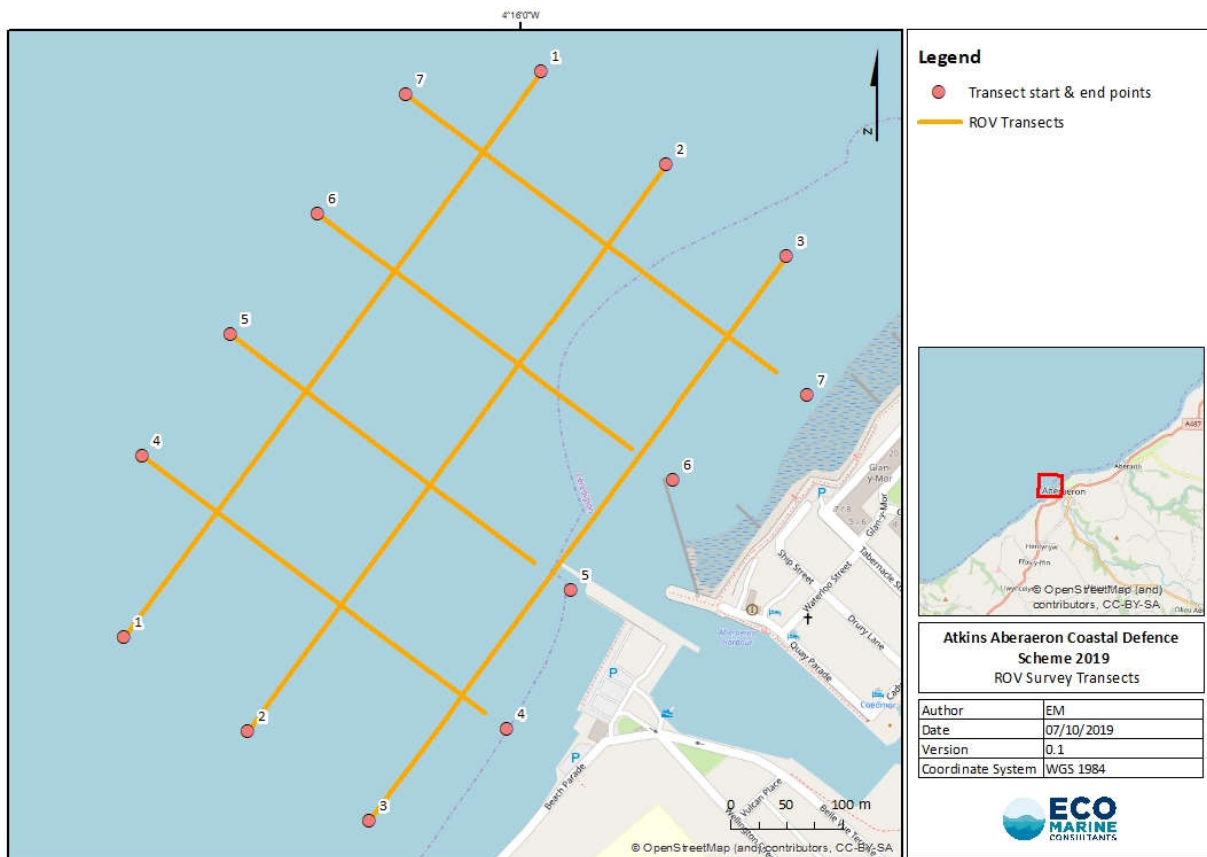
A total of seven transects across the study area were surveyed using a high-performance BlueROV2 system (Blue Robotics) fitted with on both a 4k GoPro device and a 1080p internal lens system. The locations for each of the pre-designated ROV transects are shown in Figure 1 and full start and end coordinates along with full field notes can be found in Appendix 1.

Three transects were placed running parallel to the shore and four perpendicular. The minimum transect length was 360m (Transect 5) while the maximum transect length was 646m (Transect 1). Transects 5 and 6 were shortened slightly from the planned length when undertaking the ROV tows in the field; this allowed the survey team to safely avoid potential hazards including the breakwater and harbour entrance, parts of which were situated in very shallow depths even at high-water. Additionally, the ROV tow along Transect 2 was cut short and the ROV continued along the target line using thrusters and heading data alone. This meant that the exact track of the ROV could not be recorded as the dGPS was located on the survey vessel. However, it allowed the collection of data further along the transect line than would have been possible using the vessel alone due to the presence of hazardous and very shallow substrates where complex bedrock and boulder substrates dominated.

Positional data was recorded using HydroPro software from a dGPS unit (independent from the vessel's) with layback and offsets calculated as appropriate. The use of dGPS gives a navigational accuracy of approximately +/- 1m.

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<sup>1</sup> JNCC, 2018. Remotely Operated Vehicles for use in marine benthic monitoring. Marine Monitoring Platform Guidelines No.1. JNCC, Peterborough. ISSN 2517-7605.



**Figure 1.** Target start and end positions and the approximate ROV survey transects undertaken aboard ‘Suldaire’ in September 2019 – some transect positions were relocated slightly in the field to avoid structural hazards. Note that the transects are numbered according to Eco Marine’s numbering system for ease of use in the field; the original Atkins transect names are shown in Appendix 1.

The ROV was deployed at the start of each transect and slowly towed to the finish location. The ROV thrusters ensured that a constant height of approximately 1m above the seabed was maintained. Upon completion of each transect the ROV was recovered ready for the next deployment.

Footage was viewed in real-time on the surface by Eco Marine’s on-board ecologist to provide a means of recording conspicuous fauna, calculating substrate composition and monitoring survey parameters e.g. visibility, camera angle, relative position etc. All videos were also stored in the camera and downloaded after each tow onto designated hard drives for subsequent analysis.

The quality of the footage obtained during the survey was very high thanks in part to the good weather conditions experienced but also the quality of the video system used in the ROV. The twin camera system on the ROV allowed for two video streams to be recorded, one in very high quality 4K and one with metadata overlay.

The camera recorded continuous video and was fitted with lights and scaling lasers for later analysis. Positional and metadata overlay was also present on the internal video system. Detailed handwritten fieldnotes were collected during the survey, including notes on sampling coordinates, water depth and any fauna visible in the images. As a minimum, the notes also included:

- Transect number, date & time
- Start & end of video coordinates
- Any notable seabed features and corresponding time
- Texture and presence of surface features (accretions, algae, fauna)
- Digital video code
- Laser separation distance



**Plate 1.** (from top to bottom, left to right): BlueROV2 system on the deck of 'Suldaire'; the existing breakwater at Aberaeron; Eco Marine staff monitoring the ROV tether and the ROV at the surface of the water.

## 2.2. Seabed Footage & Imagery Analysis

All ROV footage and image analysis has been undertaken in-line with JNCC guidance given in the Marine Monitoring Handbook (JNCC, 2001), the JNCC guidance on assigning benthic biotopes (Parry, 2015) and the NMBAQC and JNCC epibiota interpretation guidelines (Turner *et al.*, 2016). Biotopes have been assigned along each transect in the study area using a standardised recording format. This enabled the identification of biotopes through record of substrate type, habitats and species present as well as the identification of energy regimes locally (through video footage and field notes). Note that incidental patches of habitat smaller than 5x5m did not constitute biotopes following guidance by Connor *et al.* (2004). Though records of small patches of habitat were made, they have been excluded for mapping purposes.

Upon return to the Eco Marine lab, footage from the ROV transects was analysed to determine habitat types and their boundaries present across the site and notes were made of any obvious macrobenthic and epifaunal species present. The 4k GoPro footage from individual transects was reviewed twice per transect at a quarter speed to allow the identification of fauna, algae and biotopes. Start and end points

for each biotope type were noted using the 1080p footage which was reviewed following the identification of a boundary in the 4k footage which enabled the extraction of coordinates for each habitat transition.

A total of 59 images were extracted from the 4k footage collected along each of the biotope sections identified along the transects during the footage analysis (Appendix Plate 2). Stills were extracted 1 minute following the identified start point of each biotope in the 4k footage though this was reduced to a shorter period following the start of the biotope where coverage did not last up to a minute in the video. This approach ensured that each habitat section along each of the transects was subject to SACFOR abundance interrogation as well as footage identification analysis. These stills were consequently analysed to determine the SACFOR abundance of faunal and algal communities at a higher resolution not possible from video interrogation as per JNCC guidance (Parry, 2015). Where appropriate, biotopes were assigned in accordance with the EUNIS classification scheme.

Two species matrices have been produced as a result of the ROV footage and image analysis; one for sections of video transects covering each habitat and one for stills. A presence/absence matrix has been compiled for sections of video covering single habitat types per transect while a SACFOR abundance matrix has been compiled for the stills given the high resolution of the images which allows for the identification of less conspicuous taxa. SACFOR abundance of epibiota in stills allows for quantitative analysis of identifiable organisms. Coverage of macroalgae has been recorded where possible to aid with the identification of biotopes. The species matrices for the footage and stills collected along each transect at Aberaeron are given in full in Appendices 2 and 3 respectively.

Biotopes were assigned along each transect using the survey results and field notes. Information used to classify biotopes included biological zone, substrate, energy level, sediment mobility, salinity, depth and species composition as per JNCC guidelines (Parry, 2015).

### **2.3. Quality Assurance**

All data processing and reporting has undergone a rigorous internal quality assurance (QA) process at Eco Marine. All external QA was undertaken by Carcinus Ltd. Approximately 10% of stills and MNCR SACFOR abundances were subject to review and a faunal, algal and biotope verification exercise was completed by an expert biologist. No identification changes were recommended by Carcinus Ltd.

### **2.4. Health and Safety Processes**

Eco Marine take health and safety considerations very seriously, especially when working in dynamic marine environments. Due to the nature of the survey element of this project, health and safety issues were a key concern. Complete risk assessments were undertaken for all activities to be completed as part of this project and supplied to Atkins during the survey planning phase along with an Emergency Response Procedure (ERP) and the Eco Marine daily toolbox talk template.

Daily toolbox talks were given prior to survey operations each working day. Toolbox talks included provisions to ensure that the ERP was available to all staff, suitable PPE was worn, and that the survey team (including vessel operator and deckhand) were all fully briefed on the tasks and health and safety issues. A minimum of three staff were always be present on survey operations - Eco Marine

does not engage in lone-working practices. Eco Marine also had standard risk assessments and SOPs in place for office-based activities which were strictly adhered to.

## 3. Results

### 3.1. Substrates of Aberaeron

A variety of substrate types were identified during the analysis of footage collected during the survey at Aberaeron. Mixed sediments composed of bedrock, boulders, cobbles and coarse gravel were typically dominant across the site though large patches of fine sand were also identified. A contrast in substrate compared to surrounding areas was apparent at the mouth of the Afon Aeron river and near the breakwater (nearest to Transect 5) where relatively uniform 'clean' cobbles were present. The river mouth and the breakwater also appeared to form a divide between the more sand dominated area to the south west of the river mouth and the mixed sediments dominant to the north east.

A gradient in sediment type and associated ecology was apparent along the transects running from shore to sea. Sediments observed were increasingly coarse as depth increased with the fine sands largely observed in the shallow regions of the site.

The sediments at Aberaeron appeared to be highly influential on the benthic and epibenthic communities identified across the site. Where boulders, cobbles and mixed sediments provided heterogeneity and stable surfaces more impervious to tidal action, macroalgae was abundant alongside epibiota. The substrates present at Aberaeron were important in identifying the biotopes present across the site and were a key guidance feature when determining suitable habitat descriptions. Rationale for biotope descriptions are outlined in Appendix 2 and discussed further in Section 3.4.

### 3.2. Epibenthic Fauna of Aberaeron

A total of 46 fauna were identified from across a range of habitat types in the video analysis of footage collected using the ROV at Aberaeron in 2019. A total of 18 taxa were recorded in the stills collected from along the same footage, the majority of which had been identified to the same or similar taxonomic level during the footage analysis process. A breakdown of the fauna presence and absence recorded in footage collected at Aberaeron is given in Appendix 3 while SACFOR abundance determined from stills can be located in Appendix 4.

The epibenthic fauna identified in both the video and stills gathered during the ROV survey were relatively diverse for a small area and indicative of a relatively complex community. Notable features included extensive *Sabellaria alveolata* reef which was dominant in the north eastern portion of the site as well as a relatively diverse population of large bodied fish species. It should be noted that unlike subtidal *Sabellaria spinulosa* reefs which are associated with substantial increases in biodiversity, *S. alveolata* reefs are linked to much smaller increases in localised ecological complexity and are comparatively species poor (Jackson, 2008). Nonetheless, biogenic reefs act to stabilise boulders and cobbles and are often associated with *F. serratus* cover (as was observed in Aberaeron) which provides habitat for crustaceans, molluscs and other algal species (Ceredigion County Council *et al.*, 2008).

Larger fish identified across the site included including corkwing wrasse (*Symphodus melops*), goldsinney wrasse (*Ctenolabrus rupestris*), and the lesser spotted dogfish (*Scyliorhinus canicula*). Several commercially valuable species including the European lobster (*Homarus gammarus*), edible crab (*Cancer pagurus*), European bass (*Dicentrarchus labrax*) and European plaice (*Pleuronectes*

*platessa*) were recorded in low abundance across the site. Anchored fishing pots were also observed at several locations in the site boundaries and surrounding areas. Discussion with a locally based skipper revealed that the survey area is well utilised by local fishermen targeting lobster, crab and spider crabs depending on the season.

All of the fauna identified in footage collected at Aberaeron were typical for the intertidal and infralittoral habitats present and are generally widespread along the coast of west Wales. A large proportion of the faunal community was made up of mobile species which in the event of disturbance may be capable of either relocating or recruiting from surrounding populations should habitat and environmental requirements be met. The majority of immobile taxa were represented by common bryozoan, hydroid and sponge species as well as anemones including the snakeslocks anemone and the beadlet anemone *Anemonia viridis* and *Actinia equina*. Many of the small gastropod and annelid species associated with kelp and bedrock habitats are also considered to have limited mobility and rely on the presence of hard substrate and particular environmental provisions to succeed.

The most frequently recorded taxon was the tube dwelling annelid *Spirobranchus* sp. which was identified at 36 of the 59 habitat sections identified along the transects at Aberaeron. The exposed bedrock and boulders at Aberaeron provided an ideal habitat on which *Spirobranchus* sp. could settle and construct a tube. *Spirobranchus* sp. is widely distributed across the British Isles and though it is considered to be intolerant to habitat loss, population recoverability is likely to be fast (Riley & Ballerstedt, 2005). Following *Spirobranchus* sp., the corkwing wrasse, *S. melops* was the second most frequently observed taxon across habitat sections followed by the bryozoan *Electra Pilosa*, the common periwinkle *Littorina littorea* and the flat topshell *Steromphala umbilicalis*. The encrusting sponge *Halichondria* was also widespread across the site though formations of the sponge were not extensive.

### 3.3. Species of Conservation Interest

#### 3.3.1. *Sabellaria alveolata* Reef

Large swaths of *Sabellaria alveolata* reef was observed along the lower littoral and upper infralittoral region of the survey area. Though few management measures for the protection of *S. alveolata* exist, 'Reefs' (1170) are listed under Annex I of the Habitats Directive 92/42/EEC which includes biogenic structures.

The Aberaeron coastline lies within the Cardigan Bay / Bae Ceredigion Special Area of Conservation (SAC) which is designated for numerous features including reefs – though this is not a not a primary reason for selection of this site. Cardigan Bay SAC supports both biogenic and rocky reefs with the *S. alveolata* reefs along the lower shore being considered some of the best examples of littoral biogenic reef in Wales (Ceredigion County Council *et al.*, 2008). The extent and distribution of *S. alveolata* reef is dictated by several environmental factors including wave exposure, seabed scour and sediment transport. As such, coastal engineering projects may have a harmful effect to reef communities if they result in significant alterations to the pertinent environmental factors.

#### 3.3.2. Rare & Invasive Species

The small spotted catshark *Scyliorhinus canicula* is listed on the IUCN Red List though is categorised as 'Least Concern' with the main threat considered to be fishing and harvesting of aquatic resources (Ellis

*et al.*, 2009). The population mature of *S. canicula* is considered to be stable and widespread across Europe.

No invasive non-native species were identified from the footage and stills collected at Aberaeron in 2019.

### 3.4. Macroalgae of Aberaeron

The seaweed (macroscopic marine algae) communities at Aberaeron were well developed and established wherever suitable substrate allowed. The presence of the numerous seaweeds across the site had an apparent influence on the faunal communities present. A wide range of forms and species were observed, offering multiple functions to the local ecosystem including habitat provision, food supply, shelter and protection. Though identification from stills and video was challenging (many algal species require microscopic inspection), some prominent species were identified.

A gradient in algal species and forms (zonation) was apparent between the intertidal to subtidal regions of the site at Aberaeron. The furoid *Fucus vesiculosus* and green algae including *Enteromorpha intestinalis* and *Ulva lactuca* dominated the lower littoral shoreline with larger red and brown seaweeds including *Laminaria digitata*, *Saccharina latissima*, *Fucus serratus*, *Dilsea carnosa*, *Palmaria palmata*, *Mastocarpus stellatus*, *Chondrus crispus*, *Polyides rotunda*, *Halidrys siliquosa* and *Chorda filum* dominating deeper waters subject to less emersion. Diversity in algal species typically increased with water depth and was relatively variable across the site. Seaweeds were generally found wherever hard substrates were present to allow attachment though sand abrasion stunted growth along some transect sections. This was most notable in areas where the biotope 'Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata' (LR.FLR.Eph.EphX) (A2.821) was recorded along Transect 3 and the intertidal portion of Transect 5.

The oar weed kelp species *Laminaria digitata* was frequently observed at deeper stations where bedrock and large boulders provided surfaces for holdfasts to anchor to, whilst sugar kelp *Saccharina latissima* was recorded less frequently. These large, brown macroalgae provide food directly to fauna that feed on them and also by releasing dissolved organic matter (e.g. Bunker *et al.*, 2017). The kelp forests present in the waters adjacent to Aberaeron also provide protection for fish species as well as a structure on which red seaweeds such as *P. palmata* were established.

In the band below the kelp forest along the edges of rocky outcrops were well developed seaweed turfs. These were made up of tufts of foliose red, brown and green seaweeds important for grazing gastropods and other herbivores. Encrusting and foliose *Corallina* species were common in the lower infralittoral zone alongside numerous foliose reds including *Palmaria palmata* which was often present as an epiphyte on kelp stipes. In particular, *P. rotunda*, *M. stellatus* and *C. crispus* were common across much of the site where conditions were suitable for establishment.

The influence of freshwater from the Afon Aeron was reflected in both the substrate and algal species distribution across the study area. Green algal species tolerant to low salinity conditions (*E. intestinalis* and *U. lactuca*) were present along transects and areas closest to the river mouth while other seaweeds were typically scarce here.

Analysis of the SACFOR abundances revealed that Rhodophyta (red algae) was recorded as 'Superabundant' a total of eight times and as 'Abundant' a total of 19 times across all the transect

biotope sections, highlighting its ecological importance at Aberaeron (Table 1). Chlorophyta (green algae) was recorded as ‘Superabundant’ twice and ‘Abundant’ four times. The only brown algae to be recorded as ‘Superabundant’ was *Fucus* spp. though it was also recorded as ‘Abundant’ seven times which illustrates its dominance across much of the survey area. *Laminaria* spp. was observed to be ‘Abundant’ three times while *Halidrys siliquosa* was recorded in this category just once, demonstrating the ecological dominance of kelp over *H. siliquosa* at Aberaeron. The peak abundance category for the brown algae *Chorda filum* was ‘Common’. Please note that algal groups were defined by the category size and form descriptions outlined by JNCC guidance documentation as listed in Turner *et al.*, (2016).

**Table 1.** The MNCR SACFOR abundance for groups of macroalgae as determined from stills collected at Aberaeron in 2019.

Algal group	Superabundant	Abundant	Common	Frequent	Occasional	Rare
Rhodophyta (red)	8	19	6	6	7	6
Chlorophyta (green)	2	4	0	0	6	5
Phaeophyceae (brown)	0	1	0	0	2	3
<i>Laminaria</i> spp.	0	3	1	1	4	0
<i>Halidrys siliquosa</i>	0	1	2	1	1	2
<i>Chorda filum</i>	0	0	2	1	0	0
<i>Fucus</i> spp.	6	7	5	4	2	5

Please see the biotope rationale in Appendix 2 for a breakdown of algal species briefly identified from ROV footage interrogation. The SACFOR abundances for seaweeds and fauna based upon group breakdowns in the MNCR abundance scale are presented in Appendix 4.

### 3.5. Biotope Designation at Aberaeron

On completion of the ROV survey, the gathered field information was transferred to an internal database, whilst photographs and footage were processed for assessment. Maps of the extent and distribution of the broad-scale habitats at Aberaeron have been produced by analysing field notes and positional data alongside the footage collected during the survey.

The locations of the biotopes have been identified from ROV footage analysis. A total of 12 littoral and infralittoral biotope complexes were identified following the 2019 survey suggesting a diverse and ecologically heterogeneous site. These biotopes have been digitised to allow the visualisation of biotope distribution and are representative of EUNIS levels 3-6 (Figure 2). Please note that following guidance given in Parry *et al.* (2015), any habitat covering an area of greater than 5m<sup>2</sup> has been classified as a biotope to the highest possible level of certainty. There were numerous stretches along each of the transects where two habitats were intermittently present, with more than one biotope description fitting the environmental conditions as well as faunal and algal species recorded. Where this was the case, two biotopes have been recorded in ‘mosaic’ form and are shown alongside one another both in Table 2 and on the map shown in Figure 2.

An example photograph of each biotope designation is given in Appendix Plate 1. Variation in biotopes across the site is apparent with infaunal communities transitioning between transects as environmental conditions transform. Table 2 shows the approximate coverage each of the assigned biotopes identified at Aberaeron.

**Table 2.** Biotope coverage at Aberaeron in 2019. Combination biotopes where mosaics of two habitats were identified area coloured in blue. The EUNIS classification scheme has been used primarily with MNCR biotope codes shown in brackets next to description.

EUNIS Biotope Complex	Habitat Description	Distance Coverage (m)	% Coverage
A1.125 (Level 5)	<i>Mastocarpus stellatus</i> and <i>Chondrus crispus</i> on very exposed to moderately exposed lower eulittoral rock (LR.HLR.FR.Mas)	101.93	3.03
A1.2 (Level 3)	Moderate energy littoral rock (LR.M.LR)	14.11	0.42
A1.3131 (Level 5)	<i>Fucus vesiculosus</i> on moderately exposed to sheltered mid eulittoral rock (LR.LLR.F.Fves)	92.11	2.74
A1.3131 (Level 5) & A2.711 (Level 5)	<i>Fucus vesiculosus</i> on moderately exposed to sheltered mid eulittoral rock (LR.LLR.F.Fves) and <i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock (LS.LBR.Sab.Salv) mosaic	22.77	0.68
A1.3132 (Level 6)	<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata (LR.LLR.F.Fves.X)	22.60	0.67
A1.3132 (Level 6) & A1.1221 (Level 6)	<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata (LR.LLR.F.Fves.X) (Level 6) and <i>Corallina officinalis</i> and <i>Mastocarpus stellatus</i> on exposed to moderately exposed lower eulittoral rock (LR.HLR.FR.Coff.Coff)	14.99	0.45
A1.3151 (Level 5)	<i>Fucus serratus</i> on full salinity sheltered lower eulittoral rock (LR.LLR.F.Fserr.FS)	13.85	0.41
A1.3152 (Level 6)	<i>Fucus serratus</i> on full salinity lower eulittoral mixed substrata (LR.LLR.F.Fserr.X)	28.39	0.84
A1.3152 (Level 6) & A2.2 (Level 6)	<i>Fucus serratus</i> on full salinity lower eulittoral mixed substrata (LR.LLR.F.Fserr.X) and Littoral sand (LS.Lsa)	60.38	1.80
A1.3152 (Level 6) & A3.2111 (Level 6)	<i>Fucus serratus</i> on full salinity lower eulittoral mixed substrata (LR.LLR.F.Fserr.X) and <i>Laminaria digitata</i> on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig) mosaic	13.35	0.40
A2.2 (Level 3)	Littoral sand (LS.Lsa)	127.07	3.78
A2.711 (Level 5)	<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock (LS.LBR.Sab.Salv)	171.70	5.11
A2.711 (Level 5) & A1.3132 (Level 6)	<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock (LS.LBR.Sab.Salv) and <i>Fucus vesiculosus</i> on mid eulittoral mixed substrata (LR.LLR.F.Fves.X)	234.84	6.98
A2.711 (Level 5) & A2.821 (Level 5)	<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock (LS.LBR.Sab.Salv) and Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata (LR.FLR.Eph.EphX)	7.57	0.23
A2.821 (Level 5)	Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata (LR.FLR.Eph.EphX)	18.52	0.55
A2.821 (Level 5) & A2.2 (Level 3)	Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata (LR.FLR.Eph.EphX) and Littoral sand (LS.Lsa) (Level 3)	290.66	8.64
A3.116 (Level 5)	Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR)	818.54	24.34
A3.116 (Level 5) & A3.127 (Level 5)	Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) and <i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn)	251.92	7.49
A3.127 (Level 5)	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn)	463.02	13.77

EUNIS Biotope Complex	Habitat Description	Distance Coverage (m)	% Coverage
A3.127 (Level 5) & A1.125 (Level 5)	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn) and <i>Mastocarpus stellatus</i> and <i>Chondrus crispus</i> on very exposed to moderately exposed lower eulittoral rock (LR.HLR.FR.Mas)	55.56	1.65
A3.127 (Level 5) & A2.711 (Level 5)	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn) & <i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock (LS.LBR.Sab.Salv)	62.39	1.86
A3.2111 (Level 6)	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig)	155.29	4.62
A3.2111 (Level 6) & A1.3151 (Level 6)	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig) and <i>Fucus serratus</i> on full salinity sheltered lower eulittoral rock (LR.LLR.F.Fserr.FS)	198.40	5.90
A3.2111 (Level 6) & A3.116 (Level 5)	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig) and Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR)	123.16	3.66

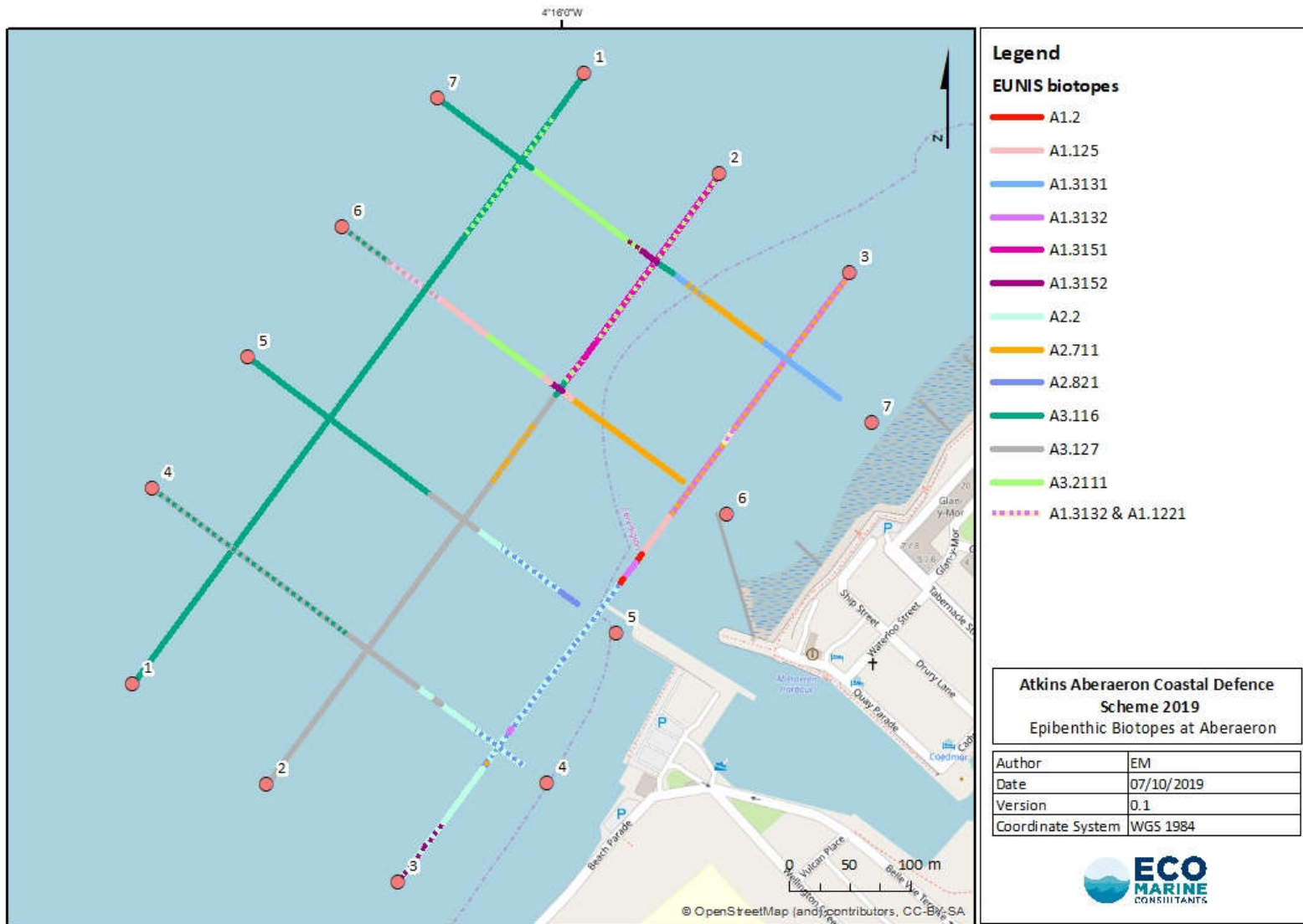
The biotopes designated to the communities at Aberaeron were generally typified by moderately exposed to sheltered conditions with relatively low energy regimes and ranged from the littoral intertidal to shallow infralittoral zones. Moderate tidal flow was a defining environmental condition in the area of interest which was influential for the algal and faunal species identified across the site. As discussed in Section 3.1, bedrock, boulders, cobbles and mixed sediment appeared to be dominant across the site and video analysis revealed that barren sand patches were also present along Transects 3, 4 and 5. The variable proportions of bedrock, boulders and mixed sediments was the defining feature between habitats at several stations. For example, the biotopes '*Fucus serratus* on full salinity sheltered lower eulittoral rock' (A1.3151) and '*Fucus serratus* on full salinity lower eulittoral mixed substrata' (A1.3152) were similar both environmentally and in regard to the faunal communities present in each habitat and would have been largely indistinguishable were it not for the differing substrates.

Variation in faunal assemblages were apparent along all of the transects and were correlated with the habitat type and environmental conditions which included freshwater input at the river mouth. Communities were most diverse along the deepest section of the site along Transect 1 in the biotope 'Kelp with cushion fauna and/or foliose red seaweeds' (A3.116) which occurred twice along this transect. A total of 15 taxa were recorded in this biotope along each section in Transect 1 while 12 taxa were identified in the same biotope along Transect 5. In contrast, faunal records in the biotopes 'Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata' (A2.821) and 'Littoral sand' (A2.2) along Transects 3, 4 and 5 were zero. The biotopes of Aberaeron are discussed in greater detail in Section 3.5.

There is an evident distinction between the biotopes identified in the north-eastern and south western part of the Aberaeron site (Figure 2). Examination of the ROV footage and biotope distributions shows that the mouth of the Afon Aeron forms a border between the bedrock and boulder dominated communities in the north-east and the increasingly sand dominated habitats in the southwest. The input of freshwater from the river affects both the species distribution as well as the localised sediment dynamics. This results in greater heterogeneity in the biotopes to the northeast of the site

and therefore the presence of more complex faunal and algal communities compared to the other half of the site.

Detailed descriptions and commentary of each biotope recorded is presented in the sections below.



**Figure 2.** The distribution of biotopes assigned along the seven transects surveyed at Aberaeron in 2019. Each colour represents a single biotope; dashed lines represent the locations of biotope mosaics. Biotope A1.1221 (*Corallina officinalis* and *Mastocarpus stellatus* on exposed to moderately exposed lower eulittoral rock (LR.HLR.FR.Coff.Coff)) was recorded only in mosaic formation alongside A1.3132 and is displayed as such in the legend.

### **Biotope A1.125 (LR.HLR.FR.Mas)**

The biotope '*Mastocarpus stellatus* and *Chondrus crispus* on very exposed to moderately exposed lower eulittoral rock' was identified as a standalone stretch of habitat along 101.9m of the transect length covered during the ROV survey, representing 3% of the total coverage. This biotope was recorded along the central part of the survey area from the middle of Transect 3 to the most offshore stretch of Transect 6. This biotope was also recorded in mosaic form along Transect 6. Bedrock and large boulders present were typical of this biotope and the algal community was dominated by *C. crispus* and occasionally *M. stellatus*. The gastropods *S. umbilicalis*, *L. Littorina* and *Patella vulgata*, the tube forming annelid *Spirobranchus* sp., and the hydrozoan *Obelia* sp. were frequently observed as well as the corkwing wrasse *S. melops*.

### **Biotope A1.2 (LR.MLR)**

'Moderate energy littoral rock' was recorded in isolation along 14.1m of Transect 3, representing just 0.4% of the overall biotope coverage. This biotope was characterised by low algal diversity, though some ephemeral red, greens and brown seaweeds were identified (*E. intestinalis*, *M. stellatus* and *F. vesiculosus*). Faunal diversity in the area represented by this biotope was also relatively low but included Cirripedia, *L. littorea* and *N. lapillus* which are characteristic of the habitat conditions. This biotope was identified in the lower intertidal area immediately adjacent to the mouth of the Afon Aeron (and the harbour) and sat either side of biotope A1.31. It is typified by freshwater input and ephemeral green and red seaweeds.

### **Biotope A1.3131 (LR.LLR.F.Fves)**

The biotope '*Fucus vesiculosus* on moderately exposed to sheltered mid eulittoral rock' was identified intermittently along 92.1m of the nearshore half of Transect 7, representing 2.7% of the overall habitat coverage. This biotope was typified by a canopy of the brown seaweed *Fucus vesiculosus* as well as the presence of the red seaweeds *Corallina officinalis*, *Mastocarpus stellatus* and coralline crusts. The green ephemeral algae *E. intestinalis* was also noted. This biotope was well populated by numerous gastropods including *L. Littorina*, *Littorina saxatilis*, *P. vulgata* and *Steromphala cineraria* and occasionally coincided with patches of *S. alveolata* veneer/reef.

### **Biotoxes A1.3131 (LR.LLR.F.Fves) & A2.711 (LS.LBR.Sab.Salv) mosaic**

'*Fucus vesiculosus* on moderately exposed to sheltered mid eulittoral rock' and '*Sabellaria alveolata* reefs on sand-abraded eulittoral rock' were identified in mosaic formation along 22.8m of the seabed, representing 0.7% of the overall coverage. This mixed mosaic switched between patches characterised by A1.3131 and A2.711 along Transect 7 only and possessed characteristics of both with large patches of exposed *S. alveolata* reef and dense *F. vesiculosus* canopy. This mosaic represented the transition between A1.3131 and A2.711 as depth increased and substrate became increasingly dominated by cobbles rather than bedrock and boulders.

### **Biotope A1.3132 (LR.LLR.F.Fves.X)**

The habitat classified as '*Fucus vesiculosus* on mid eulittoral mixed substrata' was present along the north-eastern section of Transect 3 in mosaic form with A1.125 as well as in the middle of the transect

at the opening of the harbour and river mouth. As a standalone biotope, A1.3132 was present for 22.6m (0.7% total coverage). This biotope was typified by the presence of stable pebbles and cobbles in variable salinity and characterised by the brown wrack *F. vesiculosus* as well as several gastropod species (*L. Littorina*, *N. lapillus*, *S. umbilicalis*) and Cirripedia with *L. littorea* being particularly abundant.

#### **Biotopes A1.3132 (LR.LLR.F.Fves.X) & A1.1221(LR.HLR.FR.Coff.Coff)**

The two biotopes '*Fucus vesiculosus* on mid eulittoral mixed substrata' and '*Corallina officinalis* and *Mastocarpus stellatus* on exposed to moderately exposed lower eulittoral rock' were identified in conjunction along a small section (15m) of Transect 3, representing just 0.4% of the total biotope coverage. This was the only location where A1.1221 was identified as a biotope and was assigned due to the substantial abundance of *C. officinalis* and occasional *M. stellatus* in the area, though features of A1.3132 were also apparent. The epibenthic faunal community in this biotope mosaic was made up of *Carcinus maenas*, *Littorina littorea*, *Steromphala umbilicalis*, *Steromphala cineraria* and *Patella vulgata*.

#### **Biotope A1.3151 (LR.LLR.F.Fserr.FS)**

The standalone biotope '*Fucus serratus* on full salinity sheltered lower eulittoral rock' was present along 13.8m of Transect 2, accounting for 0.4% of the total coverage though the same biotope is present in mosaic form alongside A3.2111 for a large portion of this transect. This biotope was characterised by a dense canopy of *F. serratus* and a range of sessile fauna including *Electra Pilosa*, Spirobidae and *Spirobranchus* sp. The lesser spotted dogfish (*S. canicula*) was also observed in this biotope amongst the *F. serratus* canopy. Other than *F. serratus*, other seaweed species were also frequently observed including *Laminaria hyperborea*, *Palmaria palmata*, *Chondrus crispus*, coralline crusts and *E. intestinalis*.

#### **Biotope A1.3152 (LR.LLR.F.Fserr.X)**

The biotope '*Fucus serratus* on full salinity lower eulittoral mixed substrata' was identified along the mid points of Transects 6 and 7 near intersections with Transect 2. It was recorded along 28.4m of the surveyed transects, representing 0.8% of the total biotope coverage. A1.3152 shares numerous characteristics with A1.3152 though the substrate is formed of mixed cobbles and boulders rather than bedrock and boulders. *F. serratus* was abundant as was the annelid *Spirobranchus* sp., gastropods *S. umbilicalis*, *L. littorea*, and *P. vulgata*, Cirripedia and *S. melops*. The bryozoan *E. pilosa* was also observed growing as an epiphyte upon *Fucus* fronds.

#### **Biotopes A1.3152 & A2.2 (LR.LLR.F.Fserr.X) and (LS.Lsa)**

The two biotopes '*Fucus serratus* on full salinity lower eulittoral mixed substrata' and 'Littoral sand' were observed for a total of 60.4m (1.8%) along the southwestern end of Transect 3 where A1.3152 was interspersed with large patches of barren, fine sand overlaying the rockier substrate below. Small and large patches of *F. serratus* broke up the sandy expanses where bedrock broke through the sand and provided habitat for numerous faunal species including *P. platessa* and *N. puber*. Sessile species present on the rocky substrate included *P. vulgata*, low densities of *S. alveolata* and Spirobidae.

### **Biotopes A1.3152 (LR.LLR.F.Fserr.X) & A3.2111 (IR.MIR.KR.Ldig.Ldig)**

The combination of '*Fucus serratus* on full salinity lower eulittoral mixed substrata' and '*Laminaria digitata* on moderately exposed sublittoral fringe bedrock' was observed for 13.4m along Transect 7 (0.4% of total coverage). This small mosaic patch was present where the two biotopes met as depth increased and represented the border between the two habitats before the kelp forest became dominant.

### **Biotope A2.2 (LS.Lsa)**

'Littoral Sand' was recorded along Transects 3, 4 and 5 in the southwestern portion of the site. It was typically characterised by fine sands and low epibenthic faunal and algal abundance except where patches of bedrock or boulder emerged and provided a holdfast surface for ephemeral green and red algae. This biotope was present in isolation along 127.1m, representing 3.8% coverage of the transects.

### **Biotope A2.711 (LS.LBR.Sab.Salv)**

The biotope '*Sabellaria alveolata* reefs on sand-abraded eulittoral rock' was relatively widespread, occurring across three mid-shore transect sections in the north eastern portion of the site (Transects 2, 6 and 7). Biotope A2.711 was present along 171.7m of the ROV transects and represented 5.1% of the total coverage. This habitat was characterised by the presence of *S. alveolata* reef which was formed across bedrock, boulders and large cobbles. Typically, it was associated with *F. vesiculosus* and numerous gastropod species including *S. umbilicalis*, *S. cineraria*, *L. littorea* and *P. vulgata*. As well as gastropods, *S. melops*, *Halichondria* sp., *C. maenas* and *N. puber* were also observed in association with this biotope where it occurred.

### **Biotopes A2.711 (LS.LBR.Sab.Salv) & A1.3132 (LR.LLR.F.Fves.X)**

The two biotopes '*Sabellaria alveolata* reefs on sand-abraded eulittoral rock' and '*Fucus vesiculosus* on mid eulittoral mixed substrata' when combined as a mosaic covered 234.8m of the transect lengths, representing 7% coverage of the habitat types. Though the biotope description for A2.711 accounts for the presence of occasional *F. vesiculosus*, large patches of superabundant *F. vesiculosus* were present intermittently with *S. alveolata* reef along Transect 3. Both of the biotopes in the mosaic were characterised by the presence of numerous gastropod species as well as *C. maenas* and *S. melops*.

### **Biotopes A2.711 (LS.LBR.Sab.Salv) & A2.821 (LR.FLR.Eph.EphX)**

The combination of '*Sabellaria alveolata* reefs on sand-abraded eulittoral rock' and 'Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata' represents the smallest coverage of all of the identified biotopes at Aberaeron, measuring just 7.6m along Transect 3 (0.2% total coverage). This combination of biotopes represented the transition between A2.711 and A2.821. The patches of A2.711 were dominated by *S. alveolata* reef and occasional *F. vesiculosus* while the areas of A2.821 were characterised by green and red ephemeral algae including *E. intestinalis*, *U. lactuca*, *Porphyra* spp., *Polysiphonia elongata*.

### **Biotope A2.821 (LR.FLR.Eph.EphX)**

The biotope 'Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata' was present for 18.5m of the total distance covered with the ROV (0.6% total coverage) at Aberaeron. This habitat was identified along the sheltered area of stony shores to the southwest of the river mouth along Transects 3 (as mosaic), 4 (as mosaic) and 5. The sediment present in this biotope was mixed with cobbles overlying sand and was influenced by freshwater input from the Afon Aeron, which resulted in a relatively homogeneous community in the area. A lack of fauna was observed in the biotope while the green seaweed *E. intestinalis* was highly abundant.

### **Biotope A2.821 (LR.FLR.Eph.EphX) & A2.2 (LS.Lsa)**

The combination of 'Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata' and 'Littoral sand' in mosaic form was the third most recorded habitat along the transects at Aberaeron covering 290.7 m and representing 8.6% of the total habitat types present. These two biotopes were identified intermittently along the southwest portion of Transect 3 and along the most inshore portions of Transects 4 and 5 in the area most heavily influenced by freshwater input from the Afon Aeron. Faunal and seaweed communities were generally concentrated in the portions of A2.821 while A2.2 was typically barren. Fauna observed across the mosaic of biotopes included Cirripedia, *L. littorea*, *S. umbilicalis*, *S. melops*, *C. maenas*, a variety of small shoaling fish and rare *S. alveolata*; seaweeds were dominated by *E. intestinalis*, *U. lactuca*, *Poryphira* sp., *Osmundea pinnatifida*, *Polysiphonia* sp. and *F. vesiculosus*.

### **Biotope A3.116 (IR.HIR.KFaR.FoR)**

The biotope covering the largest distance was 'Foliose red seaweeds on exposed lower infralittoral rock' was identified as a standalone habitat along 818.5m of the transects covered during the ROV survey. The high coverage of this biotope highlights the dominance of Rhodophyta and exposed bedrock and cobbles rock at the Aberaeron site. This biotope was found to be representative of 24.3% of the transect lines covered with the ROV and was present in the deeper waters of the survey area along Transects 1, 2, 4, 5, 6 (as mosaic) and 7. This particular habitat was characterised by the presence a dense turf of foliose red seaweeds including *D. carnosa*, *D. sanguinea*, *Heterophobia plumosa*, *Calliblepharis ciliata*, *Corallina officinalis* and coralline crusts with the occasional presence of brown algae including *Fucus* sp., *Laminaria digitata* and *C. filum*. In addition to a variety of red algae, the faunal community associated with this biotope was rich and included *S. melops*, *A. viridis*, *S. canicula*, *C. rupestris*, *S. umbilicalis*, *C. pagurus*, the velvet swimming crab *Necora puber* and *Halichondria* sp.

### **Biotopes A3.116 (IR.HIR.KFaR.FoR) & A3.127 (IR.HIR.KSed.ProtAhn)**

The biotopes 'Foliose red seaweeds on exposed lower infralittoral rock' and '*Polyides rotundus*, *Ahnfeltia plicata* and *Chondrus crispus* on sand-covered infralittoral rock' were identified in mosaic form along 251.9m of the transects covered with the ROV, representing 7.5% of the total habitat coverage at Aberaeron. This combination of biotopes was identified along the deepest sections of Transects 4 and 6, though both individual habitats were seen frequently in littoral areas covered during the survey. These biotopes were typified by the occurrence of numerous red seaweed species anchored to infralittoral rock in varying proportions. Both faunal and algal diversity were relatively high in this biotope mosaic with characterising reds including *P. rotundus*, Coralline crusts, *D. carnosa*,

*C. crispus*, *Corallina*, *A. plicata*, *C. ciliata*, *P. palmata* and browns including *H. siliquosa*, *F. vesiculosus* and *C. filum*.

#### **Biotope A3.127 (IR.HIR.KSed.ProtAhn)**

The biotope '*Polyides rotundus*, *Ahnfeltia plicata* and *Chondrus crispus* on sand-covered infralittoral rock' was the second most recorded biotope covering 463m and representing 13.8% of the transects covered at Aberaeron. This biotope was identified along the central and southwestern portion of the site, mostly along Transects 3 and 4 though the biotope was also present in a mosaic format with A3.116 along Transect 6. The biotope was designated in areas dominated by low lying rock with overlying sand and a turf of robust red algae. The algae present were attached to emerging bedrock and boulders and were typically tolerant to sand scour. Commonly recorded species included *P. rotundus*, *H. siliquosa*, *F. serratus*, *C. crispus*, *H. plumosa*, *M. stellatus*, *D. carnosus*, *C. filum* as well as Coralline crusts. Numerous faunal species were associated with this biotope including the bryozoan *E. Pilosa* which formed as crusts upon algae, *Spirobranchus* sp., *C. rupestris*, *S. melops*, *P. vulgata*, *L. littorea*, *A. equina* and *C. maenas*.

#### **Biotope A3.127 (IR.HIR.KSed.ProtAhn) & A1.125 (LR.HLR.FR.Mas)**

The combination of '*Polyides rotundus*, *Ahnfeltia plicata* and *Chondrus crispus* on sand-covered infralittoral rock' and '*Mastocarpus stellatus* and *Chondrus crispus* on very exposed to moderately exposed lower eulittoral rock' was recording along 55.6m of Transect 6 at Aberaeron, representing 1.7% of the total biotope coverage. Elements of the two biotopes recorded in combination along the infralittoral portion of Transect 6 were similar though both are characterised by robust red seaweed presence on bedrock and cobbles with patches of sand-covered rock. This biotope complex provided habitat for several taxa including *E. Pilosa*, *Halichondria* sp., *A. equina*, *S. melops*, *Obelia* and *Spirobranchus* sp.

#### **Biotope A3.127 (IR.HIR.KSed.ProtAhn) & A2.711 (LS.LBR.Sab.Salv)**

The two biotopes '*Polyides rotundus*, *Ahnfeltia plicata* and *Chondrus crispus* on sand-covered infralittoral rock' & '*Sabellaria alveolata* reefs on sand-abraded eulittoral rock' were identified along 62.4m of the transects covered at Aberaeron, representing 1.9% of the total biotope coverage. These two biotopes were seen in combination along the mid-section of Transect 2. The substrate in the areas designated as A3.127 and A2.711 was dominated by bedrock and cobbles which were recurrently covered by *P. rotundus* and other robust red algae and *S. alveolata* reef. Fauna associated with this biotope included *E. pilosa*, *Spirobranchus* sp., *C. rupestris*, *S. melops*, *P. vulgata*, *L. littorea*, *A. equina* and *C. maenas*.

#### **Biotope A3.2111 (IR.MIR.KR.Ldig.Ldig)**

'*Laminaria digitata* on moderately exposed sublittoral fringe bedrock' was identified at along 155.3m of the transects covered by the ROV survey, representing 4.6% of the total biotopes identified at Aberaeron. This biotope was observed in the north-eastern portion of the site along Transects 1 (as mosaic), 2 (as mosaic), 6 and 7 where littoral bedrock was dominant. The fringe bedrock present was dominated by a dense canopy of *L. digitata* which was accompanied by a variety of foliose red seaweeds forming a dense turf. These seaweeds frequently included *C. crispus*, *M. stellatus*, *H. plumosa*, *C. officinalis*, Coralline crusts, *P. palmata*, *D. carnosus* and *P. rotundus*, *C. ciliate* and *D.*

*sanguinea* while brown seaweeds present included *F. vesiculosus*, *H. siliquosa* and *C. filum*. Faunal communities identified from ROV footage were typical for this biotope and included *Spirobranchus* sp., *P. vulgata*, *S. umbilicalis* as well as *S. melops*.

#### **Biotopes A3.2111 (IR.MIR.KR.Ldig.Ldig) & A1.3151 (LR.LLR.F.Fserr.FS)**

The combination ‘*Laminaria digitata* on moderately exposed sublittoral fringe bedrock’ and ‘*Fucus serratus* on full salinity sheltered lower eulittoral rock’ in mosaic form was identified along 198.4m of the distance covered by the ROV transects, representing 5.9% of the total biotope coverage at Aberaeron. These biotopes were present intermittently along the north-eastern half of Transect 2 where exposed bedrock and boulders were colonised by large kelp species and a thick canopy of *F. serratus*. The seaweed species observed in these biotopes were dominated by large brown alga; predominantly these were *L. digitata* and *F. serratus* which were accompanied by *Cladophora rupestris*, Coralline crusts, *P. palmata*, *C. crispus*, *E. intestinalis* and *P. elongata*. Fauna observed in the length of transect covered by these biotopes included *S. umbilicalis*, *E. Pilosa*, *Spirobranchus* sp., *S. melops*, *C. rupestris*, *S. canicula* and an indeterminate species of *Gobius*, highlighting the importance of these two biotopes for the provision of habitat for fish.

#### **Biotopes A3.2111 (IR.MIR.KR.Ldig.Ldig) & A3.116 (IR.HIR.KFaR.FoR)**

The two biotopes ‘*Laminaria digitata* on moderately exposed sublittoral fringe bedrock’ and ‘Foliose red seaweeds on exposed lower infralittoral rock’ were identified in combination along 123.2m of the transects covered by the ROV, representing 2.7% of the total biotope coverage at Aberaeron. These biotopes were observed in along the most north-eastern section of Transect 1 where *L. digitata* forest formed upon bedrock was interspersed with a thick canopy of foliose red seaweeds below. Fauna recorded in these biotopes was typical for the biotope descriptions and included *E. Pilosa* and *M. membranacea* encrusted on seaweed, *S. canicula*, *C. rupestris*, *Spirobranchus* sp., *S. cineraria*, Spirobidae and *A. viridis*. Algal species identified were also typical of the biotope descriptions and were dominated by *L. digitata*, *F. serratus*, *C. filum*, *Dictyota* spp. as well as Coralline crusts, *D. carnosa*, *C. crispus*, *Membranoptera alata*, *C. ciliate* and *D. sanguinea*.

### **3.6. Notes on Biotope Designations**

It should be noted that limited detail regarding the presence of some faunal and algal species identified from footage collected during the ROV survey were included in the biotope descriptions. Many of the most abundant taxa including fish identified and localised patches of *S. alveolata* were not mentioned in the most frequently occurring biotope descriptions though they were clearly important components of the community structure across the site. Additionally, many of the macrofauna mentioned in the JNCC habitat descriptions such as *Semibalanus* sp. or *Carcinus maenas* were not visible in some biotopes where descriptions suggest they should have been abundant, while other species such as *Necora puber* were more abundant than any biotope descriptions indicated they would be. This may be a result of the complex ecological conditions present at Aberaeron as well as the limited capacity to identify inconspicuous taxa using video and stills techniques.

There was also a high degree of overlap between several biotopes such as ‘*Polyides rotundus*, *Ahnfeltia plicata* and *Chondrus crispus* on sand-covered infralittoral rock’ and ‘*Mastocarpus stellatus* and *Chondrus crispus* on very exposed to moderately exposed lower eulittoral rock’, making

borders between the two designations challenging to define. Similarly, the biotopes '*Fucus serratus* on full salinity sheltered lower eulittoral rock' and '*Fucus serratus* on full salinity lower eulittoral mixed substrata' are distinguished by fine details regarding the substrate but the similarity in communities and the patchy nature of the seabed at times made the two challenging to distinguish given the high coverage of algae.

Nonetheless, biotopes remain a useful descriptive tool and provide a good basis for understanding the littoral and infralittoral communities present at Aberaeron in 2019.

## 4. Conclusions

This report has been prepared to characterise the benthic ecology and environmental conditions at the proposed development site of Aberaeron, west Wales.

Overall it can be said that faunal and algal communities observed at Aberaeron in 2019 were relatively complex and reflected the environmental conditions including substrate type, depth and energy regime. The nature of the substrate across the proposed development site was variable over a small area, though this was characteristic of a strong tidal regime and a coastline with increased complexity due to man-made structures including a breakwater and harbour wall. The presence of bedrock, boulders and mixed sediments across the site added structural complexity that can be associated with a diverse ecosystem at Aberaeron.

The following conclusions can be drawn from the monitoring investigation outlined in this report:

### Nature of the Aberaeron Substrate

- The substrates at Aberaeron were dominated by bedrock, boulders and mixed sediments though occasional large patches of fine sand were present. The nature of the sediment type was patchy across the site though sand was largely restricted to the south western portion and a gradient from sand to coarser sediment was evident from shore to sea.
- A divide in substrate type either side of the breakwater and harbour wall was apparent when reviewing footage collected during the ROV survey, this was most apparent along Transect 3 which was nearest to shore and the most influenced by structural influences.
- The presence of bedrock, boulders and cobbles in the Aberaeron site provided a surface on which numerous algal species could establish and provide community structures for epibenthos, thus increasing complexity in local communities.

### Nature of Aberaeron Fauna and Macroalgae

- A total of 46 fauna were identified from across a range of habitat types in the video analysis of footage collected using the ROV at Aberaeron in 2019. A total of 18 taxa were recorded in the stills collected from along the same footage. Taxa identified at Aberaeron in 2019 included fauna belonging to Porifera, Hydrozoa, Bryozoa, Actiniaria, Annelida, Crustacea, Mollusca and Pisces.
- Fauna, macroalgae and sediment data from the footage collected using the ROV as well as stills extracted from the footage were used to designate biotopes along each of the seven transects surveyed at Aberaeron. A total of 12 biotopes were characterised with the most common being 'Foliose red seaweeds on exposed lower infralittoral rock' and '*Polyides rotundus*, *Ahnfeltia plicata* and *Chondrus crispus* on sand-covered infralittoral rock'.

- Boundaries between biotopes were often transitional which resulted in the designation of 'mosaic' biotopes where two habitat types were apparent intermittently for more than 5m. This resulted in the designation of 10 mosaic biotope designations along the seven transects.
- Large swaths of *S. alveolata* reef was observed along the lower littoral and upper infralittoral region of the survey area. Biogenic 'Reefs' (1170) are listed under Annex I of the Habitats Directive 92/42/EEC.
- The extent and distribution of *S. alveolata* reef is dictated by several environmental factors including wave exposure, seabed scour and sediment transport. As such, coastal engineering projects may have a harmful effect to reef communities if they result in significant alterations to the pertinent environmental factors.
- Several fish species were observed across the site, the most common of which was the corkwing wrasse (*S. melops*) and the lesser spotted dogfish (*S. canicula*). Additionally, several species of commercial value including *H. gammarus*, *C. pagurus* and *D. labrax* were observed and evidence of local fishing activity was apparent.
- A diverse range of red, green and brown seaweeds and kelps were present across much of the site. Algae was present in numerous forms as turf, foliose and kelp forest, suggesting a mature and complex ecosystem was present where suitable substrate allowed establishment.

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## 6. Appendices

**Appendix 1** – Summary of field notes and positions for the Aberaeron ROV survey in 2019.

**Appendix 2** – Biotope designation rationale using ROV footage collected at Aberaeron in 2019.

**Appendix 3** – Faunal presence and absence matrix from ROV video footage analysis in 2019.

**Appendix 4** – Faunal SACFOR abundance matrix from ROV stills analysis undertaken in 2019.

**Appendix Plate 1** – Example images of biotope types identified at Aberaeron in 2019.

**Appendix Plate 2** – Contact sheet for ROV stills collected at Aberaeron and analysed by Eco Marine in 2019.

**Appendix 1.** Position metadata and position summary for the Aberaeron DDV survey in 2019. Navigational positions are recorded in WGS1984. Please note that the transects were renamed to the numbering system shown for ease during the survey (original Atkins vertex lettering shown in brackets).

Staff 1 name	Ellie Maher					ROV make & model	Blue ROV2 - Heavy Blue Robotics		
Staff 2 name	David Alexander					Target Altitude	1 m		
Staff 3 name	Matthew Crabb					Video format	4k MP4 & 1080p MP4		
Vessel & skipper	Simon Rigby, Suldaire					Laser Distance	30cm		
Positioning System	HydroPro - dGPS & offset					ROV Operator	Matt Crabb, Carcinus Ltd.		
Field Note Author	Ellie Maher					Frames	60 frames per second		
Transect	Date	Start Time	End Time	Start Latitude	Start Longitude	End Latitude	End Longitude	Comments	
1 (E-F)	19/09/2019	09:23	09:59	52.248327	4.265509	52.243159	4.271912	Tether adjusted during transect to allow ROV to be towed meaning that footage is 'backward' facing rather than 'forward' to allow more consistent height maintenance.	
2 (C-D)	19/09/2019	14:18	14:49	52.242549	4.270379	52.245742	4.266344	Last section of transect completed by ROV alone due to very shallow water - no dGPS tracking for final segment but continuous video recorded.	
3 (A-B)	19/09/2019	10:38	11:13	52.246459	4.263059	52.241821	4.268483		
4 (G-H)	19/09/2019	13:35	13:53	52.242686	4.266710	52.24480	4.271798		
5 (I-J)	19/09/2019	13:10	13:29	52.24466	4.264744	52.245752	4.270633		
6 (K-L)	19/09/2019	12:18	12:36	52.24466	4.264744	52.246742	4.269412	Launch point for ROV moved NW slightly due to close proximity with breakwater.	
7 (M-N)	19/09/2019	11:50	12:11	52.245287	4.263089	52.246742	4.269412		

**Appendix 2.** Biotope designation rationale from video footage collected using ROV at Aberaeron in 2019.

Zone	Designated Biotope	EUNIS Biotope	Start Depth (m)	End Depth (m)	Start Lat	Start Long	End Lat	End Long	Substrate Type	Fauna Present	Key Algae Present
<b>Transect 1</b>											
1	Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) (Level 5)	A3.116	4.9	4.4	52.2482607	-4.2656111	52.2475015	-4.2668626	Mixed (bedrock, boulders, gravel, sand)	<i>Halichondria</i> sp., <i>Anemonia viridis</i> , Ascidiacea, <i>Scyliorhinus canicula</i> , <i>Electra pilosa</i> , <i>Spirobranchus</i> sp., <i>Symphodus melops</i> , <i>Ctenolabrus rupestris</i> , <i>Steromphala umbilicalis</i> , Actiniaria sp. <i>Cancer pagurus</i> , <i>Necora puber</i> , <i>Actinia equina</i> , indet. Porifera, Cirripedia spp.	Corallinaceae crusts, <i>Dilsea carnosa</i> , <i>Chondrus crispus</i> , <i>Polyides rotunda</i> , <i>Corallina officinalis</i> , <i>Heterosiphonia plumosa</i> , <i>Calliblepharis ciliata</i> , <i>Delesseria sanguinea</i> , <i>Phyllophora pseudoceranoides</i> , <i>Laminaria digitata</i> (rare), <i>Chorda filum</i> , <i>Dictyota</i> sp. <i>Fucus</i> sp., <i>Halidrys siliquosa</i>
2	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig) (Level 6) and Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) (Level 5)	A3.2111 & A3.116	4.4	4.7	52.2475015	-4.2668626	52.2466292	-4.2679110	Mixed (bedrock, boulders, gravel, sand)	<i>Electra pilosa</i> , <i>Membranipora membranacea</i> , <i>Spirobranchus</i> sp., <i>Ctenolabrus rupestris</i> , <i>Cirripedia</i> , <i>Steromphala cineraria</i> , Spirobidae, <i>Scyliorhinus canicula</i> , <i>Anemonia viridis</i> .	Corallinaceae crusts, <i>Dilsea carnosa</i> , <i>Chondrus crispus</i> , <i>Membranoptera alata</i> , <i>Calliblepharis ciliata</i> , <i>Delesseria sanguinea</i> . Brown algae including <i>Laminaria digitata</i> , <i>Chorda filum</i> , <i>Dictyota</i> sp.
3	Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) (Level 5)	A3.116	4.7	6.6	52.2466292	-4.2679110	52.2454631	-4.2692395	Mixed (bedrock, boulders, gravel, sand)	<i>Spirobranchus</i> sp, <i>Cirripedia</i> , <i>Electra pilosa</i> , <i>Aglaophenia pluma</i> , <i>Symphodus melops</i> , <i>Homarus gammarus</i> (26:41 in to video), <i>Ctenolabrus rupestris</i> , <i>Anemonia viridis</i> , indet. Porifera, <i>Halichondria</i> sp., <i>Necora puber</i>	Corallinaceae crusts, <i>Dilsea carnosa</i> , <i>Chondrus crispus</i> , <i>Polyides rotunda</i> , <i>Heterosiphonia plumosa</i> , <i>Calliblepharis ciliata</i> , <i>Delesseria sanguinea</i> . Brown algae including <i>Laminaria digitata</i> (rare), <i>Chorda filum</i> , <i>Dictyota</i> spp. <i>Fucus</i> sp. and <i>Halidrys siliquosa</i> .
			6.6	6.7	52.2454631	-4.2692395	52.2446857	-4.2701924	Mixed (bedrock, boulders, gravel, sand)	<i>Cirripedia</i> , <i>Electra pilosa</i> , <i>Symphodus melops</i> , <i>Scyliorhinus canicula</i> , <i>Spirobranchus</i> sp., Porifera sp., <i>Anemonia viridis</i> , <i>Steromphala cineraria</i> , indet. Osteichthyes, <i>Halichondria</i> sp., <i>Aglaophenia pluma</i> , indet. Hydrozoa	Corallinaceae crusts, <i>Polyides rotunda</i> , <i>Dilsea carnosa</i> , <i>Chondrus crispus</i> , <i>Corallina officinalis</i> , <i>Heterosiphonia plumosa</i> , <i>Calliblepharis ciliata</i> , <i>Delesseria sanguinea</i> , <i>Chorda filum</i> , <i>Himanthalia elongata</i> , <i>Dictyota</i> spp. <i>Fucus</i> sp. (rare), <i>Halidrys siliquosa</i> .
			6.7	5.7	52.2446857	-4.2701924	52.2440926	-4.2708155			
			5.5	6.3	52.2439589	-4.2710006	52.2430784	-4.2720363			
<b>Transect 2</b>											
1	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn) (Level 5)	A3.127	3.2	3.3	52.242965	-4.2695649	52.2448024	-4.2674918	Sand, bedrock, boulders	<i>Electra pilosa</i> , <i>Spirobranchus</i> sp., <i>Halichondria</i> sp., <i>Symphodus melops</i> , <i>Patella vulgata</i> , <i>Steromphala cineraria</i> , <i>Urticina felina</i> , indet. Osteichthyes, Ascidacea, <i>Obelia</i> , <i>Sabellaria spinulosa</i>	<i>Polyides rotundus</i> , <i>Halidrys siliquosa</i> , <i>Fucus serratus</i> , <i>Chondrus crispus</i> , <i>Heterosiphonia plumosa</i> , <i>Mastocarpus stellatus</i> , <i>Dilsea carnosa</i> , <i>Chorda filum</i> , Coralline crusts.
2	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn) (Level 5) & <i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock (LS.LBR.Sab.Salv) (Level 5)	A3.127 & A2.711	3.3	2.4	52.248024	-4.2674918	52.2452503	-4.2669351	Sand, bedrock, boulders	<i>Electra pilosa</i> , <i>Spirobranchus</i> sp., Hydrozoa, <i>Ctenolabrus rupestris</i> , <i>Symphodus melops</i> , <i>Patella vulgata</i> , <i>Littorina littorea</i> , <i>Actinia equina</i> , <i>Carcinus maenas</i>	<i>Polyides rotundus</i> , <i>Halidrys siliquosa</i> , <i>Chondrus crispus</i> , <i>Heterosiphonia plumosa</i> , <i>Mastocarpus stellatus</i> , <i>Chorda filum</i> , Coralline crusts, <i>Fucus serratus</i> , <i>Calliblepharis ciliata</i>
3	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn) (Level 5)	A3.127	2.4	1.9	52.2452503	-4.2669351	52.2454431	-4.2666859	Sand, bedrock, boulders	<i>Spirobranchus</i> sp., <i>Electra pilosa</i> , <i>Littorina littorea</i> , <i>Steromphala umbilicalis</i> , <i>Halichondria</i> sp., <i>Symphodus melops</i> .	<i>Polyides rotundus</i> , <i>Halidrys siliquosa</i> , <i>Chondrus crispus</i> , <i>Heterosiphonia plumosa</i> , <i>Mastocarpus stellatus</i> , Coralline crusts, <i>Fucus serratus</i> , <i>Calliblepharis ciliata</i> , <i>Dilsea carnosa</i>
4	Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) (Level 5)	A3.116	1.9	1.9	52.2454431	-4.2666859	52.2455361	-4.2665523	Bedrock & boulders	<i>Halichondria</i> sp. <i>Sabellaria</i> , <i>Electra pilosa</i> , <i>Spirobranchus</i> sp., <i>Littorina littorea</i> , Spirobidae.	<i>Chondrus crispus</i> , <i>Mastocarpus stellatus</i> , <i>Fucus serratus</i> , <i>Laminaria digitata</i> , <i>Heterosiphonia plumosa</i> , <i>Calliblepharis ciliata</i> , <i>Palmaria palmata</i> , <i>Corallina officinalis</i> , Coralline crust, <i>Saccharina latissima</i> , <i>Laminaria digitata</i> , <i>Cladophora rupestris</i> .

Zone	Designated Biotope	EUNIS Biotope	Start Depth (m)	End Depth (m)	Start Lat	Start Long	End Lat	End Long	Substrate Type	Fauna Present	Key Algae Present
5	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig) (Level 6) and <i>Fucus serratus</i> on full salinity sheltered lower eulittoral rock (LR.LLR.F.Fserr.FS) (Level 5)	A3.2111 & A1.3151	1.9	1.5	52.2455361	-4.2665523	52.2456897	-4.2662594	Mixed (bedrock, boulders, gravel, sand)	<i>Electra pilosa</i> , <i>Spirobranchus</i> spp., Spiorbidae, <i>Littorina littorea</i> .	Foliose reds, <i>Heterosiphonia plumosa</i> , <i>Phyllophora</i> (or similar), <i>Laminaria digitata</i> , <i>Fucus serratus</i> , <i>Saccharina latissima</i> (rare), <i>Calliblepharis ciliata</i> , <i>Palmaria palmata</i> , <i>Cladophora rupestris</i> , <i>Chondrus crispus</i> , <i>Dilsea carnos</i> , <i>Coralline crust</i>
6	<i>Fucus serratus</i> on full salinity sheltered lower eulittoral rock (LR.LLR.F.Fserr.FS) (Level 5)	A1.3151	1.5	1.5	52.2456897	-4.2662594	52.2457700	-4.2660880	Bedrock, boulders	<i>Electra pilosa</i> , Spiorbidae, <i>Spirobranchus</i> sp., <i>Scyliorhinus canicula</i> , <i>Steromphala umbilicalis</i> .	<i>Fucus serratus</i> , <i>Laminaria hyperborea</i> , <i>Palmaria palmata</i> , <i>Chondrus crispus</i> , <i>Cladophora rupestris</i> , <i>Coralline crust</i> , <i>Enteromorpha intestinalis</i>
7	Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) (Level 5)	A3.116	1.5	0.8	52.2457700	-4.2660880	52.2457735	-4.2660802	Bedrock, boulders	<i>Steromphala umbilicalis</i> , <i>Symphodus melops</i> , Spiorbidae, <i>Spirobranchus</i> sp., <i>Patella vulgata</i> , <i>Littorina littorea</i> .	<i>Fucus serratus</i> , <i>Cladophora rupestris</i> , <i>Heterosiphonia plumosa</i> , <i>Enteromorpha intestinalis</i> , <i>Heterosiphonia plumosa</i>
8	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig) (Level 6)	A3.2111	1.6	1.6	52.2459032	-4.2664856	Unknown	Unknown	Bedrock, boulders	<i>Steromphala umbilicalis</i> , <i>Scyliorhinus canicula</i> , Spiorbidae, <i>Spirobranchus</i> sp., <i>Littorina littorea</i> .	<i>Laminaria hyperborea</i> , <i>Fucus serratus</i> , <i>Saccharina latissima</i> , <i>Cladophora rupestris</i> , <i>Dilsea carnos</i> , <i>Coralline crusts</i> , <i>Heterosiphonia plumosa</i> , <i>Palmaria palmata</i> , <i>Chorda filum</i> , <i>Dilsea carnos</i> , <i>Cladophora rupestris</i> , <i>Chorda filum</i>
9	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig) (Level 6) and <i>Fucus serratus</i> on full salinity sheltered lower eulittoral rock (Level 5)	A3.2111 & A1.3151	1.6	1.3	Unknown	Unknown	Unknown	Unknown	Bedrock, boulders	<i>Steromphala umbilicalis</i> , Spiorbidae, <i>Electra pilosa</i> , <i>Spirobranchus</i> sp., <i>Ctenolabrus rupestris</i> , <i>Symphodus melops</i> , <i>Gobius</i> .	<i>Laminaria digitata</i> , <i>Fucus serratus</i> , <i>Cladophora rupestris</i> , <i>Saccharina latissima</i> , <i>Coralline crusts</i> , <i>Palmaria palmata</i> , <i>Enteromorpha intestinalis</i> sp., <i>Chondrus crispus</i> , <i>Dilsea carnos</i>
10	<i>Fucus serratus</i> on full salinity sheltered lower eulittoral rock (LR.LLR.F.Fserr.FS) (Level 5)	A1.3151	1.3	1.5	Unknown	Unknown	Unknown	Unknown	Bedrock, boulders	Gastropoda, Spiorbidae, <i>Electra pilosa</i> , <i>Spirobranchus</i> sp., <i>Steromphala umbilicalis</i> , <i>Symphodus melops</i> , <i>Pododesmus patelliformis</i> , <i>Steromphala cineraria</i> .	<i>Fucus serratus</i> , <i>Laminaria digitata</i> , <i>Cladophora rupestris</i> , <i>Coralline crusts</i> , <i>Palmaria palmata</i> , <i>Chondrus crispus</i> , <i>Enteromorpha intestinalis</i> , <i>Polysiphonia elongata</i>
<b>Transect 3</b>											
1	<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock (LS.LBR.Sab.Salv) (Level 5) and <i>Fucus vesiculosus</i> on mid eulittoral mixed substrata (LR.LLR.F.Fves.X) (Level 6)	A2.711 & A1.3132	1.4	1.7	52.2463093	-4.2632650	52.2451755	-4.2644477	Bedrock, boulders, cobbles	<i>Sabellaria alveolata</i> , <i>Littorina littorea</i> , <i>Steromphala umbilicalis</i> , <i>Steromphala cineraria</i> , <i>Patella vulgata</i> , <i>Cirripedia</i> , <i>Spirobranchus</i> spp., <i>Sabellaria spinulosa</i> , <i>Carcinus maenas</i> , <i>Symphodus melops</i> .	<i>Fucus vesiculosus</i> (occasionally aberrant), <i>Coralline crust</i> , <i>Corallina officinalis</i> , <i>Cladophora rupestris</i> , <i>Mastocarpus stellatus</i> , <i>Chondrus crispus</i> , <i>Calliblepharis ciliata</i> , <i>Enteromorpha intestinalis</i>
2	<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata (LR.LLR.F.Fves.X) (Level 6) and <i>Corallina officinalis</i> and <i>Mastocarpus stellatus</i> on exposed to moderately exposed lower eulittoral rock (Level 6) (LR.HLR.FR.Coff.Coff)	A1.3132 & A1.1221	1.7	1.7	52.2451755	-4.2644477	52.2450567	-4.2645830	Bedrock, boulders, cobbles, coarse sand	<i>Carcinus maenas</i> , <i>Littorina littorea</i> , <i>Steromphala umbilicalis</i> , <i>Steromphala cineraria</i> , <i>Patella vulgata</i> .	<i>Fucus vesiculosus</i> (occasionally aberrant), <i>Corallina officinalis</i> , <i>Mastocarpus stellatus</i> .
3	<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock (LS.LBR.Sab.Salv) (Level 5) and <i>Fucus vesiculosus</i> on mid eulittoral mixed substrata (LR.LLR.F.Fves.X) (Level 6)	A2.711 & A1.3132	1.7	1.9	52.2450567	-4.2645830	52.2445418	-4.2652758	Bedrock, boulders, cobbles	<i>Steromphala umbilicalis</i> , <i>Sabellaria alveolata</i> , <i>Patella vulgata</i> , <i>Littorina littorea</i> , small shoaling sand smelt ( <i>Atherina</i> sp.), <i>Hyperoplus</i> sp., <i>Cirripedia</i> , <i>Steromphala cineraria</i>	<i>Fucus vesiculosus</i> (occasionally aberrant), <i>Corallina officinalis</i> , <i>Mastocarpus stellatus</i> .
4	<i>Mastocarpus stellatus</i> and <i>Chondrus crispus</i> on very exposed to moderately exposed lower eulittoral rock (Level 5) (LR.HLR.FR.Mas)	A1.125	1.9	2.3	52.2445418	-4.2652758	52.2442898	-4.2657418	Bedrock, boulders, cobbles	<i>Steromphala umbilicalis</i> , <i>Patella vulgata</i> , <i>Steromphala cineraria</i> , small indet. Fish, <i>Cirripedia</i> , <i>Nucella lapillus</i> , <i>Actiniaria</i> , <i>Hyperoplus</i> sp.	<i>Fucus vesiculosus</i> , <i>Corallina officinalis</i> , <i>Mastocarpus stellatus</i> , <i>chondrus crispus</i> , <i>Ulva lactuca</i> ,
5	Moderate energy littoral rock (Level 3) (LR.MLR)	A1.2	2.3	2.2	52.2442898	-4.2657418	52.2442502	-4.2658247	Bedrock, boulders, cobbles	<i>Cirripedia</i> , <i>Littorina littorea</i> , <i>Nucella lapillus</i>	<i>Fucus vesiculosus</i> , <i>Mastocarpus stellatus</i> , <i>Enteromorpha intestinalis</i>
6	<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata (LR.LLR.F.Fves.X) (Level 6)	A1.3132	2.2	2.3	52.2442502	-4.2658247	52.2441160	-4.2660660	Bedrock, boulders, cobbles	<i>Cirripedia</i> , <i>Littorina littorea</i> , <i>Nucella lapillus</i> , <i>Steromphala umbilicalis</i>	<i>Fucus vesiculosus</i> , <i>Mastocarpus stellatus</i> , <i>Enteromorpha intestinalis</i>

Zone	Designated Biotope	EUNIS Biotope	Start Depth (m)	End Depth (m)	Start Lat	Start Long	End Lat	End Long	Substrate Type	Fauna Present	Key Algae Present
7	Moderate energy littoral rock (LR.MLR) (Level 3)	A1.2	2.3	2.2	52.2441160	-4.2660660	52.2440831	-4.2661127	Bedrock, boulders, cobbles	Cirripedia, <i>Littorina littorea</i> , <i>Carcinus maena</i> s	<i>Fucus vesiculosus</i> , <i>Enteromorpha intestinalis</i> , <i>Porphyra purpurea</i>
8	Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata (LR.FLR.Eph.EphX) and Littoral sand (LS.Lsa) (Level 3)	A2.821 & A2.2	2.2	3.3	52.2440831	-4.2661127	52.2429295	-4.2670967	Bedrock, boulders, cobbles, sand	Cirripedia, <i>Littorina littorea</i> , <i>Steromphala umbilicalis</i> , Labridae, <i>Symphodus melops</i> , <i>Carcinus maenas</i> , <i>Sabellaria alveolata</i>	<i>Enteromorpha intestinalis</i> , <i>Ulva lactuca</i> , <i>Porphyra</i> sp., <i>Osmundea pinnatifida</i> (?), <i>Polysiphonia</i> sp., <i>Fucus vesiculosus</i>
9	<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata (LR.LLR.F.Fves.X) (Level 6)	A1.3132	3.3	3.3	52.2429295	-4.2670967	52.2428920	-4.2671431	Boulders, sand	-	<i>Fucus vesiculosus</i> , <i>Enteromorpha intestinalis</i> , <i>Ulva lactuca</i> , <i>Polysiphonia</i> sp.,
10	Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata (LR.FLR.Eph.EphX) (Level 5) and Littoral sand (LS.Lsa) (Level 3)	A2.821 & A2.2	3.3	3.4	52.2428920	-4.2671431	52.2426886	-4.2673802	Boulders, sand	<i>Symphodus melops</i> , <i>Sabellaria alveolata</i> .	<i>Enteromorpha intestinalis</i> , <i>Ulva lactuca</i> , <i>Porphyra</i> spp., <i>Osmundea pinnatifida</i> , <i>Polysiphonia</i> sp., <i>Fucus vesiculosus</i> , Coralline crust
11	<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock (LS.LBR.Sab.Salv) (Level 5) and Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata (LR.FLR.Eph.EphX) (Level 5)	A2.711 & A2.821	3.4	3.6	52.2426886	-4.2673802	52.2426332	-4.2674565	Boulders, sand	<i>Symphodus melops</i> , <i>Sabellaria alveolata</i> , indet. Small silver fish.	<i>Enteromorpha intestinalis</i> , <i>Ulva lactuca</i> , <i>Porphyra</i> spp., <i>Polysiphonia elongata</i> , <i>Fucus vesiculosus</i> .
12	Littoral sand (Level 3) (LS.Lsa)	A2.2	3.6	3.2	52.2426332	-4.2674565	52.2422260	-4.2679426	Sand	<i>Lanice conchilega</i> tube, Spiorbidae	<i>Enteromorpha intestinalis</i> , <i>Ulva lactuca</i> , <i>Polysiphonia elongata</i> , <i>Fucus vesiculosus</i> .
13	<i>Fucus serratus</i> on full salinity lower eulittoral mixed substrata (Level 6) (LR.LLR.F.Fserr.X) and Littoral sand (LS.Lsa).	A1.3152 & A2.2	3.2	3.3	52.2422260	-4.2679426	52.2420605	-4.2681535	Boulders, sand	<i>Pleuronectes platessa</i> (07:18 GoPro), <i>Electra pilosa</i> , <i>Necora puber</i> (07:20 GoPro), <i>Patella vulgaris</i> , <i>Spirobranchus</i> sp., <i>Sabellaria alveolata</i> , Spiorbidae.	<i>Fucus serratus</i> , Coralline crust, <i>Cladophora rupestris</i> , rhodophyta film ( <i>Lithothamnion</i> sp.), <i>Palmaria palmata</i> .
14	<i>Fucus serratus</i> on full salinity lower eulittoral mixed substrata (Level 6) (LR.LLR.F.Fserr.X)	A1.3152	3.3	3.2	52.2420605	-4.2681535	52.2419416	-4.2683328	Boulders, cobbles, sand	Spiorbidae, <i>Patella vulgata</i> , <i>Sabellaria alveolata</i> , <i>Symphodus melops</i> , <i>Electra pilosa</i> , Spiorbidae, <i>Dicentrachus labrax</i>	<i>Fucus serratus</i> , Coralline crust, <i>Cladophora rupestris</i> , rhodophyta film ( <i>Lithothamnion</i> sp.), <i>Palmaria palmata</i> , <i>Mastocarpus stellatus</i> , <i>Enteromorpha intestinalis</i> .
15	<i>Fucus serratus</i> on full salinity lower eulittoral mixed substrata (Level 6) (LR.LLR.F.Fserr.X) and Littoral sand (LS.Lsa).	A1.3152 & A2.2	3.2	3.2	52.2419416	-4.2683328	52.2418427	-4.2684920	Boulders & sand	<i>Electra pilosa</i> , Spiorbidae, <i>Patella vulgata</i>	<i>Fucus serratus</i> , Coralline crust, <i>Cladophora rupestris</i> , <i>Enteromorpha intestinalis</i> .
16	Littoral sand (LS.Lsa) (Level 3)	A2.2	3.2	3.2	52.2418427	-4.2684920	52.2418027	-4.2685572	Sand	-	-
17	<i>Fucus serratus</i> on full salinity lower eulittoral mixed substrata (Level 6) (LR.LLR.F.Fserr.X) and Littoral sand (LS.Lsa).	A1.3152 & A2.2	3.2	3	52.2418027	-4.2685572	52.2417795	-4.2685972	Bedrock, boulder, sand	<i>Electra pilosa</i> , <i>Symphodus melops</i>	<i>Fucus serratus</i> , <i>Cladophora rupestris</i> , <i>Enteromorpha intestinalis</i> , <i>Mastocarpus stellatus</i> , Coralline crust.
<b>Transect 4</b>											
1	Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata (LR.FLR.Eph.EphX) (Level 5) and Littoral sand (Level 3) (LS.Lsa)	A2.821 & A2.2	1	1.6	52.2428752	-4.2668108	52.2430322	-4.2675040	Bedrock, boulders & sand	<i>Sabellaria alveolata</i>	<i>Enteromorpha intestinalis</i> , foliose reds, <i>Fucus serratus</i> , Coralline crusts
2	Littoral sand (Level 3) (LS.Lsa)	A2.2	1.6	2.5	52.2430322	-4.2675040	52.2431129	-4.2679922	Sand & boulders	-	<i>Enteromorpha intestinalis</i> , indet. Foliose red
3	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn) (Level 5)	A3.127	2.5	2.7	52.2431129	-4.2679922	52.2431472	-4.2681277	Sand & boulders	<i>Electra pilosa</i> , <i>Spirobranchus</i> sp.	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> , Coralline crusts, <i>Polysiphonia</i> sp.
4	Littoral sand (Level 3) (LS.Lsa)	A2.2	2.7	3.2	52.2431472	-4.2681277	52.2431994	-4.2683200	Sand	-	<i>Polysiphonia</i> sp.

Zone	Designated Biotope	EUNIS Biotope	Start Depth (m)	End Depth (m)	Start Lat	Start Long	End Lat	End Long	Substrate Type	Fauna Present	Key Algae Present
5	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn) (Level 5)	A3.127	3.2	4.2	52.2431994	-4.2683200	52.2435810	-4.2690990	Bedrock, boulders, cobbles & sand	<i>Spirobranchus</i> sp., <i>Patella vulgata</i> , <i>Arenicola marina</i> cast, indet. Porifera (encusting), <i>Necora puber</i> , <i>Symphodus melops</i> , <i>Sabellaria alveolata</i>	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> , Coralline crusts, <i>Enteromorpha intestinalis</i> , <i>Dilsea carnosa</i> , <i>Halidrys siliquosa</i> , <i>Chondrus crispus</i> , <i>Corallina</i> , <i>Fucus vesiculosus</i> , <i>Chorda filum</i> .
6	Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) (Level 5) and <i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn) (Level 5)	A3.116 & A3.127	4.2	6.5	52.2435810	-4.2690990	52.2447152	-4.2715949	Bedrock, boulders & cobbles	<i>Symphodus melops</i> , <i>Obelia</i> , <i>Spirobranchus</i> sp., <i>Electra pilosa</i> , <i>Steromphala</i> sp., <i>Sabellaria alveolata</i> , <i>Anemonia viridis</i> , <i>Buccinum</i> eggs, <i>Halichondria</i> sp.,	<i>Polyides rotundus</i> , Coralline crusts, <i>Dilsea carnosa</i> , <i>Halidrys siliquosa</i> , <i>Chondrus crispus</i> , <i>Corallina</i> , <i>Fucus vesiculosus</i> , <i>Chorda filum</i> , <i>Ahnfeltia plicata</i> , <i>Calliblepharis ciliata</i> , <i>Palmaria palmata</i> , algal turf.
7	Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) (Level 5)	A3.116	6.5	6.2	52.2447152	-4.2715949	52.2448018	-4.2718455	Bedrock, boulders & cobbles	<i>Halichondria</i> sp., <i>Spirobranchus</i> , <i>Electra pilosa</i> , <i>Obelia</i> , <i>Anemonia viridis</i> , <i>Symphodus melops</i>	Coralline crusts, <i>Dilsea carnosa</i> , <i>Halidrys siliquosa</i> , <i>Chondrus crispus</i> , <i>Corallina</i> , <i>Chorda filum</i> , <i>Calliblepharis ciliata</i> .
<b>Transect 5</b>											
1	Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata (LR.FLR.Eph.EphX) (Level 5)	A2.821	2.5	2.3	52.2439840	-4.2663167	52.2440418	-4.2665263	Bed rock, boulders, cobbles & sand	-	<i>Enteromorpha intestinalis</i>
2	Littoral sand (Level 3) (LS.Lsa) and Ephemeral green and red seaweeds on variable salinity and/or disturbed eulittoral mixed substrata (LR.FLR.Eph.EphX) (Level 5)	A2.2 & A2.821	2.3	2.9	52.2440418	-4.2665263	52.2443131	-4.2672866	Boulders & sand	<i>Littorina littorea</i> , <i>Necora puber</i> , <i>Gobius</i> , <i>Symphodus melops</i> , <i>Carcinus melops</i>	<i>Enteromorpha intestinalis</i> , <i>Polyides rotundus</i> , <i>Polyphira</i> sp., <i>Chondrus crispus</i> , rhodophyta film ( <i>Lithothamnion</i> sp.)
3	Littoral sand (Level 3) (LS.Lsa)	A2.2	2.9	3.1	52.2443131	-4.2672866	52.2444518	-4.2675517	Sand	<i>Arenicola marina</i> casts	Red filamentous algae (occasional), <i>Enteromorpha intestinalis</i> , <i>Halidrys siliquosa</i> , <i>Polyides rotundus</i>
4	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn) (Level 5)	A3.127	3.1	4.3	52.2444518	-4.2675517	52.2447232	-4.2680914	Boulders, cobbles & sand	<i>Arenicola marina</i> casts, <i>Carcinus maenas</i> , <i>Spirobranchus</i> sp., <i>Littorina littorea</i>	<i>Polyides rotundus</i> , <i>Heterosiphona plumosa</i> , <i>Halidrys siliquosa</i> , filamentous red, Coralline crust, <i>Phyllophora</i> sp.
5	Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) (Level 5)	A3.116	4.3	7.2	52.2447232	-4.2680914	52.2457511	-4.2706664	Boulders, cobbles & gravel	<i>Spirobranchus</i> sp., <i>Obelia</i> , <i>Littorina littorea</i> , <i>Electra pilosa</i> , <i>Halichondria</i> , <i>Cancer pagurus</i> , <i>Gobius</i> , <i>Steromphala umbilicalis</i> , <i>Anemonia viridis</i> , <i>Necora puber</i> , <i>Hyas</i> sp., <i>Symphodus melops</i>	<i>Polyides rotundus</i> , <i>Heterosiphona plumosa</i> , <i>Halidrys siliquosa</i> , filamentous red, Coralline crust, <i>Fucus vesiculosus</i> , <i>Chondrus crispus</i> , <i>Corallina officinalis</i> , <i>Cryptopleura ramosa</i> , <i>Dilsea carnosa</i> , <i>Chorda filum</i> , <i>Dictyota dichotoma</i>
<b>Transect 6</b>											
1	<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock (LS.LBR.Sab.Salv) (Level 5)	A2.711	1	2.8	52.2448525	-4.2650555	52.2453796	-4.2664920	Bed rock, boulders, cobbles & sand	<i>Sabellaria alveolata</i> , <i>Steromphala umbilicalis</i> , <i>Stromphala cineraria</i> , <i>Littorina littorea</i> , <i>Spirobranchus</i> sp., <i>Arenicola marina</i> cast, <i>Patella vulgata</i> , <i>Necora puber</i> , <i>Symphodus melops</i>	<i>Fucus vesiculosus</i> , foliose reds, <i>Corallina officinalis</i> , <i>Enteromorpha intestinalis</i> , <i>Chondrus crispus</i> , <i>Mastocarpus stellatus</i> , <i>Drachiella spectabilis</i> , <i>Ulva lactuca</i> , <i>Heterosiphonia plumosa</i>
2	<i>Mastocarpus stellatus</i> and <i>Chondrus crispus</i> on very exposed to moderately exposed lower eulittoral rock (LR.HLR.FR.Mas) (Level 5)	A1.125	2.8	2.9	52.2453796	-4.2664920	52.2453943	-4.2666446	Bed rock, boulders & sand	<i>Spirobranchus</i> sp., <i>Sabellaria alveolata</i> , <i>Steromphala umbilicalis</i> , <i>Littorina littorea</i> , <i>Patella vulgata</i>	<i>Chondrus crispus</i> , <i>Mastocarpus stellatus</i> , <i>Fucus serratus</i> , <i>Corallina officinalis</i> , Coralline crusts, <i>Cladophora rupestris</i>
3	<i>Fucus serratus</i> on full salinity lower eulittoral mixed substrata (Level 6) (LR.LLR.F.Fserr.X)	A1.3152	2.9	3.4	52.2453943	-4.2666446	52.2454449	-4.2668237	Bed rock, boulders & sand	<i>Spirobranchus</i> sp., <i>Steromphala umbilicalis</i> , <i>Littorina littorea</i> , <i>Patella vulgata</i> , <i>Sabellaria alveolata</i> , <i>Symphodus melops</i> , Cirripedia, <i>Electra pilosa</i> .	<i>Fucus serratus</i> , <i>Cladophora rupestris</i> , <i>Chondrus crispus</i> , <i>Mastocarpus stellatus</i>
4	<i>Mastocarpus stellatus</i> and <i>Chondrus crispus</i> on very exposed to moderately exposed lower eulittoral rock (LR.HLR.FR.Mas) (Level 5)	A1.125	3.4	3.4	52.2454449	-4.2668237	52.2454998	-4.2669285	Bed rock, boulders & cobbles	<i>Spirobranchus</i> sp., <i>Patella vulgata</i> , Spirobidae	<i>Chondrus crispus</i> , <i>Mastocarpus stellatus</i> , <i>Fucus serratus</i> , <i>Corallina officinalis</i> , Coralline crusts, <i>Cladophora rupestris</i> , <i>Ulva lactuca</i> , <i>Laminaria digitata</i> , <i>Dilsea carnosa</i> , <i>Polyides rotundus</i> , <i>Chorda filum</i>

Zone	Designated Biotope	EUNIS Biotope	Start Depth (m)	End Depth (m)	Start Lat	Start Long	End Lat	End Long	Substrate Type	Fauna Present	Key Algae Present
5	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig) (Level 6)	A3.2111	3.4	4.8	52.2454998	-4.2669285	52.2457926	-4.2676064	Bed rock, boulders & cobbles	<i>Spirobranchus</i> sp., <i>Patella vulgata</i> , Spiorbidae, <i>Actinia equina</i> , <i>Symphodus melops</i> , <i>Steromphala umbilicalis</i>	<i>Laminaria digitata</i> , <i>Chondrus crispus</i> , <i>Mastocarpus stellatus</i> , <i>Fucus vesiculosus</i> , <i>Corallina officinalis</i> , Coralline crusts, <i>Palmaria palmata</i> , <i>Halidrys siliquosa</i> , <i>Dilsea carnosa</i> , <i>Polyides rotundus</i> .
6	<i>Mastocarpus stellatus</i> and <i>Chondrus crispus</i> on very exposed to moderately exposed lower eu littoral rock (LR.HLR.FR.Mas) (Level 5)	A1.125	4.6	5.7	52.2457926	-4.2676064	52.2460152	-4.2681282	Bed rock, boulders & cobbles	<i>Symphodus melops</i> , <i>Electra pilosa</i> , <i>Spirobranchus</i> sp., <i>Steromphala</i> sp., <i>Obelia</i> , <i>Halichondria</i> sp.	<i>Mastocarpus stellatus</i> , <i>Chondrus crispus</i> , <i>Fucus vesiculosus</i> , Coralline crust, <i>Dilsea carnosa</i> , <i>Calliblepharis ciliata</i> , <i>Halidrys siliquosa</i> , <i>Laminaria digitata</i> , <i>Chorda filum</i> , <i>Palmaria palmata</i> , red crust (Lithothamnion?)
7	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn) (Level 5) and <i>Mastocarpus stellatus</i> and <i>Chondrus crispus</i> on very exposed to moderately exposed lower eu littoral rock (LR.HLR.FR.Mas) (Level 5)	A3.127 & A1.125	5.7	6.2	52.2460152	-4.2681282	52.2463592	-4.2687381	Bed rock, boulders & cobbles	<i>Electra pilosa</i> , <i>Halichondria</i> sp., <i>Actinia equina</i> , <i>Symphodus melops</i> , <i>Obelia</i> , <i>Spirobranchus</i> sp., <i>Axinella</i>	<i>Polyides rotundus</i> , <i>Mastocarpus stellatus</i> , <i>Chondrus crispus</i> , Coralline crust, <i>Calliblepharis ciliata</i> , <i>Halidrys siliquosa</i> , <i>Chorda filum</i> , <i>Palmaria palmata</i> , red crust (Lithothamnion?), <i>Dilsea carnosa</i> , <i>Flustra vesiculosa</i> , <i>Delesseria sanguinea</i>
8	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn) (Level 5) and Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) (Level 5)	A3.127 & A3.116	6.2	7.8	52.2463592	-4.2687381	52.2467544	-4.2694935	Bed rock, boulders & cobbles	<i>Electra pilosa</i> , <i>Halichondria</i> sp., <i>Obelia</i> , <i>Spirobranchus</i> sp., <i>Sabellaria spinulosa</i> (not reef) indet. Porifera, <i>Symphodus melops</i> , Osteichthys	<i>Polyides rotundus</i> , Coralline crust, <i>Halidrys siliquosa</i> , <i>Chorda filum</i> , red crust, <i>Dilsea carnosa</i> , <i>Heterosiphonia plumosa</i> , <i>Calliblepharis ciliata</i>
<b>Transect 7</b>											
1	<i>Fucus vesiculosus</i> on moderately exposed to sheltered mid eu littoral rock (LR.LLR.F.Fves) (Level 5)	A1.3131	0.6	1.2	52.2455172	-4.2631917	52.2458689	-4.2641824	Boulders & cobbles	<i>Littorina littorea</i> , <i>Littorina saxatilis</i> , <i>Patella vulgata</i> , <i>Steromphala cineraria</i> , <i>Halichondria</i> sp., <i>Sabellaria alveolata</i>	<i>Fucus vesiculosus</i> , <i>Corallina officinalis</i> , <i>Enteromorpha intestinalis</i> , Coralline crust.
2	<i>Sabellaria alveolata</i> reefs on sand-abraded eu littoral rock (LS.LBR.Sab.Salv) (Level 5)	A2.711	1.2	2	52.2458689	-4.2641824	52.2461623	-4.2648738	Bedrock & boulders	<i>Sabellaria alveolata</i> , <i>Littorina littorea</i> , <i>Patella vulgata</i> , <i>Symphodus melops</i> , <i>Halichondria</i> sp., <i>Carcinus maenas</i> , <i>Steromphala umbilicalis</i> , <i>Littorina saxatilis</i>	<i>Fucus vesiculosus</i> , <i>Corallina officinalis</i> , Coralline crust.
3	<i>Fucus vesiculosus</i> on moderately exposed to sheltered mid eu littoral rock (LR.LLR.F.Fves) (Level 5) and <i>Sabellaria alveolata</i> reefs on sand-abraded eu littoral rock (LS.LBR.Sab.Salv) (Level 5) mosaic	A1.3131 & A2.711	2	2.5	52.2461623	-4.2648738	52.2462733	-4.2651570	Bedrock, boulders & sand	<i>Sabellaria alveolata</i> , <i>Spirobranchus</i> sp., <i>Littorina littorea</i> , <i>Patella vulgata</i> , <i>Halichondria</i> sp., Cirripedia, <i>Steromphala umbilicalis</i> , <i>Sabellaria alveolata</i> , <i>Nucella lapillus</i> , <i>Littorina saxatilis</i>	<i>Fucus vesiculosus</i> , <i>Corallina officinalis</i> , Coralline crust, <i>Chondrus crispus</i> , <i>Mastocarpus stellatus</i> , <i>Enteromorpha intestinalis</i>
4	<i>Fucus vesiculosus</i> on moderately exposed to sheltered mid eu littoral rock (LR.LLR.F.Fves) (Level 5)	A1.3131	2.5	2.6	52.2462733	-4.2651570	52.2463290	-4.2652920	Bedrock, boulders & cobbles	<i>Spirobranchus</i> sp., <i>Littorina littorea</i> , <i>Patella vulgata</i> , <i>Nucella lapillus</i> , <i>Steromphala umbilicalis</i> , Cirripedia.	<i>Fucus vesiculosus</i> , <i>Corallina officinalis</i> , Coralline crust, <i>Mastocarpus stellatus</i> , <i>Enteromorpha intestinalis</i>
5	Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) (Level 5)	A3.116	2.6	3.1	52.2463290	-4.2652920	52.2464256	-4.2654803	Bedrock, boulders & cobbles	<i>Spirobranchus</i> sp., <i>Littorina littorea</i> , <i>Patella vulgata</i> , <i>Steromphala umbilicalis</i> , Cirripedia.	<i>Fucus vesiculosus</i> , <i>Mastocarpus stellatus</i> , <i>Corallina officinalis</i> , Coralline crust, <i>Chondrus crispus</i> , <i>Vertebrata fucoides</i> , <i>Heterosiphonia plumosa</i> , rhodophyta film (Lithothamnion?), <i>Laminaria</i> sp.
6	<i>Fucus serratus</i> on full salinity lower eu littoral mixed substrata (Level 6) (LR.LLR.F.Fserr.X)	A1.3152	3.1	3.2	52.2464256	-4.2654803	52.2464970	-4.2656821	Bedrock, boulders & cobbles	<i>Spirobranchus</i> sp., <i>Littorina littorea</i> , <i>Patella vulgata</i> , <i>Steromphala umbilicalis</i> , Cirripedia, <i>Electra pilosa</i>	<i>Fucus serratus</i> , <i>Chondrus crispus</i> , <i>Mastocarpus stellatus</i> , <i>Laminaria digitata</i> , <i>Heterosiphonia plumosa</i>
7	<i>Fucus serratus</i> on full salinity lower eu littoral mixed substrata (Level 6) (LR.LLR.F.Fserr.X) and <i>Laminaria digitata</i> on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig) (Level 6) mosaic	A1.3152 & A3.2111	3.2	3.7	52.2464970	-4.2656821	52.2465721	-4.2658365	Bedrock, boulders & cobbles	Spiorbidae, <i>Electra pilosa</i> , <i>Spirobranchus</i> sp.	<i>Fucus serratus</i> , <i>Laminaria digitata</i> , <i>Palmaria palmata</i> , Coralline crust, <i>Chondrus crispus</i> , <i>Heterosiphonia plumosa</i>

Zone	Designated Biotope	EUNIS Biotope	Start Depth (m)	End Depth (m)	Start Lat	Start Long	End Lat	End Long	Substrate Type	Fauna Present	Key Algae Present
8	Laminaria digitata on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig) (Level 6) mosaic	A3.2111	3.7	4.8	52.2465721	-4.2658365	52.2471232	-4.2669774	Bedrock, boulders, cobbles & gravel	Spiorbidae, <i>Electra pilosa</i> , <i>Spirobranchus</i> sp., <i>Littorina littorea</i> , <i>Symphodus melops</i> , <i>Actinia equina</i> , <i>Symphodus melops</i> (juv.), <i>Halichondria</i> sp.,	<i>Laminaria digitata</i> , <i>Palmaria palmata</i> , Coralline crust, <i>Chondrus crispus</i> , <i>Fucus serratus</i> , <i>Heterosiphonia plumosa</i> , Rhodophyta film ( <i>Lithothamnion</i> sp.), <i>Dilsea carnosa</i> , <i>Chorda filum</i> , <i>Mastocarpus stellatus</i> .
9	Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR) (Level 5)	A3.116	4.8	7.8	52.2471232	-4.2669774	52.2477571	-4.2684237	Bedrock, boulders, cobbles & gravel	Spiorbidae, <i>Electra pilosa</i> , <i>Spirobranchus</i> sp., <i>Halichondria</i> sp., <i>Steromphala</i> sp., <i>Necora puber</i> , <i>Symphodus melops</i> , <i>Obelia</i> , <i>Aglaophenia pluma</i> , <i>Ostyichthys</i>	<i>Mastocarpus stellatus</i> , <i>Palmaria palmata</i> , Coralline crust, <i>Chondrus crispus</i> , <i>Laminaria digitata</i> , <i>Heterosiphonia plumosa</i> , rhodophyta film ( <i>Lithothamnion</i> sp.), <i>Dilsea carnosa</i> , <i>Chorda filum</i> , <i>Fucus serratus</i> , <i>Halidrys siliquosa</i> , <i>Polyides rotundus</i> .

**Appendix 3.** Faunal presence and absence matrix from ROV video footage analysis taken at Aberaeron in 2019.

Taxon Name	T1 zone 1 (A3.116)	T1 zone 2 (A3.2111 & A3.116)	T1 zone 3 (A3.116)	T2 zone 1 (A3.127)	T2 zone 2 (A3.127 & A2.711)	T2 zone 3 (A3.127)	T2 zone 4 (A3.116)
Actiniaria sp	1	0	0	0	0	0	0
Anemonia viridis	1	1	1	0	0	0	0
Actinia equina	1	0	0	0	1	0	0
Asciacea	1	0	0	1	0	0	0
Porifera	1	0	1	0	0	0	0
Halichondria sp.	1	0	1	1	0	1	1
Electra pilosa	1	1	1	1	1	1	1
Hydrozoa	0	0	1	0	1	0	0
Membranipora membranacea	0	1	0	0	0	0	0
Aglaophenia pluma	0	0	1	0	0	0	0
Sabellaria	0	0	0	0	0	0	1
Sabellaria alveolata	0	0	0	0	0	0	0
Spirobranchus	1	1	1	1	1	1	1
Sporobidae	0	1	0	0	0	0	1
Osteichthyes	0	0	1	1	0	0	0
Scyliorhinus canicula	1	1	1	0	0	0	0
Symphodus melops	1	0	1	1	1	1	0
Ctenolabrus rupestris	1	1	1	0	1	0	0
Patella vulgata	0	0	0	1	1	0	0
Littorina littorea	0	0	0	0	1	1	1
Steromphala cineraria	0	1	1	1	0	0	0
Steromphala umbilicalis	1	0	0	0	0	1	0
Calliostoma ziziphinum	0	0	0	0	0	0	0
Cancer pagurus	1	0	0	0	0	0	0
Necora puber	1	0	1	0	0	0	0
Homarus gammarus	0	0	1	0	0	0	0
Cirripedia spp.	1	1	1	0	0	0	0
Obelia	0	0	0	1	0	0	0
Sabellaria spinulosa	0	0	0	1	0	0	0
Urticina felina	0	0	0	1	0	0	0
Carcinus meanas	0	0	0	0	1	0	0
Gobius	0	0	0	0	0	0	0
Gastropoda	0	0	0	0	0	0	0
Pododesmus patelliformis	0	0	0	0	0	0	0
Hyperoplus sp.	0	0	0	0	0	0	0
Atherina sp.	0	0	0	0	0	0	0
Nucella lapillus	0	0	0	0	0	0	0
Lanice conchilega	0	0	0	0	0	0	0
Pleuronectes platessa	0	0	0	0	0	0	0
Dicentrachus labrax	0	0	0	0	0	0	0
Arenicola marina	0	0	0	0	0	0	0
Steromphala sp.	0	0	0	0	0	0	0
Buccinum eggs	0	0	0	0	0	0	0
Hyas sp.	0	0	0	0	0	0	0
Axinella sp.	0	0	0	0	0	0	0
Littorina saxatilis	0	0	0	0	0	0	0

Taxon Name	T2 zone 5 (A3.2111 & A1.3151)	T2 zone 6 (A1.3151)	T2 zone 7 (A3.116)	T2 zone 8 (A3.2111)	T2 zone 9 (A3.2111 & A1.3151)	T2 zone 10 (A1.3151)	T3 zone 1 (A2.711 & A1.3132)
Actiniaria sp	0	0	0	0	0	0	0
Anemonia viridis	0	0	0	0	0	0	0
Actinia equina	0	0	0	0	0	0	0
Asciacea	0	0	0	0	0	0	0
Porifera	0	0	0	0	0	0	0
Halichondria sp.	0	0	0	0	0	0	0
Electra pilosa	1	1	0	0	1	1	0
Hydrozoa	0	0	0	0	0	0	0
Membranipora membranacea	0	0	0	0	0	0	0
Aglaophenia pluma	0	0	0	0	0	0	0
Sabellaria	0	0	0	0	0	0	0
Sabellaria alveolata	0	0	0	0	0	0	1
Spirobranchus	1	1	1	1	1	1	1
Spirobidae	1	1	1	1	1	1	0
Osteichthyes	0	0	0	0	0	0	0
Scyliorhinus canicula	0	1	0	1	0	0	0
Symphodus melops	0	0	1	0	1	4	1
Ctenolabrus rupestris	0	0	0	0	1	0	0
Patella vulgata	0	0	1	0	0	0	1
Littorina littorea	1	0	1	1	0	0	1
Steromphala cineraria	0	0	0	0	0	1	1
Steromphala umbilicalis	0	1	1	1	1	1	1
Calliostoma ziziphinum	1	0	0	0	0	0	0
Cancer pagurus	0	0	0	0	0	0	0
Necora puber	0	0	0	0	0	0	0
Homarus gammarus	0	0	0	0	0	0	0
Cirripedia spp.	0	0	0	0	0	0	1
Obelia	0	0	0	0	0	0	0
Sabellaria spinulosa	0	0	0	0	0	0	0
Urticina felina	0	0	0	0	0	0	0
Carcinus meanas	0	0	0	0	0	0	1
Gobius	0	0	0	0	1	0	0
Gastropoda	0	0	0	0	0	1	0
Pododesmus patelliformis	0	0	0	0	0	1	0
Hyperoplus sp.	0	0	0	0	0	0	0
Atherina sp.	0	0	0	0	0	0	0
Nucella lapilus	0	0	0	0	0	0	0
Lanice conchilega	0	0	0	0	0	0	0
Pleuronectes platessa	0	0	0	0	0	0	0
Dicentrachus labrax	0	0	0	0	0	0	0
Arenicola marina	0	0	0	0	0	0	0
Steromphala sp.	0	0	0	0	0	0	0
Buccinum eggs	0	0	0	0	0	0	0
Hyas sp.	0	0	0	0	0	0	0
Axinella sp.	0	0	0	0	0	0	0
Littorina saxatilis	0	0	0	0	0	0	0

Taxon Name	T3 zone 2 (A1.3132 & A1.1221)	T3 zone 3 (A2.711 & A1.3132)	T3 zone 4 (A1.125)	T3 zone 5 (A1.2)	T3 zone 6 (A1.3132)	T3 zone 7 (A1.2)	T3 zone 8 (A2.821 & A2.2)
Actiniaria sp	0	0	1	0	0	0	0
Anemonia viridis	0	0	0	0	0	0	0
Actinia equina	0	0	0	0	0	0	0
Asciacea	0	0	0	0	0	0	0
Porifera	0	0	0	0	0	0	0
Halichondria sp.	0	0	0	0	0	0	0
Electra pilosa	0	0	0	0	0	0	0
Hydrozoa	0	0	0	0	0	0	0
Membranipora membranacea	0	0	0	0	0	0	0
Aglaophenia pluma	0	0	0	0	0	0	0
Sabellaria	0	0	0	0	0	0	0
Sabellaria alveolata	0	1	0	0	0	0	1
Spirobranchus	0	0	0	0	0	0	0
Spirobidae	0	0	0	0	0	0	0
Osteichthyes	0	0	0	0	0	0	1
Scyliorhinus canicula	0	0	0	0	0	0	0
Symphodus melops	0	0	0	0	0	0	1
Ctenolabrus rupestris	0	0	0	0	0	0	0
Patella vulgata	1	1	1	0	0	0	0
Littorina littorea	1	1	0	1	1	1	1
Steromphala cineraria	1	1	1	0	0	0	0
Steromphala umbilicalis	1	1	1	0	1	0	1
Calliostoma ziziphinum	0	0	0	0	0	0	0
Cancer pagurus	0	0	0	0	0	0	0
Necora puber	0	0	0	0	0	0	0
Homarus gammarus	0	0	0	0	0	0	0
Cirripedia spp.	0	1	1	1	1	1	1
Obelia	0	0	0	0	0	0	0
Sabellaria spinulosa	0	0	0	0	0	0	0
Urticina felina	0	0	0	0	0	0	0
Carcinus meanas	1	0	0	0	0	1	1
Gobius	0	0	0	0	0	0	0
Gastropoda	0	0	0	0	0	0	0
Pododesmus patelliformis	0	0	0	0	0	0	0
Hyperoplus sp.	0	1	1	0	0	0	0
Atherina sp.	0	1	0	0	0	0	0
Nucella lapilus	0	0	1	1	1	0	0
Lanice conchilega	0	0	0	0	0	0	0
Pleuronectes platessa	0	0	0	0	0	0	0
Dicentrachus labrax	0	0	0	0	0	0	0
Arenicola marina	0	0	0	0	0	0	0
Steromphala sp.	0	0	0	0	0	0	0
Buccinum eggs	0	0	0	0	0	0	0
Hyas sp.	0	0	0	0	0	0	0
Axinella sp.	0	0	0	0	0	0	0
Littorina saxatilis	0	0	0	0	0	0	0

Taxon Name	T3 zone 9 (A1.3132)	T3 zone 10 (A2.821 & A2.2)	T3 zone 11 (A2.711 & A2.821)	T3 zone 12 (A2.2)	T3 zone 13 (A1.3152 & A2.2)	T3 zone 14 (A1.3152)	T3 zone 15 (A1.3152 & A2.2)
Actiniaria sp	0	0	0	0	0	0	0
Anemonia viridis	0	0	0	0	0	0	0
Actinia equina	0	0	0	0	0	0	0
Ascidacea	0	0	0	0	0	0	0
Porifera	0	0	0	0	0	0	0
Halichondria sp.	0	0	0	0	0	0	0
Electra pilosa	0	0	0	0	1	1	1
Hydrozoa	0	0	0	0	0	0	0
Membranipora membranacea	0	0	0	0	0	0	0
Aglaophenia pluma	0	0	0	0	0	0	0
Sabellaria	0	0	0	0	0	0	0
Sabellaria alveolata	0	1	1	0	1	1	0
Spirobranchus	0	0	0	0	1	0	0
Spirobidae	0	0	0	1	1	1	1
Osteichthyes	0	0	1	0	0	0	0
Scyliorhinus canicula	0	0	0	0	0	0	0
Symphodus melops	0	1	1	0	0	1	0
Ctenolabrus rupestris	0	0	0	0	0	0	0
Patella vulgata	0	0	0	0	1	1	1
Littorina littorea	0	0	0	0	0	0	0
Steromphala cineraria	0	0	0	0	0	0	0
Steromphala umbilicalis	0	0	0	0	0	0	0
Calliostoma ziziphinum	0	0	0	0	0	0	0
Cancer pagurus	0	0	0	0	0	0	0
Necora puber	0	0	0	0	1	0	0
Homarus gammarus	0	0	0	0	0	0	0
Cirripedia spp.	0	0	0	0	0	0	0
Obelia	0	0	0	0	0	0	0
Sabellaria spinulosa	0	0	0	0	0	0	0
Urticina felina	0	0	0	0	0	0	0
Carcinus meanas	0	0	0	0	0	0	0
Gobius	0	0	0	0	0	0	0
Gastropoda	0	0	0	0	0	0	0
Pododesmus patelliformis	0	0	0	0	0	0	0
Hyperoplus sp.	0	0	0	0	0	0	0
Atherina sp.	0	0	0	0	0	0	0
Nucella lapilus	0	0	0	0	0	0	0
Lanice conchilega	0	0	0	1	0	0	0
Pleuronectes platessa	0	0	0	0	1	0	0
Dicentrachus labrax	0	0	0	0	0	1	0
Arenicola marina	0	0	0	0	0	0	0
Steromphala sp.	0	0	0	0	0	0	0
Buccinum eggs	0	0	0	0	0	0	0
Hyas sp.	0	0	0	0	0	0	0
Axinella sp.	0	0	0	0	0	0	0
Littorina saxatilis	0	0	0	0	0	0	0

Taxon Name	T3 zone 16 (A2.2)	T3 zone 17 (A1.3152 & A2.2)	T4 zone 1 (A2.821 & A2.2)	T4 zone 2 (A2.2)	T4 zone 3 (A3.127)	T4 zone 4 (A2.2)	T4 zone 5 (A3.127)
Actinaria sp	0	0	0	0	0	0	0
Anemonia viridis	0	0	0	0	0	0	0
Actinia equina	0	0	0	0	0	0	0
Asciacea	0	0	0	0	0	0	0
Porifera	0	0	0	0	0	0	1
Halichondria sp.	0	0	0	0	0	0	0
Electra pilosa	0	1	0	0	1	0	0
Hydrozoa	0	0	0	0	0	0	0
Membranipora membranacea	0	0	0	0	0	0	0
Aglaophenia pluma	0	0	0	0	0	0	0
Sabellaria	0	0	0	0	0	0	1
Sabellaria alveolata	0	0	1	0	0	0	1
Spirobranchus	0	0	0	0	1	0	1
Spirobidae	0	0	0	0	0	0	0
Osteichthyes	0	0	0	0	0	0	0
Scyliorhinus canicula	0	0	0	0	0	0	0
Symphodus melops	0	1	0	0	0	0	1
Ctenolabrus rupestris	0	0	0	0	0	0	0
Patella vulgata	0	0	0	0	0	0	1
Littorina littorea	0	0	0	0	0	0	0
Steromphala cineraria	0	0	0	0	0	0	0
Steromphala umbilicalis	0	0	0	0	0	0	0
Calliostoma ziziphinum	0	0	0	0	0	0	0
Cancer pagurus	0	0	0	0	0	0	0
Necora puber	0	0	0	0	0	0	1
Homarus gammarus	0	0	0	0	0	0	0
Cirripedia spp.	0	0	0	0	0	0	0
Obelia	0	0	0	0	0	0	0
Sabellaria spinulosa	0	0	0	0	0	0	0
Urticina felina	0	0	0	0	0	0	0
Carcinus meanas	0	0	0	0	0	0	0
Gobius	0	0	0	0	0	0	0
Gastropoda	0	0	0	0	0	0	0
Pododesmus patelliformis	0	0	0	0	0	0	0
Hyperoplus sp.	0	0	0	0	0	0	0
Atherina sp.	0	0	0	0	0	0	0
Nucella lapillus	0	0	0	0	0	0	0
Lanice conchilega	0	0	0	0	0	0	0
Pleuronectes platessa	0	0	0	0	0	0	0
Dicentrachus labrax	0	0	0	0	0	0	0
Arenicola marina	0	0	0	0	0	0	1
Steromphala sp.	0	0	0	0	0	0	0
Buccinum eggs	0	0	0	0	0	0	0
Hyas sp.	0	0	0	0	0	0	0
Axinella sp.	0	0	0	0	0	0	0
Littorina saxatilis	0	0	0	0	0	0	0

Taxon Name	T4 zone 6 (A3.116 & A3.127)	T4 zone 7 (A3.116)	T5 zone 1 (A2.821)	T5 zone 2 (A2.2 & A2.821)	T5 zone 3 (A2.2)	T5 zone 4 (A3.127)	T5 zone 5 (A3.116)
Actiniaria sp	0	0	0	0	0	0	0
Anemonia viridis	1	1	0	0	0	0	1
Actinia equina	0	0	0	0	0	0	0
Asciacea	0	0	0	0	0	0	0
Porifera	0	0	0	0	0	0	0
Halichondria sp.	1	1	0	0	0	0	1
Electra pilosa	1	1	0	0	0	0	1
Hydrozoa	0	0	0	0	0	0	0
Membranipora membranacea	0	0	0	0	0	0	0
Aglaophenia pluma	0	0	0	0	0	0	0
Sabellaria	0	0	0	0	0	0	0
Sabellaria alveolata	1	0	0	0	0	0	0
Spirobranchus	1	1	0	0	0	1	1
Spirobidae	0	0	0	0	0	0	0
Osteichthyes	0	0	0	1	0	0	0
Scyliorhinus canicula	0	0	0	0	0	0	0
Symphodus melops	1	1	0	1	0	0	1
Ctenolabrus rupestris	0	0	0	0	0	0	0
Patella vulgata	0	0	0	0	0	0	0
Littorina littorea	0	0	0	1	0	1	1
Steromphala cineraria	0	0	0	0	0	0	0
Steromphala umbilicalis	0	0	0	0	0	0	1
Calliostoma ziziphinum	0	0	0	0	0	0	0
Cancer pagurus	0	0	0	0	0	0	1
Necora puber	0	0	0	1	0	0	1
Homarus gammarus	0	0	0	0	0	0	0
Cirripedia spp.	0	0	0	0	0	0	0
Obelia	1	1	0	0	0	0	1
Sabellaria spinulosa	0	0	0	0	0	0	0
Urticina felina	0	0	0	0	0	0	0
Carcinus meanas	0	0	0	0	0	1	0
Gobius	0	0	0	0	0	0	1
Gastropoda	0	0	0	0	0	0	0
Pododesmus patelliformis	0	0	0	0	0	0	0
Hyperoplus sp.	0	0	0	0	0	0	0
Atherina sp.	0	0	0	0	0	0	0
Nucella lapilus	0	0	0	0	0	0	0
Lanice conchilega	0	0	0	0	0	0	0
Pleuronectes platessa	0	0	0	0	0	0	0
Dicentrachus labrax	0	0	0	0	0	0	0
Arenicola marina	0	0	0	0	1	1	0
Steromphala sp.	1	0	0	0	0	0	0
Buccinum eggs	1	0	0	0	0	0	0
Hyas sp.	0	0	0	0	0	0	1
Axinella sp.	0	0	0	0	0	0	0
Littorina saxatilis	0	0	0	0	0	0	0

Taxon Name	T6 zone 1 (A2.711)	T6 zone 2 (A1.125)	T6 zone 3 (A1.3152)	T6 zone 4 (A1.125)	T6 zone 5 (A3.2111)	T6 zone 6 (A1.125)	T6 zone 7 (A3.127 & A1.125)
Actiniaria sp	0	0	0	0	0	0	0
Anemonia viridis	0	0	0	0	0	0	0
Actinia equina	0	0	0	0	1	0	1
Asciacea	0	0	0	0	0	0	0
Porifera	0	0	0	0	0	0	0
Halichondria sp.	0	0	0	0	0	1	1
Electra pilosa	0	0	1	0	0	1	1
Hydrozoa	0	0	0	0	0	0	0
Membranipora membranacea	0	0	0	0	0	0	0
Aglaophenia pluma	0	0	0	0	0	0	0
Sabellaria	0	0	0	0	0	0	0
Sabellaria alveolata	1	1	1	0	0	0	0
Spirobranchus	1	1	1	1	1	1	1
Spirobidae	0	0	0	1	1	0	0
Osteichthyes	0	0	0	0	0	0	0
Scyliorhinus canicula	0	0	0	0	0	0	0
Symphodus melops	1	0	1	0	1	1	1
Ctenolabrus rupestris	0	0	0	0	0	0	0
Patella vulgata	1	1	1	1	1	0	0
Littorina littorea	1	1	1	0	0	0	0
Steromphala cineraria	1	0	0	0	0	0	0
Steromphala umbilicalis	1	1	1	0	1	0	0
Calliostoma ziziphinum	0	0	0	0	0	0	0
Cancer pagurus	0	0	0	0	0	0	0
Necora puber	1	0	0	0	0	0	0
Homarus gammarus	0	0	0	0	0	0	0
Cirripedia spp.	0	0	1	0	0	0	0
Obelia	0	0	0	0	0	1	1
Sabellaria spinulosa	0	0	0	0	0	0	0
Urticina felina	0	0	0	0	0	0	0
Carcinus meanas	0	0	0	0	0	0	0
Gobius	0	0	0	0	0	0	0
Gastropoda	0	0	0	0	0	0	0
Pododesmus patelliformis	0	0	0	0	0	0	0
Hyperoplus sp.	0	0	0	0	0	0	0
Atherina sp.	0	0	0	0	0	0	0
Nucella lapilus	0	0	0	0	0	0	0
Lanice conchilega	0	0	0	0	0	0	0
Pleuronectes platessa	0	0	0	0	0	0	0
Dicentrachus labrax	0	0	0	0	0	0	0
Arenicola marina	1	0	0	0	0	0	0
Steromphala sp.	0	0	0	0	0	1	0
Buccinum eggs	0	0	0	0	0	0	0
Hyas sp.	0	0	0	0	0	0	0
Axinella sp.	0	0	0	0	0	0	1
Littorina saxatilis	0	0	0	0	0	0	0

Taxon Name	T6 zone 8 (A3.127 & A3.116)	T7 zone 1 (A1.3131)	T7 zone 2 (A2.711)	T7 zone 3 (A1.3131 & A2.711)	T7 zone 4 (A1.3131)	T7 zone 5 (A3.116)	T7 zone 6 (A1.3152)
Actiniaria sp	0	0	0	0	0	0	0
Anemonia viridis	0	0	0	0	0	0	0
Actinia equina	0	0	0	0	0	0	0
Asciacea	0	0	0	0	0	0	0
Porifera	1	0	0	0	0	0	0
Halichondria sp.	1	1	1	1	0	0	0
Electra pilosa	1	0	0	0	0	0	1
Hydrozoa	0	0	0	0	0	0	0
Membranipora membranacea	0	0	0	0	0	0	0
Aglaophenia pluma	0	0	0	0	0	0	0
Sabellaria	0	0	0	0	0	0	0
Sabellaria alveolata	0	1	1	1	0	0	0
Spirobranchus	1	0	0	1	1	1	1
Spirobidae	0	0	0	0	0	0	0
Osteichthyes	1	0	0	0	0	0	0
Scyliorhinus canicula	0	0	0	0	0	0	0
Symphodus melops	1	0	1	0	0	0	0
Ctenolabrus rupestris	0	0	0	0	0	0	0
Patella vulgata	0	1	1	1	1	1	1
Littorina littorea	0	1	1	1	1	1	1
Steromphala cineraria	0	1	0	0	0	0	0
Steromphala umbilicalis	0	0	1	1	1	1	1
Calliostoma ziziphinum	0	0	0	0	0	0	0
Cancer pagurus	0	0	0	0	0	0	0
Necora puber	0	0	0	0	0	0	0
Homarus gammarus	0	0	0	0	0	0	0
Cirripedia spp.	0	0	0	1	1	1	1
Obelia	1	0	0	0	0	0	0
Sabellaria spinulosa	1	0	0	0	0	0	0
Urticina felina	0	0	0	0	0	0	0
Carcinus meanas	0	0	1	0	0	0	0
Gobius	0	0	0	0	0	0	0
Gastropoda	0	0	0	0	0	0	0
Pododesmus patelliformis	0	0	0	0	0	0	0
Hyperoplus sp.	0	0	0	0	0	0	0
Atherina sp.	0	0	0	0	0	0	0
Nucella lapilus	0	0	0	1	1	0	0
Lanice conchilega	0	0	0	0	0	0	0
Pleuronectes platessa	0	0	0	0	0	0	0
Dicentrachus labrax	0	0	0	0	0	0	0
Arenicola marina	0	0	0	0	0	0	0
Steromphala sp.	0	0	0	0	0	0	0
Buccinum eggs	0	0	0	0	0	0	0
Hyas sp.	0	0	0	0	0	0	0
Axinella sp.	0	0	0	0	0	0	0
Littorina saxatilis	0	1	1	1	0	0	0

Taxon Name	T7 zone 7 (A1.3152 & A3.2111)	T7 zone 8 (A3.2111)	T7 zone 9 (A3.116)
Actiniaria sp	0	0	0
Anemonia viridis	0	0	0
Actinia equina	0	1	0
Asciacea	0	0	0
Porifera	0	0	0
Halichondria sp.	0	1	1
Electra pilosa	1	1	1
Hydrozoa	0	0	0
Membranipora membranacea	0	0	0
Aglaophenia pluma	0	0	1
Sabellaria	0	0	0
Sabellaria alveolata	0	0	0
Spirobranchus	1	1	1
Sporobidae	1	1	1
Osteichthyes	0	0	1
Scyliorhinus canicula	0	0	0
Symphodus melops	0	1	1
Ctenolabrus rupestris	0	0	0
Patella vulgata	0	0	0
Littorina littorea	0	1	0
Steromphala cineraria	0	0	0
Steromphala umbilicalis	0	0	0
Calliostoma ziziphinum	0	0	0
Cancer pagurus	0	0	0
Necora puber	0	0	1
Homarus gammarus	0	0	0
Cirripedia spp.	0	0	0
Obelia	0	0	1
Sabellaria spinulosa	0	0	0
Urticina felina	0	0	0
Carcinus meanas	0	0	0
Gobius	0	0	0
Gastropoda	0	0	0
Pododesmus patelliformis	0	0	0
Hyperoplus sp.	0	0	0
Atherina sp.	0	0	0
Nucella lapillus	0	0	0
Lanice conchilega	0	0	0
Pleuronectes platessa	0	0	0
Dicentrachus labrax	0	0	0
Arenicola marina	0	0	0
Steromphala sp.	0	0	1
Buccinum eggs	0	0	0
Hyas sp.	0	0	0
Axinella sp.	0	0	0
Littorina saxatilis	0	0	0

**Appendix 4.** Faunal and algae SACFOR abundance matrix from ROV stills analysis taken at Aberaeron in 2019. S = Superabundant, A = Abundant, C = Common, F = Frequent, O = Occasional, R = Rare (as per JNCC & Turner et al., 2016)

Taxon Name	Aphia ID	T1 Zone 1 (A3.116)	T1 Zone 2 (A3.2111 & A3.116)	T1 Zone 3 (A3.116)	T2 zone 1 (A3.127)	T2 zone 2 (A3.127 & A2.711)
Porifera	558	-	-	-	-	-
Hydrozoa	1337	-	-	-	-	-
Aglaophenia pluma	117283	-	-	-	-	-
Bryozoa	146142	F	R	C	R	-
Spirorbis	129642	-	-	-	-	-
Spirobranchus	129582	-	A	C	C	C
Sabellaria alveolata	130866	-	-	-	F	-
Cirripedia	1082	-	-	-	-	-
Brachyura	106673	-	-	-	-	-
Cancer pagurus	107276	-	-	-	-	-
Gastropoda	101	-	-	-	-	-
Patella vulgata	140685	-	-	-	-	-
Steromphala	576164	-	-	-	-	-
Steromphala umbilicalis	1039850	-	-	-	-	-
Littorina littorea	140262	-	-	-	-	-
Nucella lapillus	140403	-	-	-	-	-
Labridae	125541	-	-	-	-	-
Scyliorhinus canicula	105814	-	-	-	-	-
Rhodophyta	852	S	A	A	A	A
Chlorophyta	801	-	-	-	-	-
Phaeophyceae	830	-	-	-	R	-
Laminaria	144199	-	-	-	-	-
Halidrys	144127	-	-	C	C	-
Chorda	144197	-	-	-	-	-
Fucus	144129	-	-	-	-	-

Taxon Name	T2 zone 3 (A3.127)	T2 zone 4 (A3.116)	T2 zone 5 (A3.2111 & A1.3151)	T2 zone 6 (A3.116)	T2 zone 7 (A3.116)	T2 zone 8 (A3.2111 & A1.3151)
Porifera	-	-	-	-	-	-
Hydrozoa	-	-	-	-	-	-
Aglaophenia pluma	-	-	-	-	-	-
Bryozoa	-	-	R	-	-	-
Spirorbis	-	-	-	-	-	-
Spirobranchus	C	C	-	-	C	A
Sabellaria alveolata	-	-	-	-	-	-
Cirripedia	-	-	-	-	-	-
Brachyura	-	-	-	-	-	-
Cancer pagurus	-	-	-	-	-	-
Gastropoda	-	-	-	-	-	-
Patella vulgata	-	-	-	-	-	-
Steromphala	-	-	O	-	-	-
Steromphala umbilicalis	-	-	-	-	-	-
Littorina littorea	-	-	-	-	-	-
Nucella lapillus	-	-	-	-	-	-
Labridae	-	-	-	-	-	A
Scyliorhinus canicula	-	-	-	-	-	A
Rhodophyta	A	A	O	C	A	C
Chlorophyta	-	-	-	-	A	-
Phaeophyceae	-	-	-	-	-	-
Laminaria	-	A	O	-	-	A
Halidrys	-	-	-	-	-	-
Chorda	-	-	-	-	-	C
Fucus	-	C	S	S	F	-

Taxon Name	T2 zone 9 (A3.2111 & A1.3151)	T2 zone 10 (A3.3151)	T3 zone 1 A2.711 & A1.3132	T3 zone 2 A1.3132 & A1.1221	T3 zone 3 A2.711 & A1.3132	T3 zone 4 (A1.125)
Porifera	-	-	-	-	R	-
Hydrozoa	-	-	-	-	-	-
Aglaophenia pluma	-	-	-	-	-	-
Bryozoa	R	R	-	R	-	-
Spirorbis	-	-	-	-	-	-
Spirobranchus	F	-	-	-	-	-
Sabellaria alveolata	-	-	S	-	S	-
Cirripedia	-	-	-	-	-	-
Brachyura	-	-	-	-	-	-
Cancer pagurus	-	-	-	-	-	-
Gastropoda	-	-	O	-	-	O
Patella vulgata	-	-	-	-	-	-
Steromphala	F	-	-	-	-	-
Steromphala umbilicalis	-	-	-	C	C	-
Littorina littorea	-	-	-	-	C	-
Nucella lapillus	-	-	-	-	-	-
Labridae	-	-	-	-	-	-
Scyliorhinus canicula	-	-	-	-	-	-
Rhodophyta	A	O	R	F	R	S
Chlorophyta	O	-	-	-	-	O
Phaeophyceae	-	-	-	O	-	-
Laminaria	O	-	-	-	-	-
Halidrys	-	-	-	-	-	-
Chorda	-	-	-	-	-	-
Fucus	A	A	A	F	A	R

Taxon Name	T3 zone 5 (A1.2)	T3 zone 6 (A1.3132)	T3 zone 7 (A1.2)	T3 zone 8 (A2.821 & A2.2)	T3 zone 9 (A1.3132)	T3 zone 10 (A2.821 & A2.2)
Porifera	-	-	-	-	-	-
Hydrozoa	-	-	-	-	-	-
Aglaophenia pluma	-	-	-	-	-	-
Bryozoa	-	-	-	-	-	-
Spirorbis	-	-	-	-	-	-
Spirobranchus	C	-	-	-	-	-
Sabellaria alveolata	-	-	-	-	-	-
Cirripedia	-	A	A	-	-	-
Brachyura	-	-	-	C	-	-
Cancer pagurus	-	-	-	-	-	-
Gastropoda	F	-	-	-	-	-
Patella vulgata	-	-	-	-	-	-
Steromphala	-	-	-	-	-	-
Steromphala umbilicalis	-	-	-	-	-	-
Littorina littorea	C	A	A	-	-	-
Nucella lapillus	-	F	-	-	-	-
Labridae	-	-	-	-	-	-
Scyliorhinus canicula	-	-	-	-	-	-
Rhodophyta	F	R	R	-	-	O
Chlorophyta	R	-	-	O	R	S
Phaeophyceae	-	-	-	-	-	-
Laminaria	-	-	-	-	-	-
Halidrys	-	-	-	-	-	-
Chorda	-	-	-	-	-	-
Fucus	R	R	R	-	A	-

Taxon Name	T3 zone 11 (A2.711 & A2.821)	T3 zone 12 (A2.2)	T3 zone 13 (A1.3152 & A2.2)	T3 zone 14 (A1.3152 & A2.2)	T3 zone 15 (A1.3152 & A2.2)	T3 zone 16 (A2.2)
Porifera	-	-	-	-	-	-
Hydrozoa	-	-	-	-	-	-
Aglaophenia pluma	-	-	-	-	-	-
Bryozoa	-	-	-	R	-	-
Spirorbis	-	-	-	-	-	-
Spirobranchus	-	-	-	-	-	-
Sabellaria alveolata	S	-	-	-	-	-
Cirripedia	-	-	-	-	-	-
Brachyura	-	-	-	-	-	-
Cancer pagurus	-	-	-	-	-	-
Gastropoda	-	-	-	-	-	-
Patella vulgata	-	-	-	-	-	-
Steromphala	-	-	-	-	-	-
Steromphala umbilicalis	-	-	-	-	-	-
Littorina littorea	-	-	-	-	-	-
Nucella lapillus	-	-	-	-	-	-
Labridae	-	-	-	-	-	-
Scyliorhinus canicula	-	-	-	-	-	-
Rhodophyta	F	-	O	A	F	-
Chlorophyta	S	-	R	O	-	-
Phaeophyceae	A	-	-	-	-	-
Laminaria	-	-	-	-	-	-
Halidrys	-	-	-	-	-	-
Chorda	-	-	-	-	-	-
Fucus	F	-	C	A	S	-

Taxon Name	T3 zone 17 (A1.3152 & A2.2)	T4 zone 1 (A2.821 & A2.2)	T4 zone 2 (A2.2)	T4 zone 3 (A3.127)	T4 zone 4 (A2.2)	T4 zone 5 (A3.127)
Porifera	-	-	-	-	-	-
Hydrozoa	-	-	-	-	-	-
Aglaophenia pluma	-	-	-	-	-	-
Bryozoa	-	-	-	-	-	-
Spirorbis	-	-	-	-	-	-
Spirobranchus	-	-	-	-	-	-
Sabellaria alveolata	-	-	-	-	-	-
Cirripedia	-	-	-	-	-	-
Brachyura	-	-	-	-	-	-
Cancer pagurus	-	-	-	-	-	-
Gastropoda	-	-	-	-	-	-
Patella vulgata	-	-	-	-	-	-
Steromphala	-	-	-	-	-	-
Steromphala umbilicalis	-	-	-	-	-	-
Littorina littorea	-	-	-	-	-	-
Nucella lapillus	-	-	-	-	-	-
Labridae	-	-	-	-	-	-
Scyliorhinus canicula	-	-	-	-	-	-
Rhodophyta	O	A	-	A	O	A
Chlorophyta	O	A	-	-	-	-
Phaeophyceae	-	-	-	-	-	-
Laminaria	-	-	-	-	-	-
Halidrys	-	-	-	-	-	-
Chorda	-	-	-	-	-	-
Fucus	O	-	-	-	-	-

Taxon Name	T4 zone 6 (A3.116 & A3.127)	T4 zone 7 (A3.116)	T5 zone 1 (A2.821)	T5 zone 2 (A2.2 & A2.821)	T5 zone 3 (A2.2)	T5 zone 4 (A3.127)
Porifera	-	-	-	-	-	-
Hydrozoa	-	-	-	-	-	-
Aglaophenia pluma	C	-	-	-	-	-
Bryozoa	-	R	-	-	-	-
Spirorbis	-	-	-	-	-	-
Spirobranchus	-	A	-	-	-	-
Sabellaria alveolata	-	-	-	-	-	-
Cirripedia	-	-	-	-	-	-
Brachyura	-	-	-	-	-	-
Cancer pagurus	-	-	-	-	-	-
Gastropoda	-	-	-	-	-	-
Patella vulgata	-	-	-	-	-	-
Steromphala	-	-	-	-	-	-
Steromphala umbilicalis	-	-	-	-	-	-
Littorina littorea	-	-	-	-	-	-
Nucella lapillus	-	-	-	-	-	-
Labridae	-	-	-	-	-	-
Scyliorhinus canicula	-	-	-	-	-	-
Rhodophyta	A	A	R	R	C	F
Chlorophyta	-	-	A	A	-	-
Phaeophyceae	-	-	-	-	-	-
Laminaria	-	-	-	-	-	-
Halidrys	F	R	-	-	-	A
Chorda	F	-	-	-	-	-
Fucus	-	-	-	-	-	-

<b>Taxon Name</b>	<b>T5 zone 5 (A3.116)</b>	<b>T6 zone 1 (A2.711)</b>	<b>T6 zone 2 (A1.125)</b>	<b>T6 zone 3 (A1.3152)</b>	<b>T6 zone 4 (A1.125)</b>	<b>T6 zone 5 (A3.2111)</b>
Porifera	-	-	-	-	-	-
Hydrozoa	-	-	-	-	-	-
Aglaophenia pluma	-	-	-	-	-	-
Bryozoa	R	-	-	-	R	R
Spirorbis	-	-	-	-	-	R
Spirobranchus	F	-	F	A	F	-
Sabellaria alveolata	-	S	-	-	-	-
Cirripedia	-	-	-	-	-	-
Brachyura	-	-	-	-	-	-
Cancer pagurus	C	-	-	-	-	-
Gastropoda	-	-	-	-	-	-
Patella vulgata	-	-	-	-	-	-
Steromphala	-	-	-	-	-	-
Steromphala umbilicalis	-	-	-	-	-	-
Littorina littorea	-	-	-	-	-	-
Nucella lapillus	-	-	-	-	-	-
Labridae	-	-	-	-	-	-
Scyliorhinus canicula	-	-	-	-	-	-
Rhodophyta	A	C	S	O	S	C
Chlorophyta	-	-	R	-	R	-
Phaeophyceae	O	-	-	-	-	-
Laminaria	-	-	-	-	F	A
Halidrys	-	-	-	-	-	-
Chorda	-	-	-	-	-	-
Fucus	-	C	-	S	F	O

<b>Taxon Name</b>	<b>T6 zone 6 (A1.125)</b>	<b>T6 zone 7 (A3.127 &amp; A1.125)</b>	<b>T6 zone 8 (A3.127 &amp; A3.116)</b>	<b>T7 zone 1 (A1.3131)</b>	<b>T7 zone 2 (A2.711)</b>	<b>T7 zone 3 (A1.3131 &amp; A2.711)</b>
Porifera	R	-	-	R	-	-
Hydrozoa	-	-	-	-	-	-
Aglaophenia pluma	-	-	-	-	-	-
Bryozoa	-	-	-	-	-	-
Spirorbis	-	-	-	-	-	-
Spirobranchus	-	-	O	C	A	-
Sabellaria alveolata	-	-	-	-	A	F
Cirripedia	-	-	-	-	-	-
Brachyura	-	-	-	-	-	-
Cancer pagurus	-	-	-	-	-	-
Gastropoda	-	-	-	F	-	-
Patella vulgata	-	-	-	-	-	-
Steromphala	-	-	-	-	-	-
Steromphala umbilicalis	-	-	-	-	-	A
Littorina littorea	-	-	-	-	-	-
Nucella lapillus	-	-	-	-	-	-
Labridae	-	-	-	-	-	-
Scyliorhinus canicula	-	-	-	-	-	-
Rhodophyta	S	S	A	-	-	F
Chlorophyta	-	-	-	-	-	O
Phaeophyceae	R	-	-	-	-	-
Laminaria	-	-	-	-	-	-
Halidrys	R	O	-	-	-	-
Chorda	-	-	C	-	-	-
Fucus	-	-	-	C	S	A

Taxon Name	T7 zone 4 (A1.3131)	T7 zone 5 (A3.116)	T7 zone 6 (A1.3152)	T7 zone 7 (A1.3152 & A3.2111)	T7 zone 8 (A3.2111)	T7 zone 9 (A3.116)
Porifera	-	-	-	-	-	-
Hydrozoa	-	F	-	-	-	-
Aglaophenia pluma	-	-	-	-	-	-
Bryozoa	-	-	-	-	-	R
Spirorbis	-	-	-	-	-	-
Spirobranchus	A	-	-	C	F	S
Sabellaria alveolata	-	-	-	-	-	-
Cirripedia	-	-	-	-	-	-
Brachyura	-	-	-	-	-	-
Cancer pagurus	-	-	-	-	-	-
Gastropoda	-	-	F	-	-	F
Patella vulgata	C	C	-	-	-	-
Steromphala	-	-	-	-	-	-
Steromphala umbilicalis	A	C	-	A	-	-
Littorina littorea	-	-	-	-	-	-
Nucella lapillus	-	-	-	-	-	-
Labridae	-	-	-	-	-	-
Scyliorhinus canicula	-	-	-	-	-	-
Rhodophyta	A	S	C	S	A	A
Chlorophyta	-	-	-	-	-	-
Phaeophyceae	-	R	-	-	-	-
Laminaria	-	-	C	-	O	O
Halidrys	-	-	-	-	-	-
Chorda	-	-	-	-	-	-
Fucus	C	-	S	R	-	-

**Appendix Plate 1.** Example of biotopes identified in the ROV imagery collected at Aberaeron in 2019.



**A1.125:** *Mastocarpus stellatus* and *Chondrus crispus* on very exposed to moderately exposed lower eu littoral rock (LR.HLR.FR.Mas)



**A1.2:** Moderate energy littoral rock (LR.MLR)



**A1.3131:** *Fucus vesiculosus* on moderately exposed to sheltered mid eu littoral rock (LR.LLR.F.Fves)



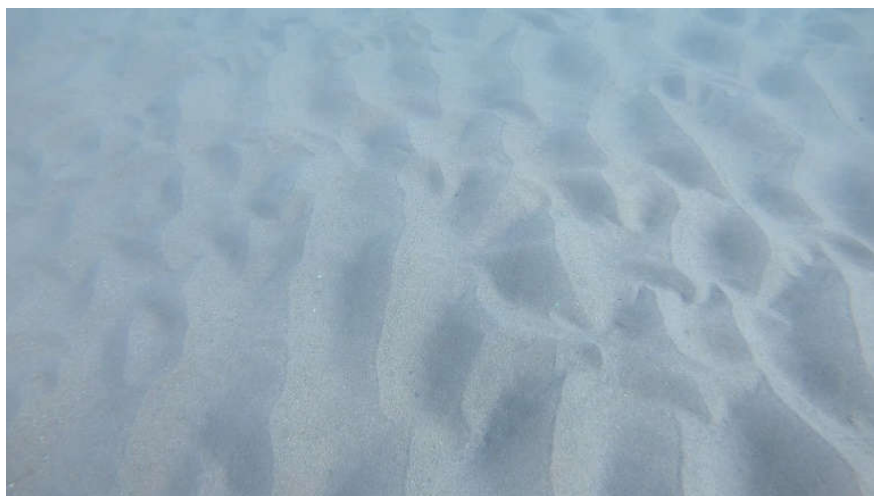
**A1.3132:** *Fucus vesiculosus* on mid eu littoral mixed substrata (LR.LLR.F.Fves.X)



**A1.3151:** *Fucus serratus* on full salinity sheltered lower eu littoral rock  
(LR.LLR.F.Fserr.FS)



**A1.3152:** *Fucus serratus* on full salinity lower eu littoral mixed substrata  
(LR.LLR.F.Fserr.X)



**A2.2:** Littoral sand (LS.Lsa)



**A2.711:** *Sabellaria alveolata* reefs on sand-abraded eu littoral rock  
(LS.LBR.Sab.Salv)



**A2.821:** Ephemeral green and red seaweeds on variable salinity and/or disturbed eu littoral mixed substrata (LR.FLR.Eph.EphX)



**A3.116:** Foliose red seaweeds on exposed lower infralittoral rock (IR.HIR.KFaR.FoR)



**A3.127:** *Polyides rotundus*, *Ahnfeltia plicata* and *Chondrus crispus* on sand-covered infralittoral rock (IR.HIR.KSed.ProtAhn)



**A3.2111:** *Laminaria digitata* on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig)

**Appendix Plate 2.** Contact sheet for ROV Stills collected at Aberaeron and analysed by Eco Marine in 2019.



T1 zone 1 A3.116



T1 zone 2 A3.2111 & A3.116



T1 zone 3 A3.116



T2 zone 1 A3.127



T2 zone 2 A3.127 & A2.711



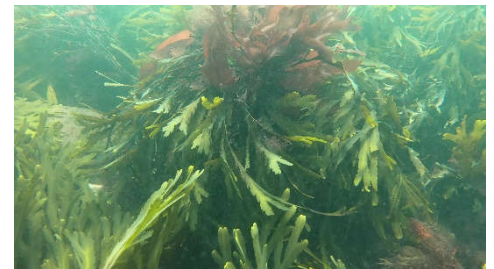
T2 zone 3 A3.127



T2 zone 4 A3.116



T2 zone 5 A3.2111 & A2.3151



T2 zone 6 A3.116



T2 zone 7 A3.116



T2 zone 8 A3.2111 & A1.3151



T2 zone 9 A3.2111 & A1.3151



T2 zone 10 A1.3151



T3 zone 1 A2.711 & A1.3132



T3 zone 2 A1.3132 & A1.1221



T3 zone 3 A2.711 & A1.3132



T3 zone 4 A1.125



T3 zone 5 A1.2



T3 zone 6 A1.3132



T3 zone 7 A1.2



T3 zone 8 A2.821 & A2.2



T3 zone 9 A1.3132



T3 zone 10 A2.821 & A2.2



T3 zone 11 A2.711 & A2.821



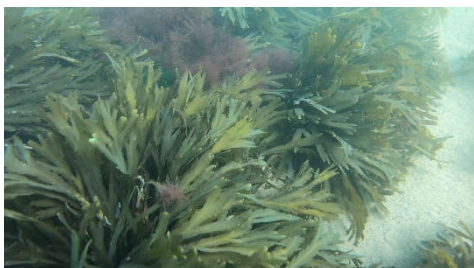
T3 zone 12 A2.2



T3 zone 13 A1.3152 & A2.2



T3 zone 14 A1.3152 & A2.2



T3 zone 15 A1.3152 & A2.2



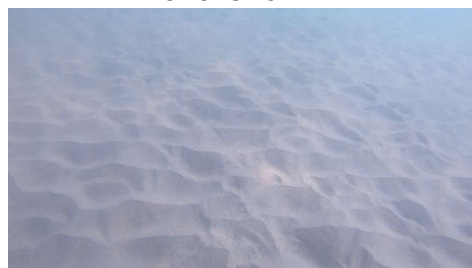
T3 zone 16 A2.2



T3 zone 17 A1.3152 & A2.2



T4 zone 1 A2.821 & A2.2



T4 zone 2 A2.2



T4 zone 3 A3.127



T4 zone 4 A2.2



T4 zone 5 A3.127



T4 zone 6 A3.116 & A3.127



T4 zone 7 A3.116



T5 zone 1 A2.821



T5 zone 2 A2.2 & A2.821



T5 zone 3 A2.2



T5 zone 4 A3.127



T5 zone 5 A3.116



T6 zone 1 A2.711



T6 zone 2 A1.125



T6 zone 3 A1.3152



T6 zone 4 A1.125



T6 zone 5 A3.2111



T6 zone 6 A1.125



T6 zone 7 A3.127 & A1.125



T6 zone 8 A3.127 & A3.116



T7 zone 1 A1.3131



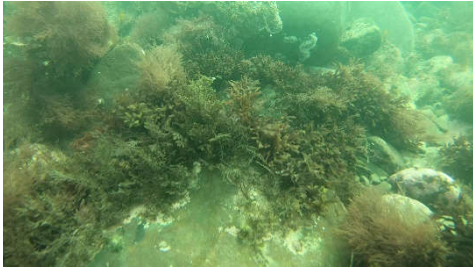
T7 zone 2 A2.711



T7 zone 3 A1.3131 & A2.711



T7 zone 4 A1.3131



T7 zone 5 A3.116



T7 zone 6 A1.3152



T7 zone 7 A1.3152 & A3.2111



T7 zone 8 A3.2111



T7 zone 9 A3.116