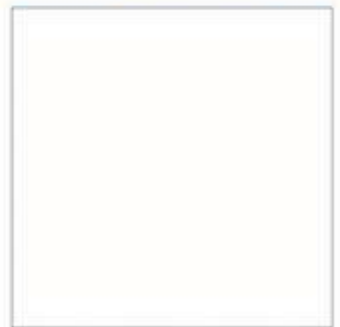
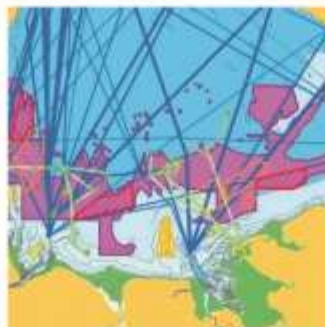
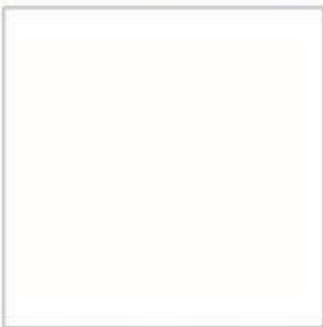
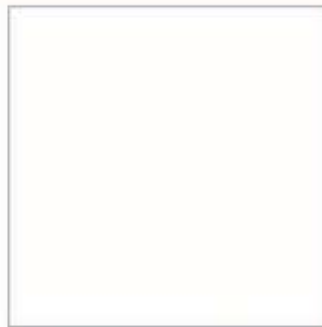


Welsh Government

Sustainable Management of Marine Natural Resources - Mapping Natural Resources

Survey Report

October 2020



Innovative Thinking - Sustainable Solutions



Page intentionally left blank




Sustainable Management of Marine Natural Resources - Mapping Natural Resources

Survey Report

October 2020



Document Information

Document History and Authorisation		
Title	Sustainable Management of Marine Natural Resources - Mapping Natural Resources	
	Survey Report	
Commissioned by	Welsh Government	
Issue date	October 2020	
Document ref	R.3526	
Project no	R/4725/2	
Date	Version	Revision Details
16/09/2020	1	Issued for client review - unsigned
16/10/2020	2	Issued for client use
27/10/2020	3	Issued for client use - web links updated
Prepared (PM)	Approved (QM)	Authorised (PD)
C R Trigg	N J Frost	S C Hull
		

Suggested Citation

ABPmer, (2020). Sustainable Management of Marine Natural Resources - Mapping Natural Resources, Survey Report, ABPmer Report No. R.3526. A report produced by ABPmer for Welsh Government, October 2020.

Contributing Authors

Vicky West, and Paul Clement

Notice

ABP Marine Environmental Research Ltd ("ABPmer") has prepared this document in accordance with the client's instructions, for the client's sole purpose and use. No third party may rely upon this document without the prior and express written agreement of ABPmer. ABPmer does not accept liability to any person other than the client. If the client discloses this document to a third party, it shall make them aware that ABPmer shall not be liable to them in relation to this document. The client shall indemnify ABPmer in the event that ABPmer suffers any loss or damage as a result of the client's failure to comply with this requirement.

Sections of this document may rely on information supplied by or drawn from third party sources. Unless otherwise expressly stated in this document, ABPmer has not independently checked or verified such information. ABPmer does not accept liability for any loss or damage suffered by any person, including the client, as a result of any error or inaccuracy in any third party information or for any conclusions drawn by ABPmer which are based on such information.

All content in this document should be considered provisional and should not be relied upon until a final version marked '*issued for client use*' is issued.

All images on front cover copyright ABPmer apart from seahorse (A J Pearson).

ABPmer

Quayside Suite, Medina Chambers, Town Quay, Southampton, Hampshire SO14 2AQ
T: +44 (0) 2380 711844 W: <http://www.abpmer.co.uk/>

Summary

The Sustainable Management of Marine Natural Resources (SMMNR) project has received funding through the European Maritime and Fisheries Fund (EMFF), which is funded by the European Union and the Welsh Government. The project is part of a broader suite of spatial work to support the implementation of the Welsh National Marine Plan (WNMP).

This project contributes to the spatial approach to marine planning in Welsh waters. It focusses on exploring and developing aspects of the ecological evidence base in relation to tidal stream energy, wave energy and aquaculture resources in the Welsh marine area to help support forward planning and the sustainable development of these sectors.

Recommendations from Part 1 of the SMMNR project, completed in early 2019, indicated benefit in undertaking targeted ecological surveys and studies as key to increasing the evidence base for Welsh waters (ABPmer, 2019a). Among the ecological work highlighted was the specific requirement for directed benthic surveys to help address some evidence gaps.

In this context, as part of the SMMNR project ABPmer carried out multibeam (bathymetry and backscatter) surveys supplemented by Drop-Down Video (DDV) surveys within Welsh waters at two sites; Pembrokeshire and West Anglesey. The sites were prioritised through an options appraisal process acknowledging that a key focus of the work was determining the presence and extent of Article 17 reef and Section 7 features. The presence of such features was relevant as it may be a factor in increasing the complexity of consenting for certain marine developments.

Geophysical data acquisition was conducted by ABPmer onboard the *FPV Morven*. The geophysical survey utilised a Kongsberg 2040C dual head multibeam bathymetry system interfaced with an Applanix POS MV inertial positioning system, providing high resolution bathymetry and backscatter positioned to a high level of accuracy.

Following the completion of the geophysical survey DDV camera surveys were carried out to groundtruth the data, enabling high quality habitat maps to be produced. In addition, high resolution video and stills images were collected to identify potential features of interest and their character (e.g. the presence of reef, type of reef, high energy habitats).

Post-processing of the multibeam data was conducted following completion of the surveys to further enhance the resolution of backscatter and bathymetric imagery enabling seabed sediment and feature classification. Groundtruthing data from the video assessment were used to assist or verify the classification of sediments and features identified in the acoustic data.

The results indicated a range of habitats and biotopes off the Pembrokeshire and West Anglesey coasts, many of which were characteristic of tide-swept environments, such as areas of scoured rocky reef and mobile sandy sediments.

A greater diversity of habitats and features were identified within the Pembrokeshire survey area. Across the extent of the Pembrokeshire area there were extensive areas of both geogenic and biogenic reef. To the north-west of the area biogenic reef was particularly prevalent with reef consisting of discrete mosaics of reef-building polychaete, *Sabellaria sp.* and the bivalve mollusc, blue mussel *Mytilus edulis*.

In contrast, at Anglesey there was comparatively sparse fauna and large expanses of mobile sand and mixed substrata, however some areas of biogenic *Sabellaria sp.* reef were noted to the north of the survey area.

Overall, the results from the survey programme have provided a greater resolution and understanding of the habitats present at each survey site. These data will contribute towards the broader marine planning related evidence base and, more generally, increase understanding of the Welsh marine environment.

Contents

1	Introduction.....	1
2	Survey Scope and Focus	3
	2.1 Survey site selection.....	3
3	Methods.....	7
	3.1 Geophysical survey	7
	3.2 Drop-down video survey.....	9
4	Results	12
	4.1 Geophysical	12
	4.2 Drop-down video	16
	4.3 Data interpretation	20
5	Conclusions.....	24
6	References and Websites.....	26
7	Abbreviations/Acronyms	27

Appendices

A	Drop Down Video Pro-forma.....	29
B	Survey Log and Imagery Analysis	30
	B.1 Pembrokeshire	30
	B.2 West Anglesey.....	35

Figures

Figure 1.	Proposed survey areas at Pembrokeshire and Anglesey	4
Figure 2.	Pembrokeshire proposed survey area	5
Figure 3.	West Anglesey proposed survey area.....	6
Figure 4.	ABPmer DDV camera system	9
Figure 5.	DDV and GoPro sled installation	10
Figure 6.	Example survey 'clapperboard'	10
Figure 7.	Overview of bathymetry and location of shoal positions, with inset showing bathymetry of soundings shallower than 10 m	12
Figure 8.	Bathymetry at Pembrokeshire.....	13
Figure 9.	Wreck of the Usat Roanoke located to the north west of the survey area	14
Figure 10.	Bathymetry at West Anglesey	15
Figure 11.	Drop-down video sample sites (Purple = stations surveyed, Black = stations not completed).....	16
Figure 12.	Example of habitats encountered during the Pembrokeshire DDV survey	17
Figure 13.	Drop-down video sample stations (purple = stations surveyed, black = stations not completed)	19
Figure 14.	Example of habitats encountered during the West Anglesey DDV survey.....	20
Figure 15.	Seabed sediments identified at Pembrokeshire following geophysical data interpretation.....	21
Figure 16.	Features of interest identified at Pembrokeshire following geophysical data interpretation.....	21
Figure 17.	Seabed sediments identified at West Anglesey following geophysical data interpretation.....	22
Figure 18.	Features of interest identified at West Anglesey following geophysical data interpretation.....	23
Figure A1.	Drop-down video survey recording form - SMMNR survey 2019.....	29

Tables

Table 1.	Summary of geophysical survey operations	7
Table 2.	Biotopes recorded during the Pembrokeshire DDV survey	18
Table 3.	Biotopes recorded during the West Anglesey DDV survey	19
Table B1.	Pembrokeshire Survey Log.....	30
Table B2.	West Anglesey Survey Log	35

1 Introduction

The **Sustainable Management of Marine Natural Resources** (SMMNR) project has received funding through the European Maritime and Fisheries Fund (EMFF), which is funded by the European Union and the Welsh Government. The project is part of a broader suite of spatial work to support the implementation of the **Welsh National Marine Plan** (WNMP).

The WNMP is the first marine plan for Wales, and the understanding of the spatial distribution of marine natural resources, and associated opportunities and constraints in relation to their sustainable use continues to evolve. The aim of the SMMNR project is to contribute towards the marine planning related evidence base in line with the WNMP which states:

'Opportunities should be taken to identify and address strategic evidence needs in line with the Plan's priorities to help 'derisk' future investment and consenting decisions. Reasonable steps should be taken to fill strategic evidence gaps to underpin decision making by planning authorities, regulators and sea users'.

This project constitutes part of the wider work on developing the **spatial approach** to marine planning and is focussed on exploring and developing the ecological evidence base in relation to three focus sectors; **tidal stream energy**, **wave energy** and **aquaculture** resources in the Welsh marine area to help support the sustainable development of these sectors.

As set out in the WNMP, Welsh Government policy is to support the sustainable growth of emerging marine sectors such as these whilst ensuring marine ecosystems are protected and enhanced to provide for their resilience and provision of benefits for future generations. In particular, the project is examining how the distribution and potential use of these resources may relate to Marine Protected Areas (MPAs), and other sensitive habitats and species, while identifying opportunities for sustainable development.

As described in the SMMNR overview document (ABPmer, 2020), the SMMNR project was split into two distinct parts by Welsh Government (Part 1 and Part 2). Part 1 was completed in early 2019 and encompassed the sourcing, collation and standardisation of the existing environmental evidence for the focus sectors while also identifying knowledge gaps (ABPmer, 2019a)¹.

Part 2 of the SMMNR project builds upon the outputs from Part 1, with the core activities driven by the recommendations and conclusions from the initial phase of work, which included:

- The collection of ecological data that would inform the knowledge and evidence base and thus aid site selection and baseline characterisation; and
- Take steps to encourage and facilitate the provision of publicly available evidence and data relevant to the development of the focus sectors.

Hence, the over-arching aim of Part 2 was to enhance and apply marine evidence to support the planning and sustainable development of the focus sectors. This being achieved through the mapping of natural resources and ecological constraints relevant to these sectors. The benefits of which are clear at the planning level, however, through the supplementation of relevant evidence and information, will also be realised at the project level.

¹ <https://gov.wales/sustainable-management-marine-natural-resources>

This report, the survey report, encompasses the data collection tasks outlined within Part 2 of the project and addresses the requirement for collection of focussed ecological data to inform identified evidence gaps.

An outline of the context and deliverables of the project, as a whole, are detailed within the SMMNR overview document (ABPmer, 2020). It is recommended that the overview document is read in conjunction with the survey report.

2 Survey Scope and Focus

Recommendations from Part 1 of the SMMNR project indicated the need for ecological surveys and studies which were an important aspect to increasing the evidence base in Welsh waters (ABPmer, 2019a). Among the ecological work highlighted was the specific requirement for directed benthic surveys to increase the knowledge base and mapping of sensitive features in Welsh waters.

In early 2019, an options appraisal identified where data collection should be prioritised along with consideration of the most appropriate survey methodology. The appraisal was carried out by ABPmer with input from NRW and Welsh Government. A fully detailed description of the appraisal process is provided in the Detailed Work Plan (ABPmer, 2019b) on the Welsh Government website².

To address the recommendations from Part 1, during the summer of 2019, ABPmer carried out multibeam (bathymetry and backscatter) surveys supplemented by Drop-Down Video (DDV) surveys within Welsh waters at two sites; Pembrokeshire and West Anglesey. A key focus of the work was determining the presence and extent of Article 17 and Section 7 features.

The presence of certain benthic features, such as Article 17 and Section 7 habitats, are recognised as a key environmental constraint, with the increased potential to complicate the consenting process for marine developments. Identifying the presence/absence of such features is important for informing site selection for new developments and as such a key objective for the data collection work was increasing the knowledge base and mapping of protected reef features in Welsh waters. The presence of reef features is often associated with increased consenting complexity as these are protected through the Habitats Directive and, in Welsh waters, as Section 7 features.

Reflecting the nature of the prioritised benthic search features, the proposed survey methodology utilised a combination of multibeam (bathymetry and backscatter) supplemented by DDV, to allow broadscale characterisation of the benthic habitats with groundtruthing from DDV. The DDV also provided high resolution of benthic features through photographic still images and video footage of the seabed to assess the presence and distribution of Article 17 'reef' and Section 7 habitats.

For the scope of the current project Article 17 'reef' habitats included consideration of rocky, stony and biogenic reefs, the latter including blue mussel beds and *Sabellaria sp.* reefs. Similarly, Section 7 habitat features such as subtidal sands and gravels and fragile sponge and anthozoan communities on subtidal rocky habitats were included within the project.

This report outlines the survey methodology and data analyses before providing a summary of the survey results.

2.1 Survey site selection

To maximise the benefits gained from the survey data, surveys were located in areas considered to have greatest potential for sector development as well as being areas with limited data availability on distribution and nature of benthic habitats. Within the options appraisal the locations of draft Strategic Resource Areas (SRAs) relevant to the focus sectors, as defined within the draft WNMP³, were used to define survey locations; however, it was acknowledged that the boundaries of the SRAs would not constrain survey extent.

² <https://gov.wales/sites/default/files/publications/2019-11/sustainable-management-of-marine-natural-resources-part-2.pdf>

³ <https://gov.wales/draft-welsh-national-marine-plan>

Although suitable wave energy resource exists within inshore Welsh waters along the south west coast of Pembrokeshire, wave energy resource is highest to the south western margins of Welsh territorial waters, with the best areas of resource considerably further offshore than those identified for tidal stream and aquaculture. Hence, following the initial prioritisation process, potential broad search areas were reduced to inshore waters which encompassed both tidal stream and aquaculture resource (see ABPmer, 2019b).

Survey areas were further refined by high level consideration of constraints that would likely hinder suitability of an area for sector development i.e. the presence of designated sites. A large proportion of Welsh waters are encompassed by European designated sites (SACs and SPAs). Consideration was given to the number of European designated sites which overlapped with the draft SRAs and the degree of overlap where this occurred (see ABPmer, 2019b). From this high-level environmental constraint analysis, two broad survey areas were taken forward, off the north west coast of Pembrokeshire and to the west of Anglesey (Figure 1).

It was acknowledged that a focussed survey programme in one broad survey area would provide a greater amount of suitable high-quality data; however, it was considered that encompassing two geographically distinct search areas would increase the overall value of the data collection exercise. The outline survey approach to target two distinct survey areas was agreed with Welsh Government and NRW (23 May 2019) prior to survey operations commencing. A more detailed description of the approach used to determine suitable survey areas is provided in the Detailed Work Plan (ABPmer, 2019b).

At each of the survey areas, in addition to recognising Priority Areas for the work (see ABPmer, 2019b), Areas of Interest were also identified (Figure 2 and Figure 3). These areas overlapped with existing multibeam survey areas which have either not been groundtruthed or where additional groundtruthing in a broadly similar area would provide greater confidence in a potential feature of interest (e.g. presence of reef, type of reef, high energy habitats).

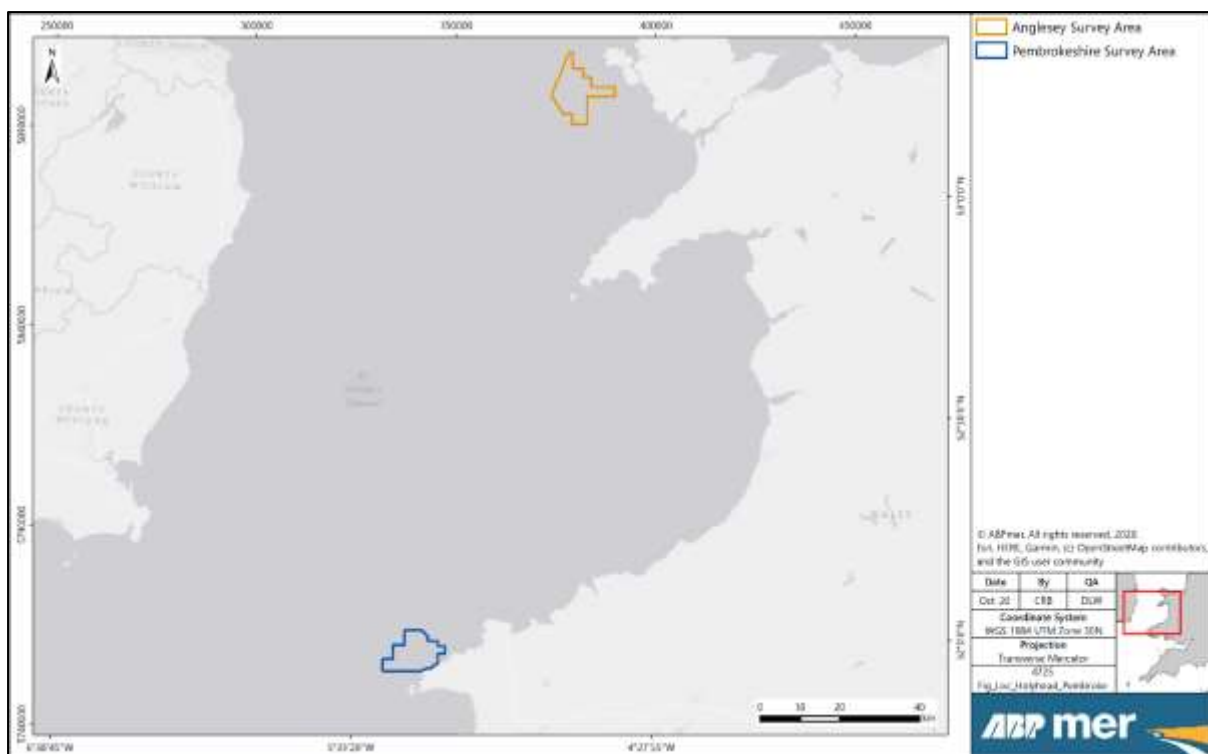


Figure 1. Proposed survey areas at Pembrokeshire and Anglesey

2.1.1 Pembrokeshire

The proposed survey area off St David's Head encompassed large areas of potential resource for both tidal stream and aquaculture. Existing habitat mapping data indicated that the survey area would likely overlap with reef feature along the southern and western margins of the proposed area (Figure 2). However, historic data covering the majority of the survey area was limited to admiralty chart information on the benthic features; suggesting that much of the proposed survey area, in particular Priority Areas 1,2 and 3 would consist of large expanses of mixed sediment features (Figure 2)

Although all of the proposed survey area was encompassed within the West Wales Marine SAC (designated for harbour porpoise), a large part of the survey area was beyond the northern extent of the Pembrokeshire Marine SAC (designated for Annex I habitats including reefs).

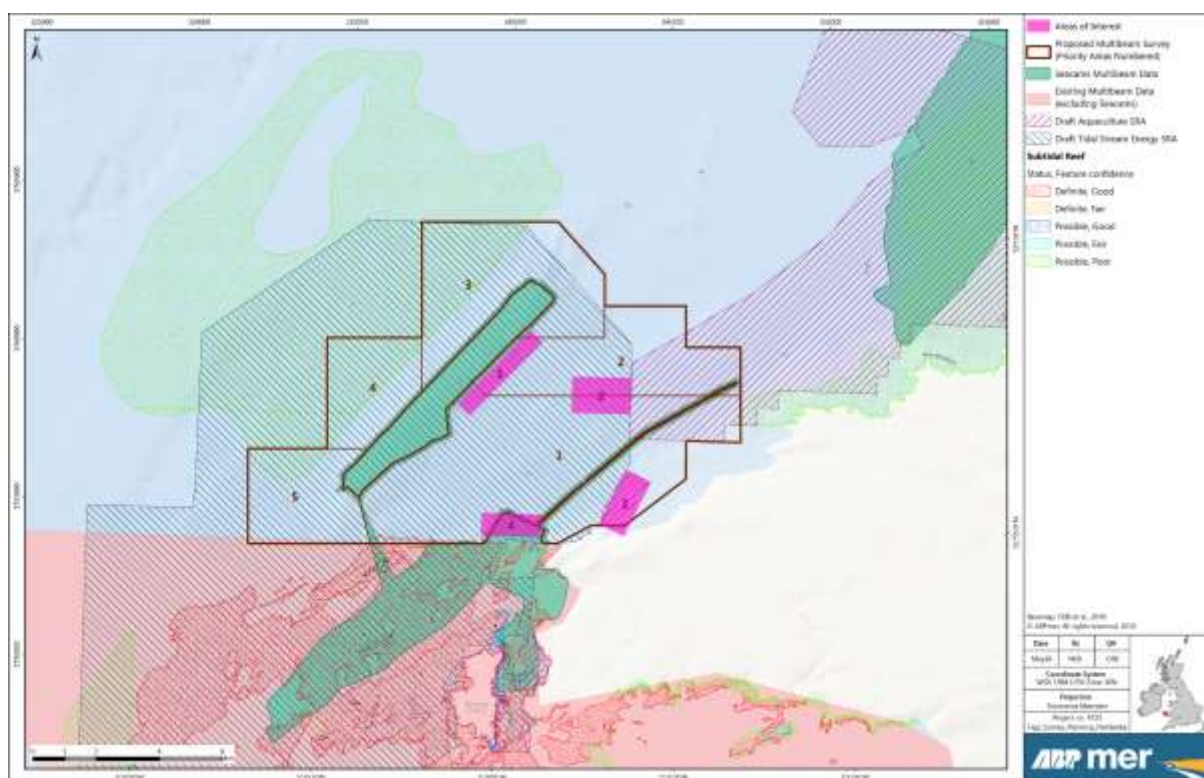


Figure 2. Pembrokeshire proposed survey area

2.1.2 West Anglesey

The proposed multibeam survey area off the West coast of Anglesey overlapped with tidal stream and aquaculture resource, though not with the draft aquaculture SRA. It was therefore proposed that DDV groundtruthing was also carried out within an area of existing multibeam survey which overlapped with the large aquaculture draft SRA to the west of Anglesey and adjacent to the proposed multibeam activity (see Figure 3)

A portion of the survey area was outside any European designated site. It was expected that the seabed to the west of Anglesey encompassed areas of coarse sediment, stony and rocky reef.

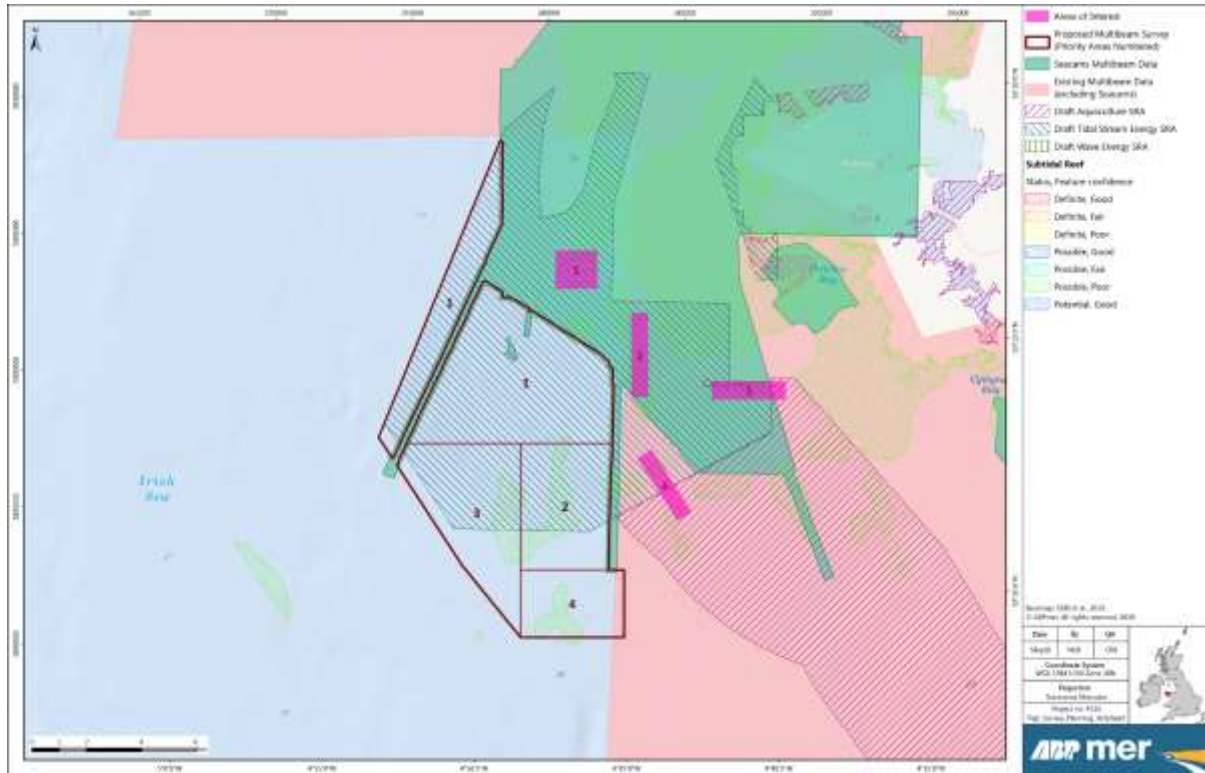


Figure 3. West Anglesey proposed survey area

3 Methods

This section provides an outline of the geophysical multibeam (MBES) survey and drop-down video operations carried out.

3.1 Geophysical survey

The geophysical survey utilised a hull-mounted Kongsberg 2040C dual head multibeam bathymetry system interfaced with an Applanix POS MV inertial positioning system (using MarineStar GNSS corrections). This provided high resolution multibeam data positioned to an accuracy of <0.1 m in real time. Post-processing of the navigation data improved positioning accuracy to <0.05 m. The multibeam data was processed for both bathymetry and backscatter enabling a detailed seabed classification.

3.1.1 Operations

Geophysical data acquisition was conducted by ABPmer between 16-21 July 2019 operating on a 24-hour basis onboard the survey vessel *FPV Morven*. Mobilisation of the vessel took place in Milford Haven, prior to the vessel transiting to the Pembroke survey area.

MBES data was acquired within the Kongsberg SIS acquisition software. The MBES was interfaced into the QPS QINSy 8.1 navigation acquisition software for both data redundancy and online quality control.

Within each of the survey areas, survey lines were designed at a spacing of 120 m in order to provide the required bathymetry coverage and data density. Lines were run at a narrower line spacing in some shallow areas, particularly at the eastern extent of the Pembroke survey area. During acquisition, a data density display was setup within QPS QINSy.

This display consisted of a 0.5 m grid, where each cell was coloured; green when an accepted sounding was available; and red where no sounding was available. This enabled the surveyor to control the vessel speed to ensure that a 0.5 m grid was being populated. Initial data processing took place onboard the vessel to ensure data was of high quality, enabling the immediate rerun of survey lines where required. Table 1 provides a summary of the geophysical survey operations.

Table 1. Summary of geophysical survey operations

Date	Daily Summary
15/07/2019	<ul style="list-style-type: none"> ▪ <i>FPV Morven</i> arrives in Milford Haven. ▪ Survey team travel to Milford Haven. ▪ Survey mobilisation conducted.
16/07/2019	<ul style="list-style-type: none"> ▪ Survey brief, HSE discussion and vessel inductions held. ▪ Vessel fuelling conducted in Milford Haven. ▪ Vessel slips ropes and transits to Pembrokeshire, Priority Area 1 (Figure 2). ▪ Commence survey of Priority Area 1.
17/07/2019	<ul style="list-style-type: none"> ▪ Continue survey of Pembrokeshire Priority Area 1. ▪ Weather conditions deteriorate and cause poor data quality. ▪ Vessel transits north of Strumble Head for shelter.
18/07/2019	<ul style="list-style-type: none"> ▪ Improvement in weather conditions - vessel returns to Pembrokeshire survey area ▪ Continue survey of Priority Area 1.

Date	Daily Summary
	<ul style="list-style-type: none"> ▪ Survey of Pembrokeshire Priority Area 1 considered complete. ▪ Vessel transits to West Anglesey. ▪ Commence survey of Holyhead Area 1.
19/07/2019	<ul style="list-style-type: none"> ▪ Continue survey of West Anglesey Priority Area 1 (Figure 3). ▪ Weather conditions deteriorate and cause poor data quality. ▪ Vessel transits to Holyhead for shelter.
20/07/2019	<ul style="list-style-type: none"> ▪ Improvement in weather conditions - vessel returns to West Anglesey survey area ▪ Continue survey of Priority Area 1
21/07/2019	<ul style="list-style-type: none"> ▪ Complete survey of Priority Area 1 ▪ Short period of workable conditions enable 1 km spaced survey lines to be run in Priority Area 2. ▪ Vessel returns to Holyhead for demobilisation. ▪ Survey team depart vessel.

3.1.2 Data processing

Positioning

Online, the Applanix POS MV positioning system, interfaced with MarineStar GNSS corrections, achieved an accuracy of <0.1 m. However, to improve this accuracy further, raw Applanix .000 files were logged throughout survey operations. These raw data files were imported into the navigation post processing software, Applanix POSpac MMS 8.3. RINEX data from the closest Ordnance Survey GPS Active station (ANLX for Pembroke site and HOLY for Holyhead site), and precise satellite ephemeris data was imported to the project. The online navigation was then processed producing centimetric accuracy positioning. The resulting 'Smoothed Best Estimate of Trajectory' (SBET) file was exported at the location of the MBES transducer and relative to the WGS84 ellipsoid ready to be applied to the bathymetry.

Backscatter

Backscatter data was processed using the QPS Fledermaus Geocoder Toolbox (FMGT 7.8). The Kongsberg .all files were imported into FMGT. Mosaic and nadir blending parameters were set and adjusted to ensure the highest quality backscatter imagery. The mosaics were produced at the high resolution of 0.2 m (0.5 m and 1.0 m also created) to provide the best definition for seabed classification interpretation.

Bathymetry

Bathymetry data was processed using Caris HIPS & SIPS 11.1. The Kongsberg .all files and the post-processed navigation SBET files were imported into the software. The post-processed SBET was then applied to the bathymetry in conjunction with the UKHO VORF model in order to reduce the data to Chart Datum. The Total Propagated Uncertainty (TPU) of each sounding was computed to enable the production of a CUBE surface at a resolution of 0.5 m (1 m and 5 m resolutions also created). Any erroneous soundings present on the CUBE surface were removed manually using the subset editor tool. The surfaces were exported as gridded XYZ datasets and sun illuminated georeferenced Geotiff images.

3.1.3 Geophysical analysis

The multibeam data was assessed by MarineSpace to characterise seabed sediment types and features.

Data was digitised in ArcMap 10.5, where the data was assessed and investigated by computing the slope, rugosity and roughness, to indicate textures and features within the data, as well as adjusting

the rendering settings to highlight further features of interest. Groundtruthing data from the video assessment were used to assist or verify the classification of sediments and features identified in the acoustic data. Where it was possible, substrata and/or features were associated with Article 17 or Section 7 features, as appropriate.

A confidence rating was provided alongside each area. This was linked to confidence in identification of the feature in the data, using the assessed imagery, with any extrapolation of these features across the site where ground truthing data was or was not available.

For each survey area, Pembrokeshire and West Anglesey, two shapefiles were then created relating to seabed sediments and seabed features.

3.2 Drop-down video survey

Following the completion of the geophysical survey, DDV camera surveys were carried out at both Pembrokeshire and Anglesey to groundtruth multibeam backscatter data, enabling high quality habitat maps to be produced. In addition, the DDV survey aimed to identify potential features of interest and their character (e.g. the presence of reef, type of reef, high energy habitats).

During both DDV surveys, video and high-resolution stills were collected using ABPmer's bespoke DDV System (Figure 4). The frame was fitted with a C-Technics CT3023 SLV system which simultaneously recorded high-definition video whilst taking full resolution still images. Built-in line lasers, set at 100 mm apart, were used to provide image scaling. The sled was also fitted with LED lighting to provide better definition and colour to imagery. The camera was mounted on an adjustable rack system which could be moved forwards and back and tilted to gain the best imagery of the seabed (Figure 4).



Figure 4. ABPmer DDV camera system

In addition, two high resolution, Go-Pro Hero 5 cameras were secured to the frame of the DDV sled to provide wider coverage of the seabed. These were positioned to record an outward port and starboards facing view. A schematic showing the relative locations of all systems on the DDV sled is shown in Figure 5.

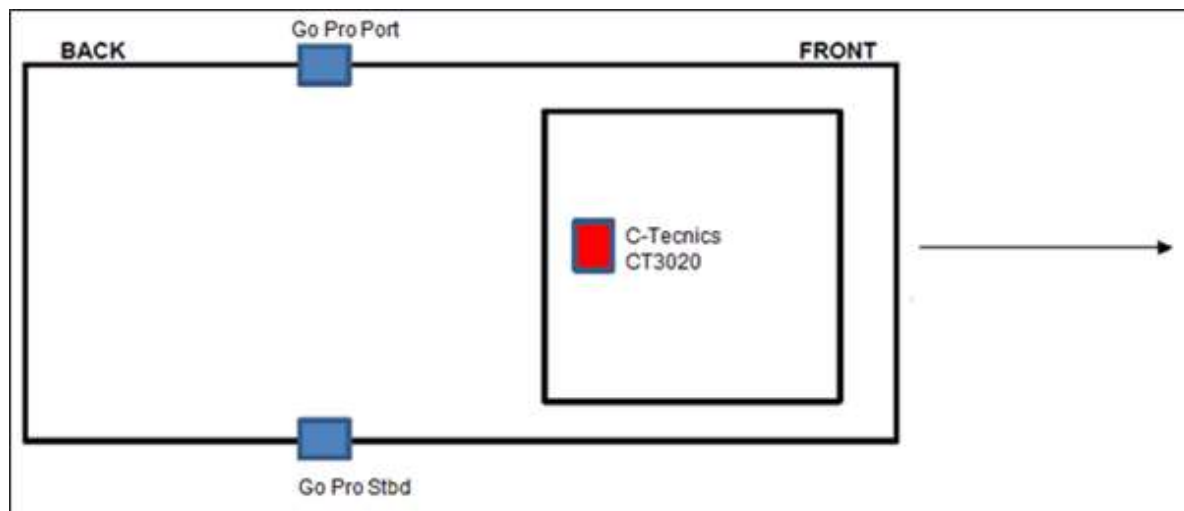


Figure 5. DDV and GoPro sled installation

3.2.1 DDV operations

Geophysical data was collected and reviewed prior to mobilisation for the DDV survey to determine DDV survey locations. DDV data were then collected to groundtruth the interpretation of the geophysical data. DDV stations were also selected to encompass areas of specific interest, cover a range of sediment types and to enable habitat boundaries to be delineated.

Due to the high tidal flows experienced at both sites, the DDV surveys were highly constrained by tidal conditions. To maximise data collection, both surveys were carried out during neap tides to provide the widest operational window. At Pembrokeshire, DDV operations took place between 26-28 August 2019 onboard the *MV Sea Leopard* mobilising each day from Solva. DDV operations took place at West Anglesey between 7-9 September 2019 onboard the *MV SeeKat C* mobilising each day from Amlwch.



Figure 6. Example survey 'clapperboard'

Prior to mobilisation, all cameras were time and date synced with the main camera to aid the data interpretation post-survey. Additionally, prior to deployment of the DDV camera frame at each station a 'clapperboard' with the date, station number and survey code was presented in front of each of the GoPro's and main camera (Figure 6) so that each video could be easily identified (in terms of transect location) in post-survey processing.

During operations, the DDV system was deployed from the stern of the vessel using the A-frame via winch wire. The video umbilical cable was deployed manually.

Prior to each video transect, the vessel was positioned so that the video system would be dropped into the current. The camera system was lowered to the seabed and a positional fix taken at the surface to mark the start of the drop and commencement of video recording. Video start time, end time and bottom depth at the start and end of the drop were also recorded. Video footage was

viewed in real-time using the topside control unit. This allowed for any required adjustments to the video system to be made and allowed for operation of the stills camera to capture high-resolution photographs. At the end of the transect, the video recording was stopped, a positional fix taken at the surface, and time and water depth recorded. The DDV was deployed for approximately 5 minutes at each station to provide clear footage of the seabed. Due to the high tidal flows DDV drops were performed, as opposed to tows, to provide the best views of the seabed and prevent the DDV frame from being lifted from the seafloor.

For each video station a log was completed to capture the following:

- Survey and event reference number and name (e.g. location, station number);
- Survey date;
- Latitude and Longitude (WGS84) of start and end of transect;
- Time on video at start and end of transect;
- Substrate and broad feature description (including type of reef where discernible);
- Key characterising species and observations of any protected, rare or invasive species;
- Water depth; and
- An indication of presence of feature of interest (e.g. reef features; Section 7 habitat).

A copy of the DDV proforma is provided in Appendix A.

3.2.2 DDV analysis

Video and photographic data were processed following survey operations and each photographic still logged in a standardised data spreadsheet. Photos were subsequently matched against each video transect in order to geo-reference them. The coordinates of each photo were then entered into the spreadsheet. Additional data relating to sediment type and notable species and the depth that each photo was obtained were also noted within the spreadsheet. The full video stills data log is provided as Appendix B.

Video footage was analysed in-line with best working practices, acknowledging the Marine Environmental Data and Information Network (MEDIN) 2016 data guidelines for video survey in addition to the NRW Guidance Notes, as relevant. Particular attention was made to Guidance Note GN030 which covers guidance for carrying out benthic marine habitat surveys and monitoring (NRW, 2018).

As mentioned previously, presence/absence of Article 17 features, specifically reef, was noted and geo-referenced, along with any Section 7 features. During video analysis, broad level biotopes were recorded along with characterising species and additional relevant information on the habitat(s) and station (see Appendix B).

4 Results

4.1 Geophysical

4.1.1 Pembrokeshire

The geophysical survey at Pembrokeshire was undertaken over three days during which a 35 km² area was surveyed, capturing high resolution bathymetry and backscatter data.

During the survey an area 6 km north east of St David's Head, Llech Isaf rock, was observed at depths significantly shallower than currently chartered, which pose a danger to navigation. Although there is a (*) hazard symbol at Llech Isaf, the shoalest chartered sounding in the vicinity is 16.2 m CD. After post-processing of the navigation and bathymetry, the survey identified a shoal sounding of 1.0 m CD (Figure 7: Position A), observed on what is chartered as a hazard. Due to this very shallow depth the peak of the rock was not surveyed so is likely even shallower. Approximately 300 m west of Llech Isaf rock, at the location of the chartered 16.2 m sounding, a shoal depth of 5.0 m was observed (Figure 7: Position B).

The outputs of the bathymetry are shown in Figure 8. Seabed depths within the survey area ranged from 1.0 m CD to the south east of the site, to nearly 63 m CD at the northern limit of the survey area.

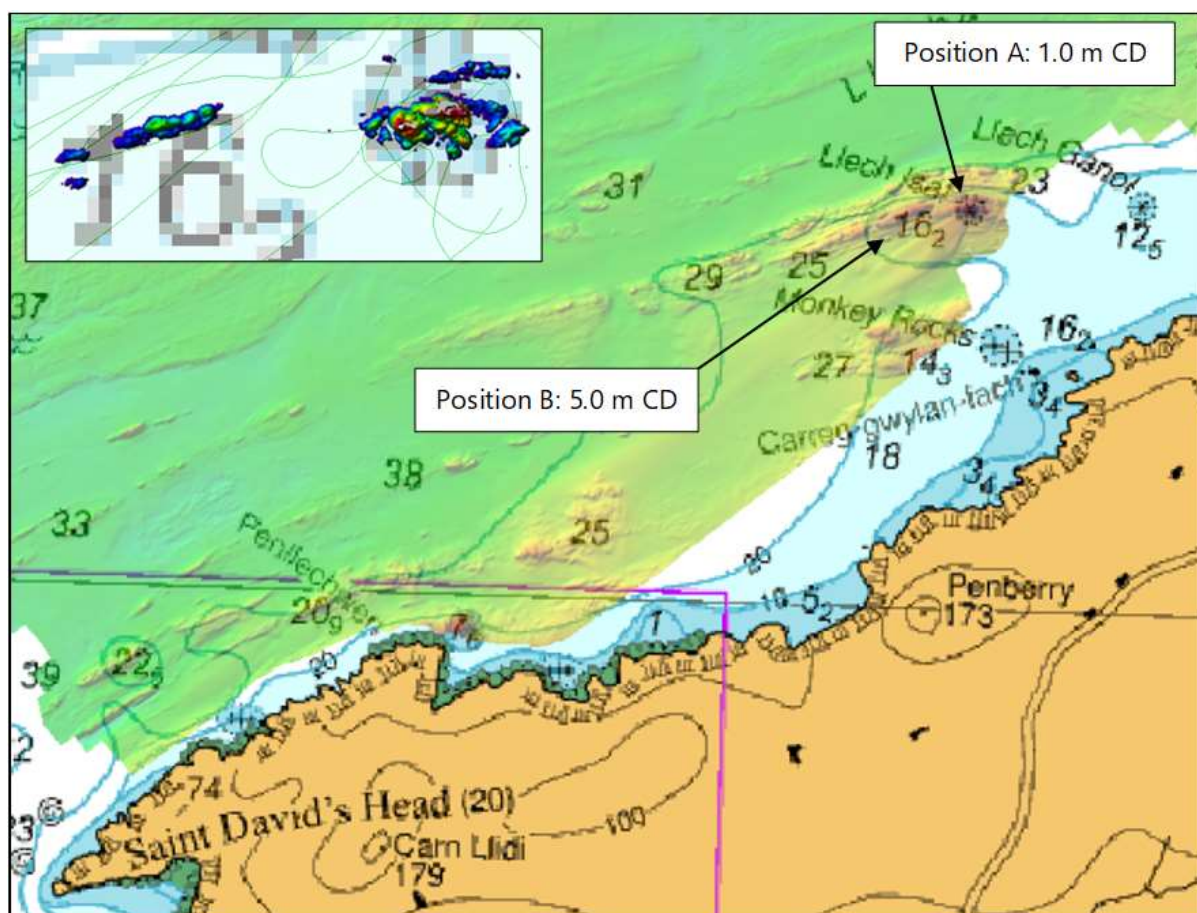


Figure 7. Overview of bathymetry and location of shoal positions, with inset showing bathymetry of soundings shallower than 10 m

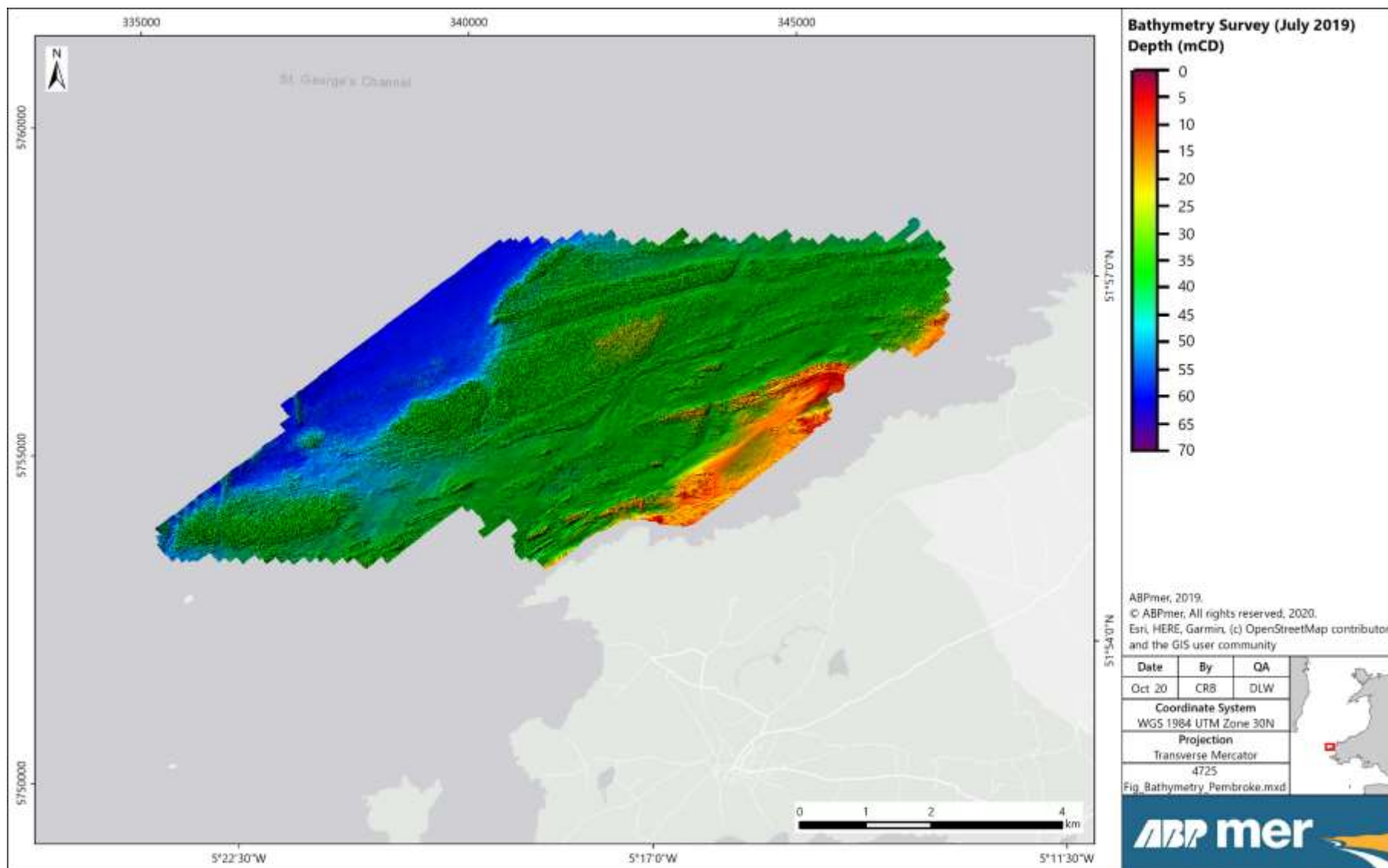
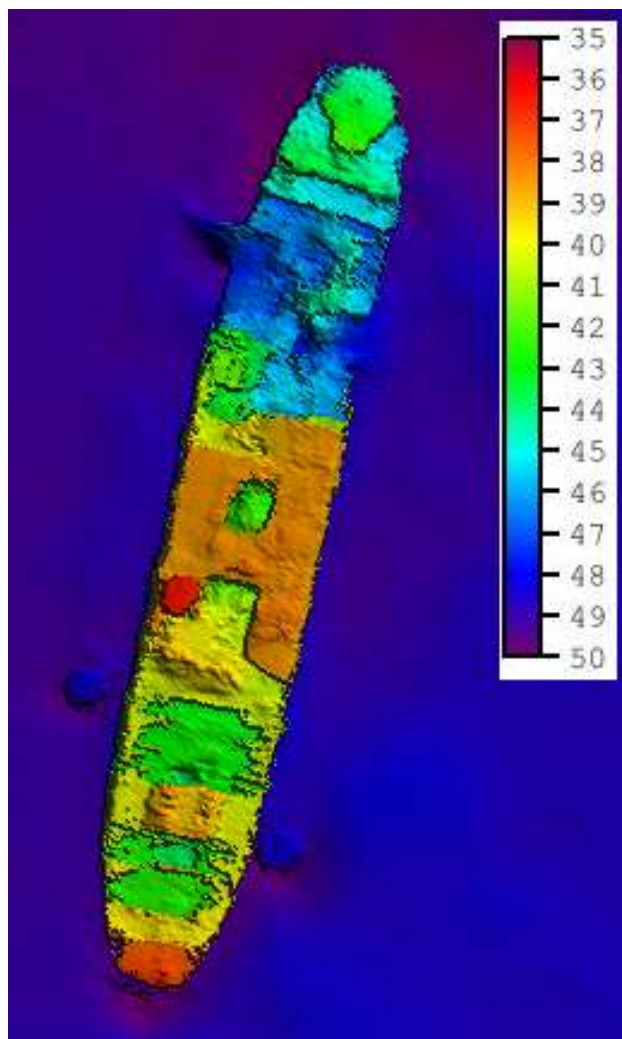


Figure 8. Bathymetry at Pembrokeshire

4.1.2 West Anglesey

The geophysical survey at West Anglesey was undertaken over four days during which a 30 km² area was surveyed capturing high resolution bathymetry and backscatter data.

During the survey three wrecks were clearly identified from the bathymetry data, the *Slieve Bloom*, *Farfield* and *Usat Roanoke*.



The *Slieve Bloom* was a passenger and cargo vessel built in 1908. The vessel was owned by the London and North Western Railway Company and had left Dublin and was on passage for Holyhead. At 30 March 1918, at approximately midnight, the ship was run down by the USS Stockton, a United States Navy destroyer. The wreck is now in two parts, with the wreckage covering an area 80 m x 30 m.

Farfield was a steel-hulled steamship. It was carrying granite from Penmaenmawr to Gloucester when it was bombed by German aircraft on 14 July 1942. The bow of the wreck is still intact, but the stern superstructure and engine room have totally collapsed. The cargo of granite boulders has spilled out of the open hatches onto the seabed.

The third wreck, the *Usat Roanoke* was recorded some distance away from that previously charted. Figure 9 shows bathymetry of the *Usat Roanoke* wreck located to the north west of the survey area. The *Usat Roanoke* steamship was, at the time of loss, being used by United States Army Transport as a refrigerated storeship. The ship was on passage from Antwerp to New York when it was torpedoed and sunk by U1055, with the loss of two crewmen and two army gunners.

Figure 9. Wreck of the *Usat Roanoke* located to the north west of the survey area

The outputs of the bathymetry are shown in Figure 10. Seabed depths within the survey area ranged from 30 m CD in a small area to the south of the site, to nearly 65 m CD at the northern limit of the survey area.

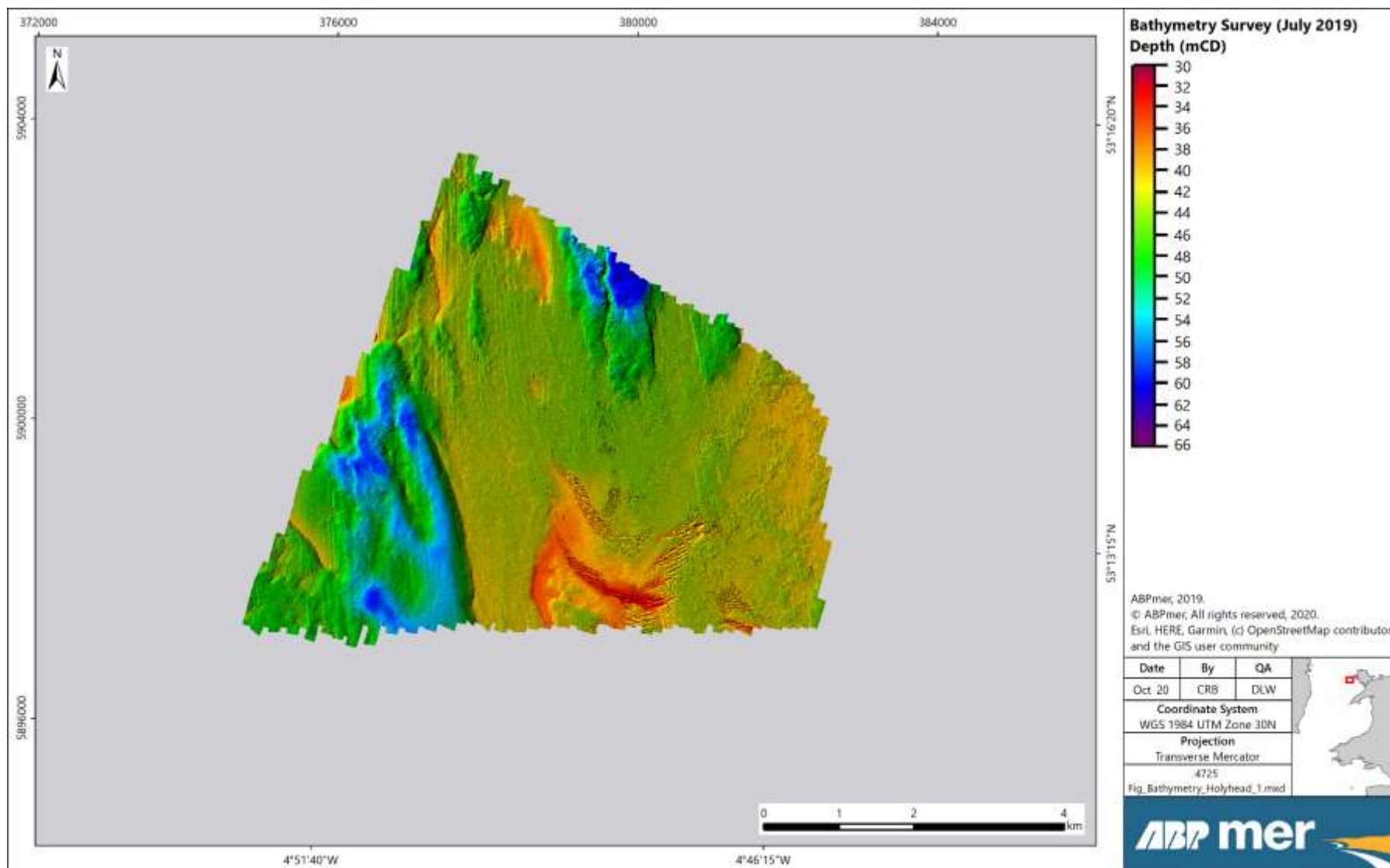


Figure 10. Bathymetry at West Anglesey

4.2 Drop-down video

4.2.1 Pembrokeshire

Six survey locations were targeted based upon previous data and the findings of the geophysical survey. Within these locations a number of proposed survey stations were plotted (Figure 11).

Throughout the DDV survey, 60 of the 94 proposed stations were sampled across the two days, these are shown in purple in Figure 11. No stations were surveyed on the third day as weather conditions were unsuitable for operations. Not all target stations within the south western area could be sampled. Initial sampling indicated that the seabed was very rocky in this region, with the presence of boulders posing a snagging risk to the equipment. Therefore, remaining stations within this area were not sampled for safety reasons.

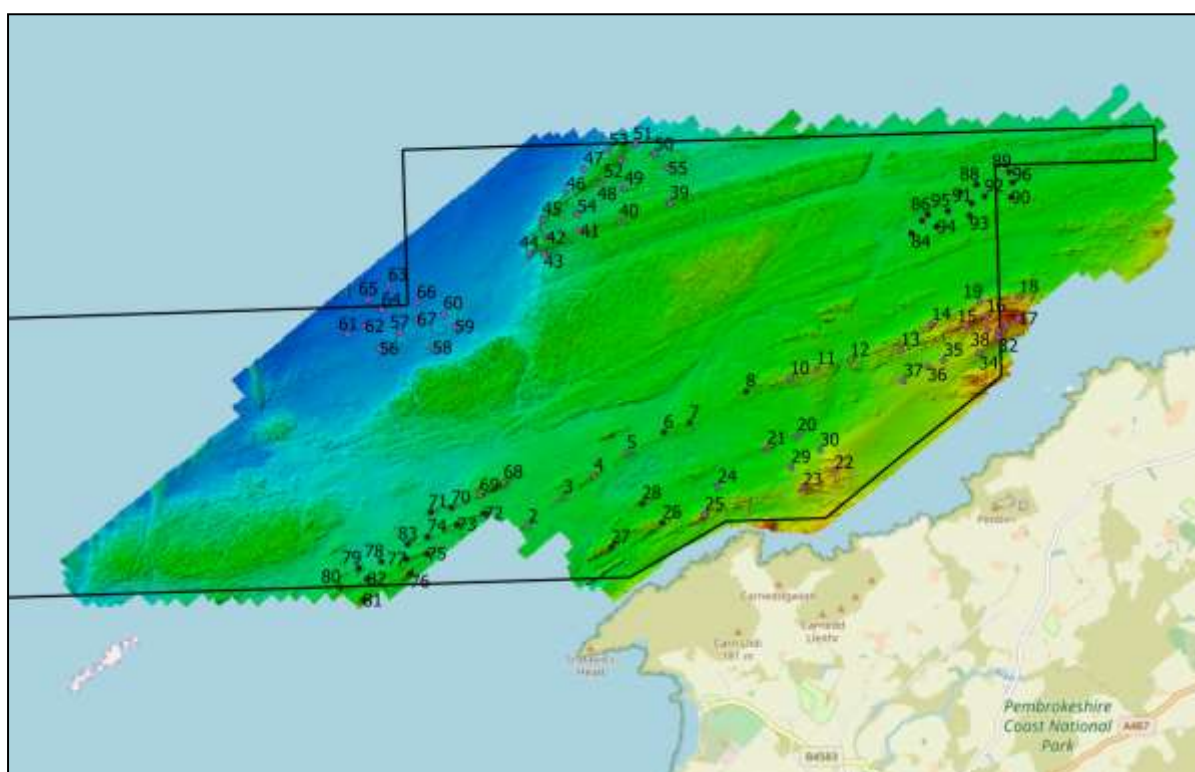


Figure 11. Drop-down video sample sites (Purple = stations surveyed, Black = stations not completed)

A range of habitats were recorded across the survey areas; from sandy sediments, mixed sediment to areas of rocky reef and mussel beds. Field notes and habitat features defined following video and imagery analysis, for each station, are provided in Appendix B.1. Example images of the range of habitats encountered are presented in Figure 12 with a list of biotopes recorded from across the survey area provided in Table 2.

Of particular interest distinct 'aggregations' of biogenic reef were discovered to the north-west of the site, located at water depths of around 45 m below Chart Datum. The reef consists of discrete mosaics of reef-building polychaete, *Sabellaria sp.* and the bivalve mollusc, blue mussel *Mytilus edulis*. Both taxa are known to form aggregations and biogenic reef structures, but usually these are species-specific and associated with shallow waters. The features discovered are extensive and are formed of both taxa, *Sabellaria sp.* and *M. edulis*, together.

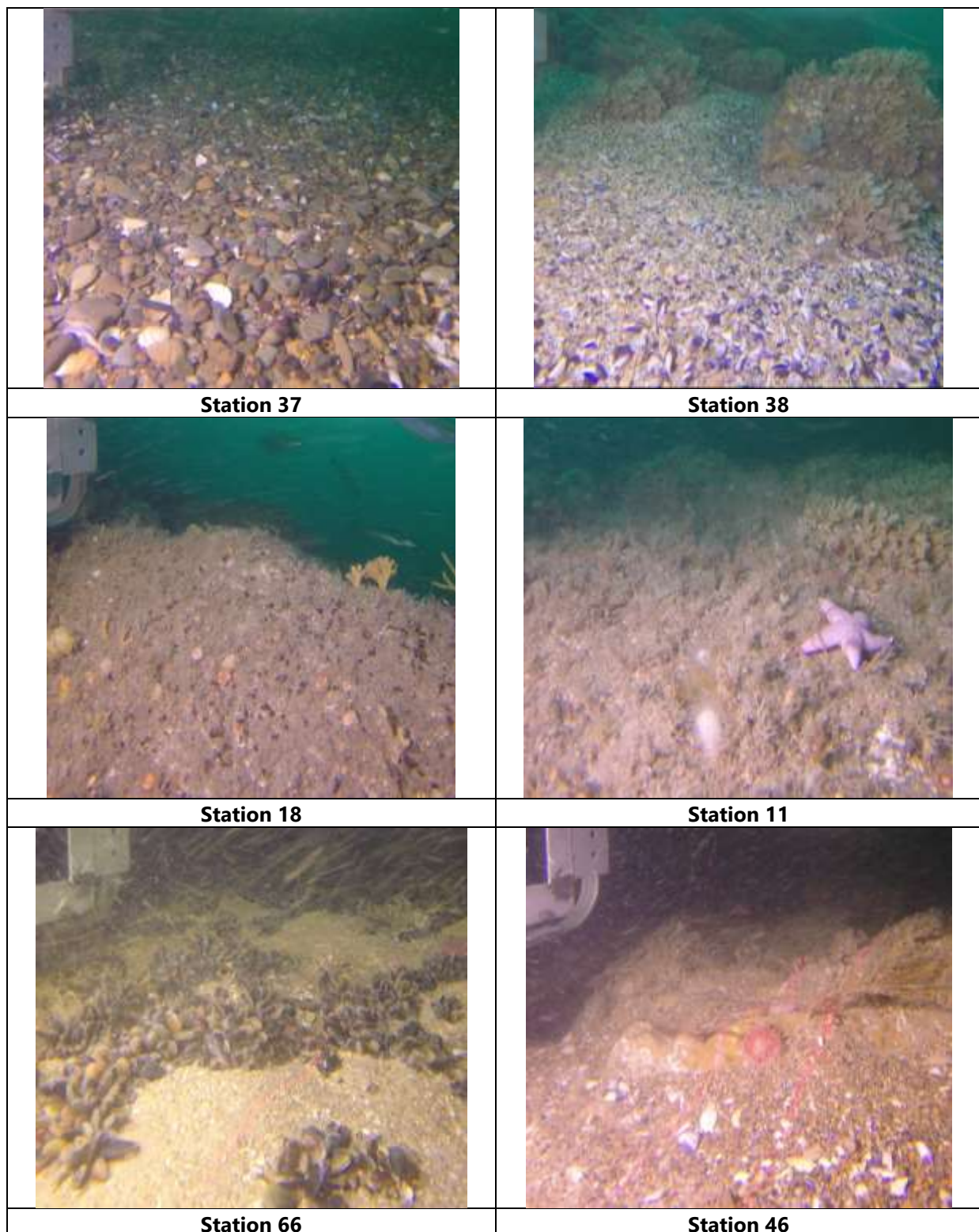


Figure 12. Example of habitats encountered during the Pembrokeshire DDV survey

Throughout the survey, incidental sightings of marine mammals and seabirds were recorded. At Station 2 a pod of 15- 20 common dolphins was recorded. The presence of several grey seals was also noted throughout the survey and at Station 68 two harbour porpoise were recorded. When large numbers of seabirds were spotted in the water these were also recorded, which included large groups of Guillemot at several locations.

Table 2. Biotopes recorded during the Pembrokeshire DDV survey

Biotope Code	Biotope Description
CR.HCR.Xfa	Mixed faunal turf communities
CR.HCR.XFa.ByErSp	Bryozoan turf and erect sponges on tide-swept circalittoral rock
CR.HCR.XFa.FluCoAs	<i>Flustra foliacea</i> and colonial ascidians on tide-swept moderately wave-exposed circalittoral rock
CR.HCR.XFa.SpAnVt	Sponges and anemones on vertical circalittoral bedrock
CR.MCR.Cmus.Cmyt	<i>Mytilus edulis</i> beds with hydroids and ascidians on tide-swept exposed to moderately wave-exposed circalittoral rock
IR.HIR	High energy infralittoral rock
SS.SBR.PoR.SspiMx	<i>Sabellaria spinulosa</i> on stable circalittoral mixed sediment
SS.SBR.Smus	Sublittoral mussel beds (on sublittoral sediment)
SS.SCS.CCS	Circalittoral coarse sediment
SS.SCS.CCS.PomB	<i>Pomatoceros triqueter</i> with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles
SS.SMx.CMx	Circalittoral mixed sediment
SS.SMx.CMx.FluHyd	<i>Flustra foliacea</i> and <i>Hydrallmania falcata</i> on tide-swept circalittoral mixed sediment
SS.SSa	Sublittoral sands and muddy sands

4.2.2 West Anglesey

Nine survey locations were targeted based upon previous data and the findings of the geophysical survey. Within these locations a number of stations were plotted, as shown in Figure 13.

Throughout the DDV survey, eight of these areas were surveyed with 60 of the 97 target stations sampled across the two days, (see Figure 13). No stations were surveyed on the third day as weather conditions were unsuitable for operations.

A range of habitats were recorded across the survey areas from sandy sediments, mixed sediment to areas of stony reef. Field notes and habitat features defined following video and imagery analysis, for each station, are provided in Appendix B.2. Example images of the range of habitats encountered are presented in Figure 14. A list of biotopes recorded from across the survey area are provided in Table 3.

Section 7 habitat 'subtidal sands and gravels' was recorded at a number of stations across the West Anglesey survey area. Many of the outcroppings within areas of sediment were also associated with Article 17 'stony reef' features. Distinct aggregations of the biogenic reef-building polychaete, *Sabellaria sp.* were recorded.

Throughout the survey, incidental sightings of marine mammals and seabirds were also recorded. At Station 15 a pod of approximately five Risso dolphins were sighted, these were sighted again at Station 60. When large numbers of seabirds were spotted in the water these were also recorded, which included large groups of Guillemot and Greater Black-backed Gulls at several locations.

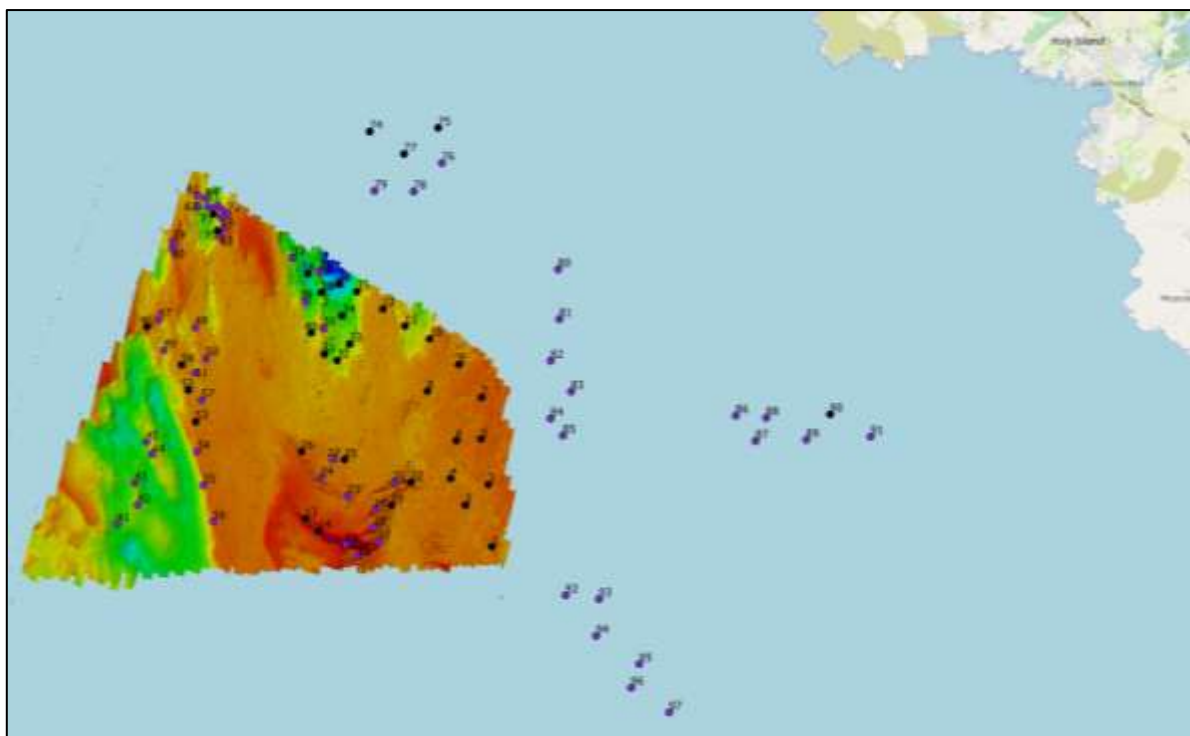


Figure 13. Drop-down video sample stations (purple = stations surveyed, black = stations not completed)

Table 3. Biotopes recorded during the West Anglesey DDV survey

Biotope Code	Biotope Description
SS.SBR.PoR.SpiMx	<i>Sabellaria spinulosa</i> on stable circalittoral mixed sediment
SS.SCS.CCS	Circalittoral coarse sediment
SS.SMx	Sublittoral mixed sediment
SS.SMx.CMx	Circalittoral mixed sediment
SS.SMx.CMx.FluHyd	<i>Flustra foliacea</i> and <i>Hydrallmania falcata</i> on tide-swept circalittoral mixed sediment
SS.SSa	Sublittoral sands and muddy sands

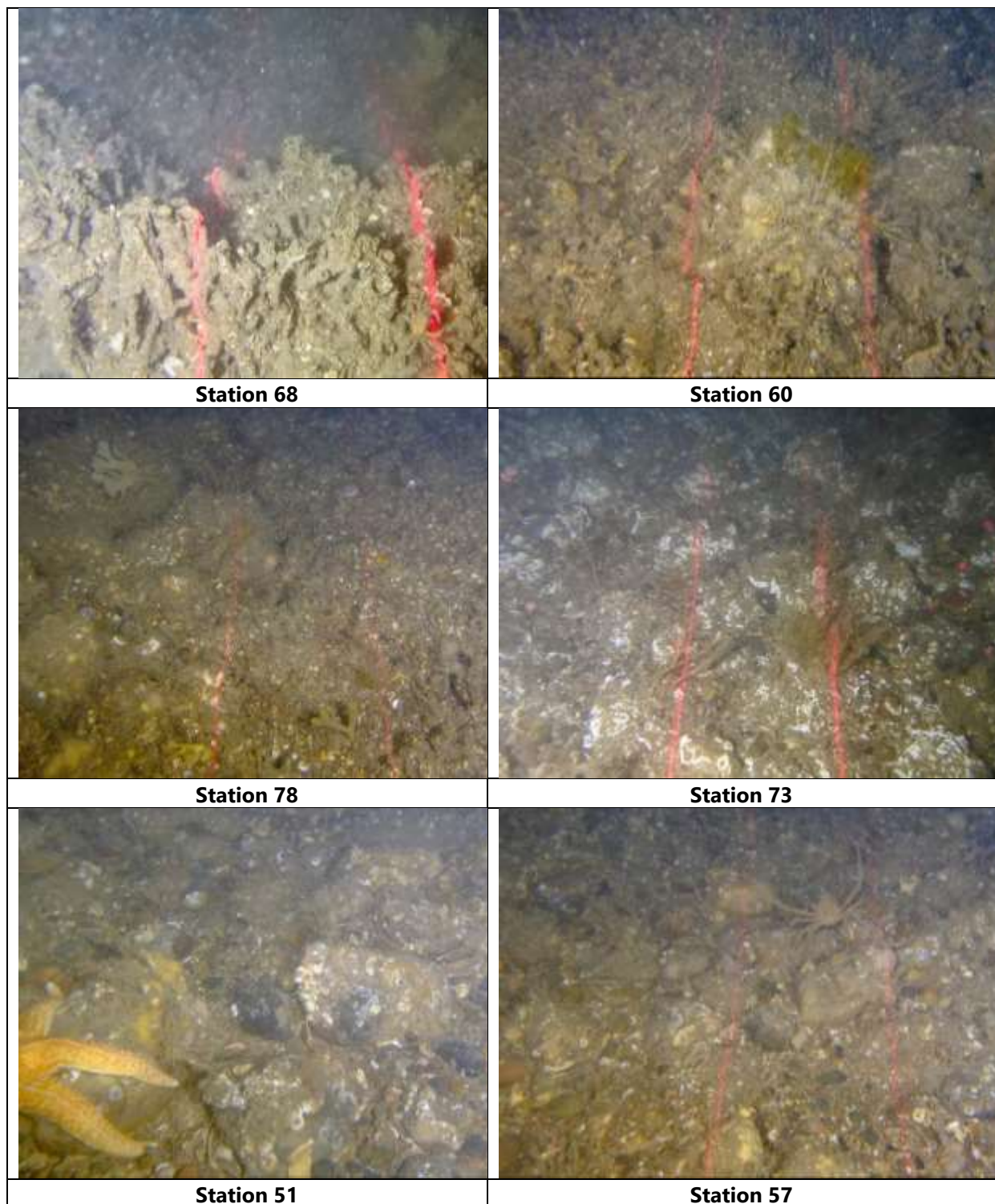


Figure 14. Example of habitats encountered during the West Anglesey DDV survey

4.3 Data interpretation

Following the geophysical survey bathymetric and backscatter data were post-processed in ArcGIS 10.5 and data were groundtruthed against the imagery obtained during the DDV surveys, to determine the seabed sediment types present within the survey areas and to identify and features of interest such as reef habitat.

4.3.1 Pembrokeshire

At Pembrokeshire a range of sediment types were identified from mobile sand and mixed sediment to geogenic reef and high energy circalittoral bedrock, characteristic of tide-swept environments (Figure 15)

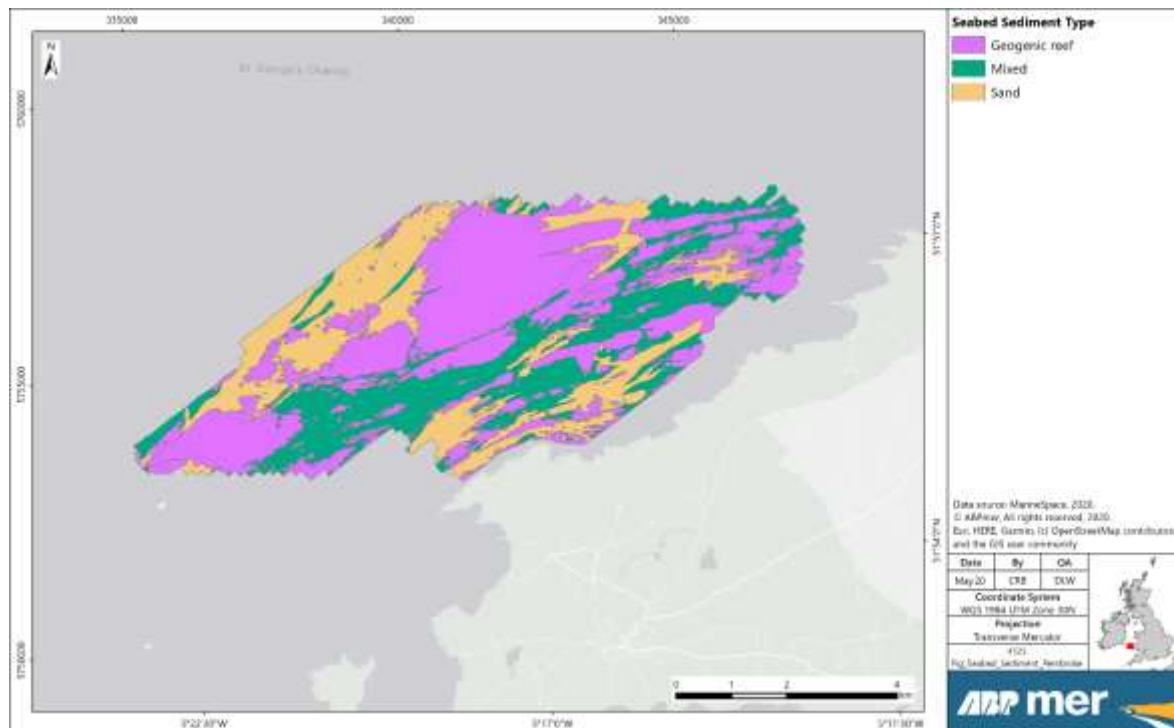


Figure 15. Seabed sediments identified at Pembrokeshire following geophysical data interpretation

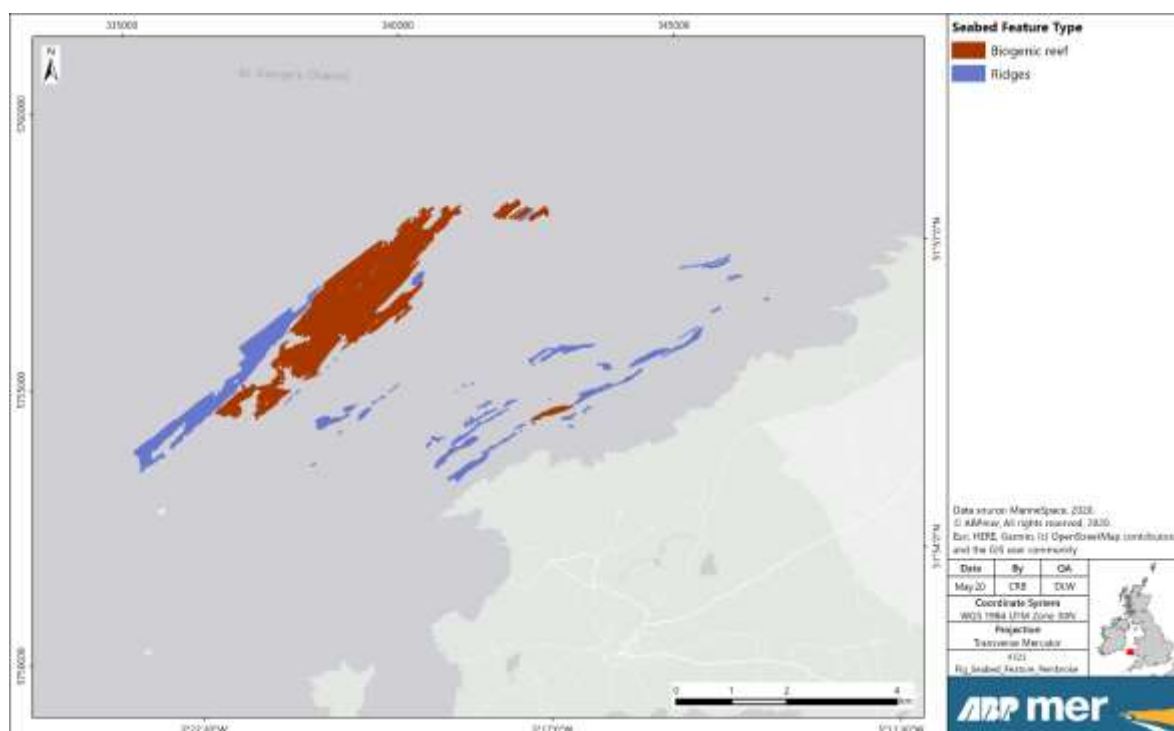


Figure 16. Features of interest identified at Pembrokeshire following geophysical data interpretation

To the north-west of the survey area biogenic reef features were also identified, following DDV groundtruthing these were identified as a mosaic of *Mytilus edulis* and *Sabellaria sp.* beds. Within the north-west of the site, and in inshore areas to the south-east, ridge features were recorded (Figure 16).

4.3.2 West Anglesey

At West Anglesey the sediment types were less diverse than those recorded at Pembrokeshire but still characteristic of tide-swept environments, with large areas of species poor mobile sands and mixed sediments (Figure 17). Between the areas of sandy sediment, in the central and eastern parts of the survey area a series of ridge features were identified. Moving west of this some areas of potential biogenic reef were identified within the bathymetry data, however no DDV data is available from the central area to provide definitive groundtruthing. DDV data was able to confirm the presence of biogenic reef in the areas identified to the far west and north of the survey area, formed by *Sabellaria sp.* (Figure 18).

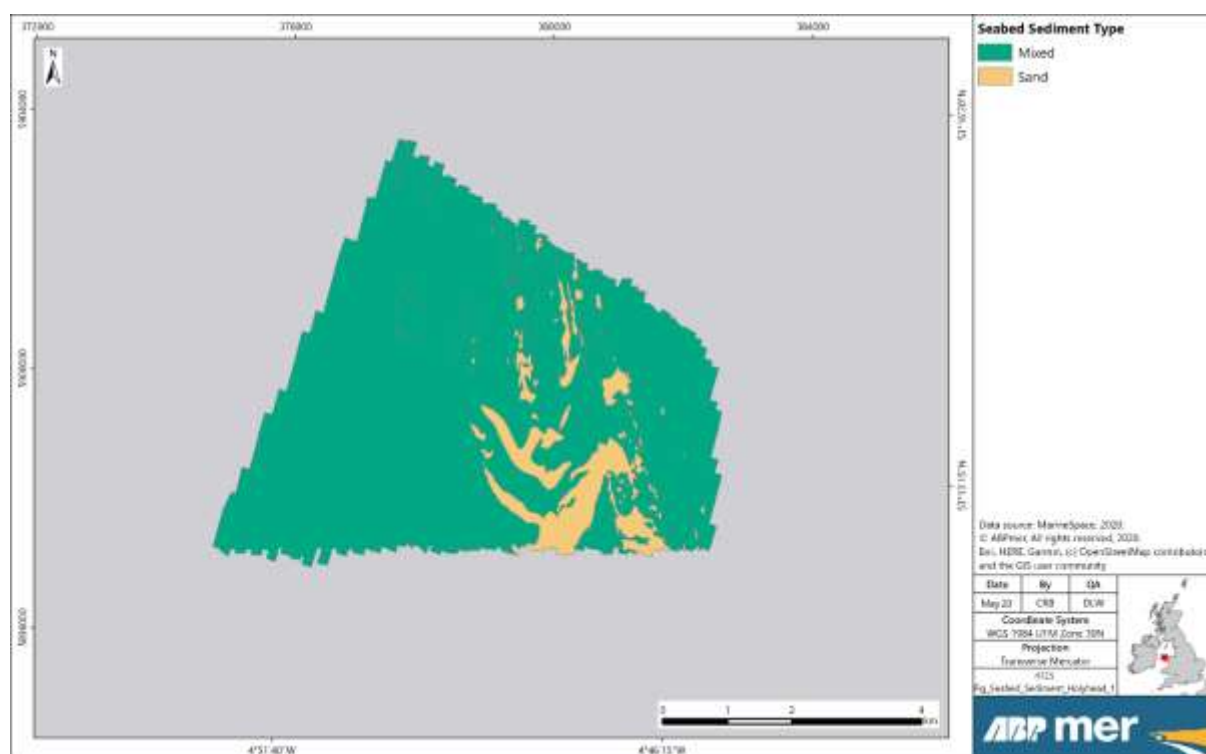


Figure 17. Seabed sediments identified at West Anglesey following geophysical data interpretation

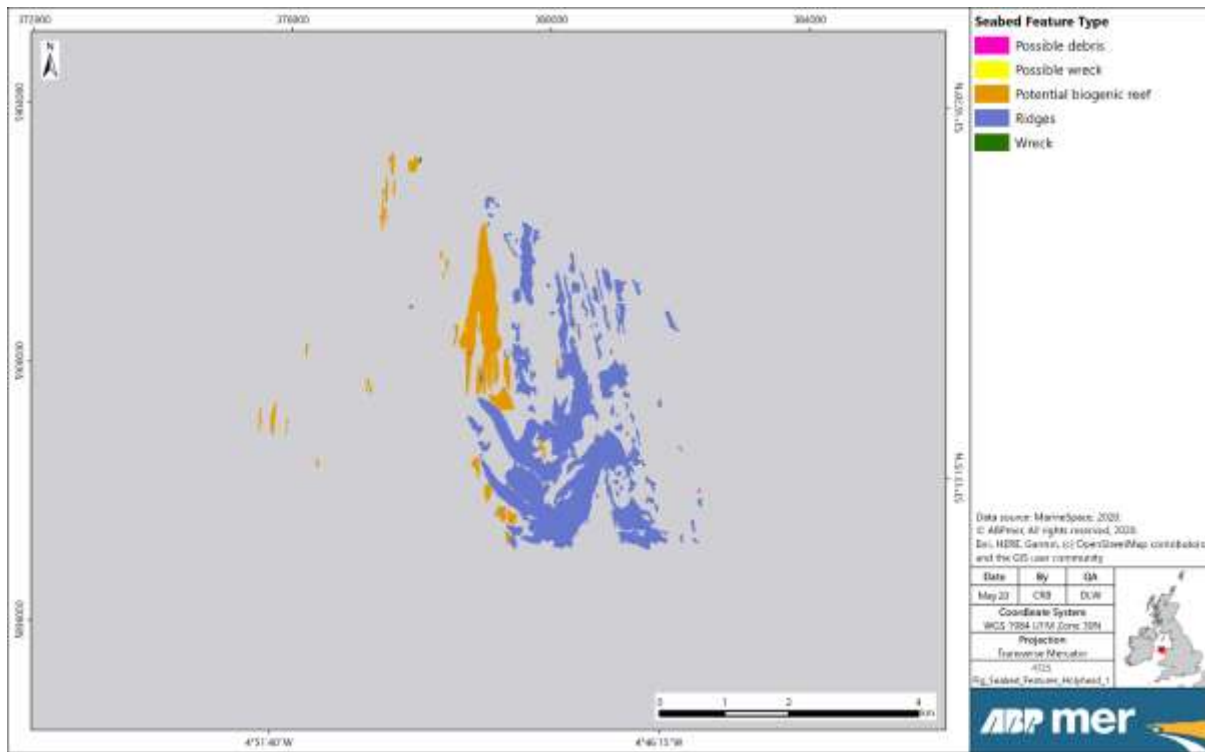


Figure 18. Features of interest identified at West Anglesey following geophysical data interpretation

5 Conclusions

Approximately 65 km² of seabed was surveyed during the geophysical, bathymetric and backscatter, surveys off the coast of Pembrokeshire and West Anglesey. From the geophysical data interpretation and the subsequent DDV groundtruthing a range of habitats and biotopes were identified across these areas. Many of the biotopes recorded were characteristic of tide-swept environments, such as areas of scoured rocky reef, mixed coarse sediments and species poor mobile sands.

The greatest diversity of habitats and features were present within the Pembrokeshire survey area. Across the Pembrokeshire survey area there were extensive areas of both geogenic and biogenic reef, which had not been previously recorded. Within the north-west region of the survey area an unusual biogenic reef feature was particularly prevalent, with reef consisting of discrete mosaics of reef-building polychaete, *Sabellaria sp.* and the bivalve mollusc, blue mussel *M. edulis*. These mosaic reef features are not widely cited within the scientific literature and have not previously been recorded in south Wales. However, the longevity of such *Sabellaria/M. edulis* beds is currently unknown and further monitoring would be required to assess the longevity of this feature.

In contrast, at Anglesey there were comparatively sparse faunal communities and large expanses of mobile sand and mixed substrata. However, patches of biogenic *Sabellaria sp.* reef were noted in the north region of the survey area. Overlapping with the eastern extent of the survey area were historic data indicating the potential presence of poor quality *Sabellaria* reef. During the survey only one record of patchy, low quality *Sabellaria* reef was found in this overlapping area, at Station 97, providing confirmation on its presence and extent around this area.

Overall, the results from both surveys have helped to provide a greater resolution and understanding of habitats within each area, beyond that recorded by existing predicted habitat maps. Knowledge on the presence and quality of the biogenic reef features recorded at both Pembrokeshire and west Anglesey will assist with considerations for future development in these areas.

Building upon the outputs of this study, it is recommended that future work seeks to address some of the remaining data gaps. To provide greater confidence in the data interpretation, further ground truthing work could be carried out in the form of additional DDV surveys, addressing areas of interest which could not be covered during the current surveys. Supplementary benthic surveys, covering the additional sites highlighted during the options appraisal, such as those areas around Bardsey and North Anglesey could also be considered (see ABPmer, 2019b).

As noted above, little is known about the longevity of the *Sabellaria/M. edulis* feature recorded at Pembrokeshire; however, as *Sabellaria* and *M. edulis* beds can be ephemeral (e.g. Callaway *et al.*, 2010; Solandt *et al.*, 2020), understanding the temporal nature of this feature is important for consideration of whether it would qualify as a 'biogenic reef' under conservation legislation. This highlights the importance of establishing monitoring programmes to provide evidence on such benthic features and assist site characterisation and therefore planning.

This survey programme has focussed on gathering evidence in relation to benthic features in Welsh waters. Recommendations from Part 1 considered a variety of survey types required to address the ecological data gaps across Wales, which in addition to benthic surveys, included combined aerial seabird and marine mammal surveys (ABPmer, 2019a⁴).

⁴ <https://gov.wales/sustainable-management-marine-natural-resources>

During the benthic surveys, incidental records were made of several marine mammal species, (i.e. Risso's dolphin, bottlenose dolphin, harbour porpoise and grey seals), as well as a range of seabird species. Multiyear surveys, spanning across the seasons, would provide more accurate information on marine mammal and seabird distribution, highlighting important foraging areas in Welsh waters. Combining such information with benthic data will provide greater confidence for defining site selection for the focus sectors.

The results from the analysis of the drop-down video surveys presented in the current report are available the Welsh Government website⁵. In addition, further analysis of the videos was commissioned by NRW and these results have been incorporated into Marine Recorder⁶.

⁵ <https://gov.wales/sustainable-management-marine-natural-resources>

⁶ <https://jncc.gov.uk/our-work/marine-recorder/#marine-recorder-data>

6 References and Websites

ABPmer (2019a) Sustainable Management of Marine Natural Resources, Work Package 1, ABPmer Report No. R.3065. A report produced by ABPmer for Welsh Government, February 2019.

ABPmer (2019b) Sustainable Management of Marine Natural Resources - Part 2, Detailed Work Plan, ABPmer Report No. R.3231. A report produced by ABPmer for Welsh Government, July 2019.

ABPmer, (2020) Sustainable Management of Marine Natural Resources - Part 2, Overview, ABPmer Report No. 3525. A report produced by ABPmer for Welsh Government, October 2020.

Callaway, R., Desroy, N., Dubois, S., Fournier, J., Frost, M., Godet, L., Hendrick, V., Rabaut, M., (2010). Ephemeral Bio-engineers or Reef-building Polychaetes: How Stable are Aggregations of the Tube Worm *Lanice conchilega* (Pallas, 1766), *Integrative and Comparative Biology*, Volume 50, Issue 2, August 2010, Pages 237-250, <https://doi.org/10.1093/icb/icq060>

MEDIN (2016). MEDIN data guideline for video surveys v4.2. <https://www.medin.org.uk/data-standards/medin-data-guidelines>

Natural Resources Wales (NRW) (2018). Benthic habitat assessment guidance for marine developments and activities. Guidance for undertaking benthic marine habitat survey and monitoring Guidance for developers and NRW staff. Guidance note: GN030.

Solandt, J., Mullier, T., Elliott, S., Sheehan, E., (2020). Chapter 9 - Managing marine protected areas in Europe: Moving from 'feature-based' to 'whole-site' management of sites. *Marine Protected Areas* 157-181.

<https://gov.wales/sites/default/files/consultations/2018-02/draft-plan-en.pdf>

<https://gov.wales/sites/default/files/publications/2019-11/sustainable-management-of-marine-natural-resources-part-2.pdf>

<https://gov.wales/sustainable-management-marine-natural-resources>

<https://jncc.gov.uk/our-work/marine-recorder/#marine-recorder-data>

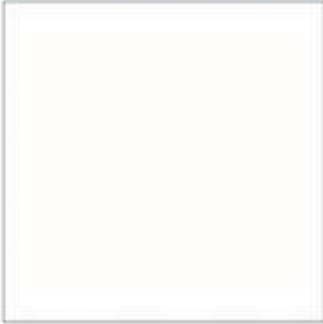
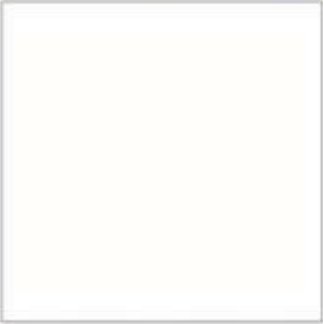
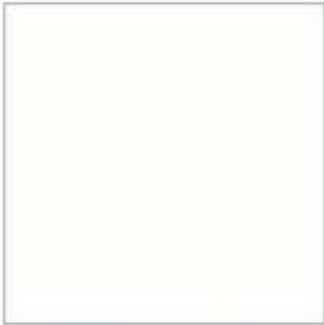
7 Abbreviations/Acronyms

ANLX	Pembroke Ordnance Survey GPS Active Station
AOI	Area of Interest
CD	Chart Datum
CUBE	Combined Uncertainty and Bathymetric Estimator
DDV	Drop-Down Video
EMFF	European Maritime and Fisheries Fund
FMGT	Fledermaus Geocoder Toolbox
FPV	Fisheries Patrol Vessel
GMT	Greenwich Mean Time
GN	Guidance Note
GNSS	Global Navigation Satellite System
GoPro	GoPro, Inc
GPS	Global Positioning System
HIPS & SIPS	Hydrographic Data Processing System (Caris)
HOLY	Holyhead Ordnance Survey GPS Active Station
HSE	Health and Safety Executive
LED	Light-Emitting Diode
MBES	Multibeam Echosounder
MEDIN	Marine Environmental Data and Information Network
MMS	Mobile Mapping Suite
MPA	Marine Protected Area
MV	Motor Vessel
NRW	Natural Resources Wales
POS MV	(Applanix) provides accurate position, heading, attitude, heave, and velocity data of marine vessel
QPS	Quality Positioning Services
RINEX	Receiver Independent Exchange Format
SAC	Special Areas of Conservation
SBET	Smoothed Best Estimate of Trajectory
SIS	Seafloor Information System
SLV	Stills, Laser and Video
SMMNR	Sustainable Management of Marine Natural Resource
SPA	Special Protection Area
SRA	Strategic Resource Area
TPU	Total Propagated Uncertainty
U	U-Boat (German Submarine)
UKHO	United Kingdom Hydrographic Office
USS	United States Ship
VORF	Vertical Offshore Reference Frames
WGS84	World Geodetic System (1984)
WNMP	Welsh National Marine Plan

Cardinal points/directions are used unless otherwise stated.

SI units are used unless otherwise stated.

Appendices



Innovative Thinking - Sustainable Solutions

A Drop Down Video Pro-forma

4725 SMMNR DDV 2019

Station Number:	Area Number:	
Date:	Weather:	
Coordinates Down:	Time down (GMT):	Depth down (m):
Coordinates Up:	Time up (GMT):	Depth up (m):

Substrate	Section 7
Rock	Subtidal sands and gravels
Mixed	Subtidal mixed muddy sediments
Soft sediment (mud/sand)	
Reef (R, S, B) (rocky, stony, biogenic)	Sponge and anthozoan communities on rock
Other:	

Total No of Photos:			
Photo #	Time	Depth	Observations/ Notes

Additional Notes (species, non-natives, anthropogenic impact, marine mammals):

Figure A1. Drop-down video survey recording form - SMMNR survey 2019

B Survey Log and Imagery Analysis

B.1 Pembrokeshire

Table B1. Pembrokeshire Survey Log

Station No.	Area No.	Date	Coordinates Down		Coordinates Up		Time Down (GMT)	Time Up (GMT)	Depth (m)	Number of Photos	Substrate Type	Reef	Section 7 Habitat	Biotope	Additional Observations	Qualifying Habitat
			Lat	Long	Lat	Long										
2	1	26/09/2019	51°54.911'N	005°19.322'W	51°54.911'N	005°19.322'W	12:26	12:28	40	5	Rock	Rocky		CR.HCR.XFa.FluCoAs	Bedrock with hydroid/bryozoan turf with <i>Flustra foliacea</i> (com).	Article 17
25a	1	26/09/2019	51°54.950'N	005°17.671'W	51°54.950'N	005°17.671'W	12:47	12:51	27.4	5	Rock	Biogenic		CR.MCR.Cmus.Cmyt	Bedrock with dense foliose hydroid and bryozoan turf and <i>Mytilus edulis</i> reef. <i>Thuria thuja</i> (com-abund); <i>M. edulis</i> (com); <i>Urticina</i> sp. (occ) in sediment surrounding reef. Encrusting sponges. <i>Axinellid</i> sponges (rare); <i>Alcyonium digitatum</i> (occ).	Article 17
25b	1	26/09/2019	51°54.950'N	005°17.671'W	51°54.950'N	005°17.671'W	12:47	12:51	27.4	5	Sand	No	Subtidal sands and gravels	SS.SSa	Sand within bedrock gully with <i>Urticina</i> sp. (occ).	Section 7
24	1	26/09/2019	51°55.109'N	005°17.543'W	51°54.111'N	005°17.542'W	13:37	13:39	39.6	5	Mixed	Stony		SS.SCS.CCS.PomB	Consolidated cobbles and pebbles. <i>Spirobranchus</i> sp. (occ); <i>Paguridae</i> (rare); <i>Mytilus edulis</i> shell debris.	Article 17
21	1	26/09/2019	51°55.334'N	005°17.102'W	51°55.334'N	005°17.102'W	13:46	13:49	33	5	Rock	Rocky	Sponge and anthozoan communities on rock	CR.HCR.XFa.ByErSp	Bedrock with encrusting and erect sponges and anthozoans and bryozoans. <i>Crassostea paposus</i> (rare).	Article 17; Section 7
29	1	26/09/2019	51°55.221'N	005°16.809'W	51°55.221'N	005°16.809'W	13:59	14:01	34.8	3	Sand	No	Subtidal sands and gravels	SS.SSa	Bare sand with <i>Mytilus edulis</i> shell debris.	Section 7
23	1	26/09/2019	51°55.078'N	005°16.764'W	51°55.075'N	005°16.763'W	14:08	14:10	24.3	5	Rock	Rocky		CR.HCR.Xfa	Bedrock outcrop with foliose hydroid and bryozoan turf.	Article 17
22	1	26/09/2019	51°55.200'N	005°16.466'W	51°55.198'N	005°16.456'W	14:17	14:19	23.1	1	Rock	Rocky		CR.HCR.Xfa.FluCoAs	Bedrock outcrop with hydroid and bryozoan turf with ascidians. <i>Polyclinum aurantium</i> (com); <i>Ascidia</i> sp. (freq); <i>Antedon bifida</i> (freq)	Article 17
30	1	26/09/2019	51°55.321'N	005°16.599'W	51°55.321'N	005°16.599'W	14:26	14:28	32.5	2	Sand	No	Subtidal sands and gravels	SS.SSa	Bare sand with <i>Mytilus edulis</i> shell debris.	Section 7
20	1	26/09/2019	51°55.410'N	005°16.812'W	51°55.409'N	005°16.768'W	14:35	14:37	34	2	Mixed	No			Toe of boulder/bedrock outcrop. Consolidated cobbles and pebbles with sand overlay. Encrusting sponges on toe of bedrock/boulders. <i>Urticina</i> sp. (rare) in interstitial spaces.	No
37	2	26/09/2019	51°55.720'N	005°15.802'W	51°55.718'N	005°15.795'W	14:50	14:52	31.3	2	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Barren pebbles with <i>Mytilus edulis</i> shell debris.	Section 7
36	2	26/09/2019	51°55.800'N	005°15.557'W	51°55.800'N	005°15.557'W	14:57	14:59	29.7	2	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Barren pebbles with <i>Mytilus edulis</i> shell debris.	Section 7
35	2	26/09/2019	51°55.841'N	005°15.433'W	51°55.843'N	005°15.416'W	15:05	15:06	29.5	2	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Sand with pebbles and occasional <i>Mytilus edulis</i> shell debris	Section 7
34	2	26/09/2019	51°55.893'N	005°15.103'W	51°55.898'N	005°15.087'W	15:13	15:15	28.3	3	Sand	No	Subtidal sands and gravels	SS.SSa	Mobile sand with <i>Mytilus edulis</i> shell debris.	Section 7
32	2	26/09/2019	51°55.979'N	005°14.925'W	51°55.977'N	005°14.907'W	15:23	15:25	21.9	2	Sand	No	Subtidal sands and gravels	SS.SSa	Mobile sand with <i>Mytilus edulis</i> shell debris.	Section 7
33	2	26/09/2019	51°56.020'N	005°14.922'W	51°56.014'N	005°14.906'W	15:32	15:33	18.4	3	Sand	No	Subtidal sands and gravels	SS.SSa	Mobile sand with <i>Mytilus edulis</i> shell debris.	Section 7
31	2	26/09/2019	51°56.044'N	005°14.842'W	51°56.048'N	005°14.841'W	15:41	15:42	17.2	3	Sand	No	Subtidal sands and gravels	SS.SSa	Bare mobile sand.	Section 7
38	2	26/09/2019	51°56.034'N	005°15.020'W	51°56.033'N	005°15.015'W	15:47	15:49	22.4	4	Sand	No	Subtidal sands and gravels	SS.SSa	Mobile sand with <i>Mytilus edulis</i> shell debris. Encroaching upon cobbles with attached <i>Flustra foliacea</i> (occ).	Section 7
17	1	26/09/2019	51°56.087'N	005°14.719'W	51°56.099'N	005°14.714'W	15:56	15:58	13	2	Rock	Rocky	Sponge and anthozoan communities on rock	IR.HIR	Tideswept/ high energy infralittoral bedrock with red alga <i>Rhodomenia pseudopalmeta</i> (?) on upper surfaces with dense turf of encrusting and erect sponges and hydroids/bryozoans. Overhang dominated by encrusting and erect sponges and faunal turf. <i>Membranoptera membrinacea</i> (?) encrusting some of the <i>Rho. pseudopalmeta</i> (occ).	Article 17; Section 7

Station No.	Area No.	Date	Coordinates Down		Coordinates Up		Time Down (GMT)	Time Up (GMT)	Depth (m)	Number of Photos	Substrate Type	Reef	Section 7 Habitat	Biotope	Additional Observations	Qualifying Habitat
			Lat	Long	Lat	Long										
17(2)	1	26/09/2019	51°56.089'N	005°14.722'W	51°56.089'N	005°14.722'W	15:58	16:01	14.7	3	Rock	Rocky	Sponge and anthozoan communities on rock	IR.HIR	Tideswept/ high energy infralittoral bedrock with red alga <i>Rhodomyenia pseudopalmata</i> (?) on upper surfaces with dense turf of encrusting and erect sponges and hydroids/bryozoans. Overhang dominated by encrusting and erect sponges and faunal turf. <i>Pachymatisma johnstonia</i> (occ).	Article 17; Section 7
18	1	26/09/2019	51°56.215'N	005°14.754'W	51°56.217'N	005°14.758'W	16:10	16:12	23.5	6	Rock	Rocky	Sponge and anthozoan communities on rock	CR.HCR.XFa.SpAnVt	Tideswept/high energy circalittoral bedrock with dense turf of encrusting and erect sponges and hydroids/bryozoans and anthozoans. Diverse community: <i>Corynactis viridis</i> (occ); <i>Caryophyllia smithii</i> (occ); <i>Sagartia elegans/Actinothoe sphyrodeta</i> (occ); notable <i>Axinella polypoides</i> (occ); <i>Raspailia ramosa</i> (occ); <i>Cellaria</i> sp. (occ); Dispersed low density <i>Mytilus edulis</i> spat embedded in surficial turf in places (not reef).	Article 17; Section 7
16	1	26/09/2019	51°56.118'N	005°15.050'W	51°56.118'N	005°15.050'W	16:22	16:23	17	2	Rock	Rocky	Sponge and anthozoan communities on rock	CR.HCR.XFa.SpAnVt	Tideswept/ high energy circalittoral bedrock with dense turf of encrusting and erect sponges and hydroids/bryozoans and anthozoans. Diverse community: <i>Corynactis viridis</i> (occ); <i>Caryophyllia smithii</i> (occ); <i>Sagartia elegans/Actinothoe sphyrodeta</i> (occ); notable <i>Axinella polypoides</i> (occ); <i>Raspailia ramosa</i> (occ). <i>Cellaria</i> sp. (freq); <i>Crisia</i> sp. (com); <i>Adocia cineria</i> (freq). <i>Echinus esculentus</i> (rare).	Article 17; Section 7
16(2)	1	26/09/2019	51°56.137'N	005°15.043'W	51°56.145'N	005°15.024'W	16:24	16:27	25	4	Rock	Rocky	Sponge and anthozoan communities on rock	CR.HCR.XFa.SpAnVt	Tideswept/ high energy circalittoral bedrock with dense turf of encrusting and erect sponges and hydroids/bryozoans and anthozoans. Diverse community: <i>Corynactis viridis</i> (occ); <i>Caryophyllia smithii</i> (occ); <i>Sagartia elegans/Actinothoe sphyrodeta</i> (occ); notable <i>Axinella polypoides</i> (occ); <i>Raspailia ramosa</i> (occ); <i>Flustra foliacea</i> (com-abun); <i>Pachymatisma johnstonia</i> (occ); <i>Alcyonidium hirsutum</i> (?) (occ); <i>Alcyonidium diaphanum</i> (rare).	Article 17; Section 7
19	1	26/09/2019	51°56.177'N	005°15.093'W	51°56.183'N	005°15.092'W	16:30	16:32	24.4	2	Rock	Rocky	Sponge and anthozoan communities on rock	CR.HCR.XFa.ByErSp	Tideswept/ high energy circalittoral bedrock with dense turf of encrusting and erect sponges and hydroids/bryozoans and anthozoans. Diverse community: <i>Corynactis viridis</i> (occ); <i>Caryophyllia smithii</i> (occ); <i>Sagartia elegans/Actinothoe sphyrodeta</i> (occ); notable <i>Axinella polypoides</i> (occ); <i>Raspailia ramosa</i> (occ); <i>Flustra foliacea</i> (com-abun); <i>Crisia</i> sp. (freq); <i>Pachymatisma johnstonia</i> (occ); <i>Myxilla</i> sp. (occ); <i>Echinus esculentus</i> (rare).	Article 17; Section 7
15	1	26/09/2019	51°56.045'N	005°15.221'W	51°56.038'N	005°15.212'W	16:39	16:41	18.7	3	Rock	Rocky		CR.HCR.Xfa	Tideswept/high energy infralittoral bedrock with dense turf of encrusting and erect sponges and hydroids/bryozoans and anthozoans with red alga <i>Rhodomyenia pseudopalmata</i> (?) (rare) on upper surfaces. Diverse community: <i>Clathrina coriacea</i> (?) (rare); <i>Corynactis viridis</i> (occ); <i>Caryophyllia smithii</i> (occ); <i>Sagartia elegans/Actinothoe sphyrodeta</i> (occ); <i>Crisia</i> sp. (com); <i>Echinus esculentus</i> (occ). <i>Labrus bergylta</i> .	Article 17
14	1	26/09/2019	51°56.046'N	005°15.555'W	51°56.039'N	005°15.523'W	16:48	16:50	24	4	Rock	Rocky	Sponge and anthozoan communities on rock	CR.HCR.XFa.ByErSp	Tideswept/ high energy infralittoral-circalittoral bedrock/bedrock gulley with dense turf of encrusting and erect sponges and hydroids/bryozoans and anthozoans. Diverse community: <i>Clathrina coriacea</i> (?) (rare); <i>Corynactis viridis</i> (occ); <i>Caryophyllia smithii</i> (occ); <i>Sagartia elegans/Actinothoe sphyrodeta</i> (occ); <i>Crisia</i> sp. (com); <i>Polymastia boletiformis</i> (occ); <i>Cellaria</i> sp. (occ); <i>Pachymatisma johnstonia</i> (occ); notable <i>Axinella polypoides</i> (occ).	Article 17; Section 7
13	1	26/09/2019	51°55.896'N	005°15.832'W	51°55.892'N	005°15.825'W	16:57	16:59	32.4	3	Rock	Rocky		CR.HCR.Xfa	Boulders and cobbles at bedrock base with <i>Balanus crenatus</i> (freq) and <i>Spriobranthus</i> sp. (com) and hydroid and bryozoan diverse epifaunal turf and encrusting sponges. <i>Halecium halecinum</i> (freq); <i>Calliostoma zizyphinum</i> (rare).	Article 17
12	1	26/09/2019	51°55.844'N	005°16.327'W	51°55.874'N	005°16.257'W	17:06	17:10	31.5	3	Rock	Rocky	Sponge and anthozoan communities on rock		Transition from rock reef across toe and boulder field to interstitial sand deposits. Low hydroid and bryozoan turf with encrusting sponges and anthozoans transitioning to inundated area by shell gravel with <i>Flustra foliacea</i> (freq) and <i>Urticina</i> sp. (occ) and <i>Halecium halecinum</i> (occ).	Article 17; Section 7

Station No.	Area No.	Date	Coordinates Down		Coordinates Up		Time Down (GMT)	Time Up (GMT)	Depth (m)	Number of Photos	Substrate Type	Reef	Section 7 Habitat	Biotope	Additional Observations	Qualifying Habitat
			Lat	Long	Lat	Long										
11a	1	26/09/2019	51°55.822'N	005°16.606'W	51°55.833'N	005°16.610'W	17:29	17:31	28.5	6	Rock	Rocky	Sponge and anthozoan communities on rock		Tideswept/ high energy circalittoral bedrock and boulders with dense turf of encrusting and erect sponges and hydroids/bryozoans and anthozoans. Diverse community: dominated by <i>Crisia sp.</i> (freq); <i>Cellaria sp.</i> (com); <i>Flustra foliacea</i> (com); <i>Sagartia elegans/Actinothoe sphyrodeta</i> (occ); <i>Raspailia ramosa</i> (occ); <i>Hydrallmania falcata</i> (occ); <i>Alcyonium glomeratum</i> (rare); <i>Dendrodoa grossularia</i> (solitary) (rare); <i>Kirchenpaueria pinnata</i> (rare); <i>Henricia oculata</i> (rare); <i>Calliostoma zizyphinum</i> (rare).	Article 17; Section 7
11b	1	26/09/2019	51°55.822'N	005°16.606'W	51°55.833'N	005°16.610'W	17:29	17:31	28.5	6	Mixed	Stony			Tideswept/high energy circalittoral bedrock and boulders with dense turf of encrusting and erect sponges and hydroids/bryozoans and anthozoans. Diverse community: dominated by <i>Crisia sp.</i> (freq); <i>Cellaria sp.</i> (com); <i>Flustra foliacea</i> (com); <i>Sagartia elegans/Actinothoe sphyrodeta</i> (occ); <i>Raspailia ramosa</i> (occ); <i>Hydrallmania falcata</i> (occ); <i>Alcyonium glomeratum</i> (rare); <i>Dendrodoa grossularia</i> (solitary); <i>Kirchenpaueria pinnata</i> (rare); <i>Henricia oculata</i> (rare); <i>Calliostoma zizyphinum</i> (rare).	Article 17
58	4	27/09/2019	51°55.911'N	005°20.253'W	51°55.839'N	005°20.398'W	09:58	09:59	49.5	0	Sand	Biogenic	Subtidal sands and gravels	SS.SSa	Mobile sand with some shell debris. Isolated patchy aggregations possibly associated with <i>Mytilus edulis</i> .	Section 7
58(2)	4	27/09/2019	51°55.920'N	005°20.334'W	51°55.858'N	005°20.337'W	10:11	10:12	49.5	0	Sand	Biogenic	Subtidal sands and gravels	SS.SSa	Mobile sand with some shell debris. Isolated patchy biogenic aggregations possibly associated with <i>Mytilus edulis</i> .	Section 7
58(3)	4	27/09/2019	51°55.915'N	005°20.258'W	51°55.895'N	005°20.282'W	10:18	10:20	49.5	3	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.Smus	Mobile sand with some shell debris. Isolated patchy biogenic aggregations associated with <i>Mytilus edulis</i> (com). <i>Urticina sp</i> (occ); <i>Cellaria sp.</i> (rare); <i>Paguridae</i> ; <i>Carcinus maenas</i> (rare); <i>Pelaeomon sp.</i> (rare); isolated <i>Sabellaria spinulosa</i> tubes (rare); ascidians (rare).	Article 17; Section 7
59	4	27/09/2019	51°56.025'N	005°20.063'W	51°56.027'N	005°20.061'W	10:29	10:31	50.2	3	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx/SS.SBR.Smus	Mobile sand with some shell debris. Extensive biogenic aggregations associated with <i>Mytilus edulis</i> (common) mosaiced with <i>Sabellaria spinulosa</i> aggregations (com). Encrusting sponges <i>Urticina sp</i> (occ); <i>Cellaria sp.</i> (rare); <i>Flustra foliacea</i> (occ); <i>Paguridae</i> ; <i>Liocarcinus holsatus</i> (rare); <i>Necora puber</i> (rare); <i>Pandalus montagui</i> (rare); <i>Aequipecten opercularis</i> (rare); ascidians (rare); <i>Sabella pavonina</i> (rare).	Article 17 - <i>Mytilus edulis</i> & <i>Sabellaria spinulosa</i> mosaic reef; Section 7
56	4	27/09/2019	51°55.905'N	005°20.753'W	51°55.863'N	005°20.794'W	10:39	10:41	50.5	2	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx/SS.SBR.Smus	Mobile sand with some shell debris. Extensive biogenic aggregations associated with <i>Mytilus edulis</i> (com) with isolated <i>Sabellaria spinulosa</i> aggregations (occ). <i>Asteria rubens</i> (rare).	Article 17 - <i>Mytilus edulis</i> & <i>Sabellaria spinulosa</i> mosaic reef; Section 7
57	4	27/09/2019	51°56.005'N	005°20.569'W	51°56.930'N	005°20.648'W	10:50	10:52	50.5	3	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx/SS.SBR.Smus	Mobile sand with some shell debris. Extensive biogenic aggregations associated with <i>Mytilus edulis</i> (com) with isolated <i>Sabellaria spinulosa</i> aggregations (occ). <i>Asteria rubens</i> (rare).	Article 17 - <i>Mytilus edulis</i> & <i>Sabellaria spinulosa</i> mosaic reef; Section 7
67	4	27/09/2019	51°56.077'N	005°20.402'W	51°56.032'N	005°20.471'W	11:03	11:06	50.5	3	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx/SS.SBR.Smus	Mobile sand with some shell debris. Extensive biogenic aggregations associated with <i>Mytilus edulis</i> (com) with isolated <i>Sabellaria spinulosa</i> tubes (occ).	Article 17 - <i>Mytilus edulis</i> & <i>Sabellaria spinulosa</i> mosaic reef; Section 7
61	4	27/09/2019	51°55.986'N	005°21.054'W	51°55.942'N	005°21.143'W	11:13	11:15	53	4	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.Smus	Mobile sand with some shell debris. Edge of biogenic aggregations associated with <i>Mytilus edulis</i> (freq) with isolated <i>Sabellaria spinulosa</i> tubes (occ).	Article 17; Section 7
62	4	27/09/2019	51°56.045'N	005°20.896'W	51°56.006'N	005°20.990'W	11:26	11:28	52.6	3	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.Smus	Mobile sand with some shell debris. Edge of biogenic aggregations associated with <i>Mytilus edulis</i> (freq). <i>Macropodia tenuirostris</i> (rare).	Article 17; Section 7
64	4	27/09/2019	51°56.144'N	005°20.723'W	51°56.105'N	005°20.837'W	11:40	11:43	52.5	3	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx/SS.SBR.Smus	Mobile sand with some shell debris. Extensive biogenic aggregations associated with <i>Mytilus edulis</i> (com) with isolated <i>Sabellaria spinulosa</i> tubes (occ). <i>Paguridae</i> (rare).	Article 17 - <i>Mytilus edulis</i> & <i>Sabellaria spinulosa</i> mosaic reef; Section 7
65	4	27/09/2019	51°56.194'N	005°20.869'W	51°56.156'N	005°20.974'W	11:50	11:52	52.7	4	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Mobile sand with occasional gravel and shell debris. Isolated aggregations of encrusting sponges and ascidians. <i>Spriobranthus sp.</i> (rare); <i>Inachus dorsettensis</i> .	Section 7
63	4	27/09/2019	51°56.288'N	005°20.669'W	51°56.250'N	005°20.776'W	12:01	12:03	52.5	5	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Mobile sand with occasional gravel and shell debris. Isolated aggregations of encrusting sponges and ascidians. <i>Spriobranthus sp.</i> (rare); <i>Nemertesia antennina</i> (rare); <i>Urticina sp.</i> (rare); juv. <i>Sagartia sp.</i> (rare); <i>Calliostoma zizyphinum</i> (rare); <i>Inachus dorsettensis</i> ; <i>Paguridae</i> (rare); <i>Mytilus edulis</i> spat present in small aggregations (occ). <i>Sabellaria spinulosa</i> tubes (occ).	Section 7

Station No.	Area No.	Date	Coordinates Down		Coordinates Up		Time Down (GMT)	Time Up (GMT)	Depth (m)	Number of Photos	Substrate Type	Reef	Section 7 Habitat	Biotope	Additional Observations	Qualifying Habitat
			Lat	Long	Lat	Long										
66	4	27/09/2019	51°56.1851'N	005°20.406'W	51°56.1851'N	005°20.406'W	12:14	12:16	52.6	2	Sand	Biogenic	Subtidal sands and gravels	SS.SSa	Mobile sand with <i>Mytilus edulis</i> (young) clumps.	Section 7
60	4	27/09/2019	51°56.114'N	005°20.151'W	51°56.097'N	005°20.187'W	12:24	12:27	48.9	4	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx/SS.SBR.Smus	Mobile sand with some shell debris. Biogenic aggregations associated with <i>Mytilus edulis</i> (com) with isolated <i>Sabellaria spinulosa</i> tubes (occ).	Article 17; Section 7
44	3	27/09/2019	51°56.457'N	005°19.348'W	51°56.348'N	005°19.365'W	12:40	12:42	44.3	3	Sand	No	Subtidal sands and gravels	SS.SSa	Sand with shell gravel.	Section 7
43	3	27/09/2019	51°56.465'N	005°19.198'W	51°56.452'N	005°19.230'W	12:46	12:47	42.8	5	Rock	Rocky		CR.HCR.XFa.ByErSp	Tideswept/ high energy circalittoral bedrock and boulders with dense turf of plumose and erect hydroids/bryozoans and occasional anthozoans. Diverse community: dominated by <i>Leuconia</i> sp. (occ); <i>Crisia</i> sp. (freq); <i>Cellaria</i> (freq); <i>Halecium halecinum</i> (occ); <i>Flustra foliacea</i> (occ); <i>Pentapora foliacea/fascialis</i> (occ); <i>Sagartia elegans</i> (occ); <i>Urticina</i> sp. (occ); <i>Alcyonium digitatum</i> (rare); <i>Clava multicornis</i> (occ); <i>Calliostoma zizyphinum</i> (rare); <i>Sabellaria spinulosa</i> tubes (occ); <i>Pandalus montagui</i> (occ); <i>Spirorbis spirobis</i> (rare); <i>Spirobranchus</i> sp. (rare).	Article 17
42	3	27/09/2019	51°56.556'N	005°19.184'W	51°56.545'N	005°19.217'W	12:53	12:55	41.7	3	Sand	No	Subtidal sands and gravels	SS.SSa	Sand with gravel.	Section 7
45	3	27/09/2019	51°56.663'N	005°19.226'W	51°54.650'N	005°19.285'W	12:59	13:01	43.1	3	Mixed	No		SS.SMx.CMx	Bedrock with sand veneer. Sparse bedrock fauna - hydroids and bryozoans with anthozoans covered by mobile sands. <i>Urticina</i> sp. (occ); <i>Asterias rubens</i> (rare); <i>Sabella pavonina</i> (rare).	No
41	3	27/09/2019	51°56.592'N	005°18.882'W	51°56.583'N	005°18.918'W	13:08	13:09	41.1	3	Rock	Rocky		CR.HCR.XFa.ByErSp	Tideswept/high energy circalittoral bedrock with dense turf of plumose and erect hydroids/bryozoans and anthozoans. Diverse community: dominated by <i>Crisia</i> sp. (freq); <i>Cellaria</i> (freq); <i>Sagartia elegans</i> (occ); <i>Urticina</i> sp. (freq); <i>Asteria rubens</i> (rare); <i>Henricia oculata</i> (rare); <i>Sabella pavonina</i> (rare).	Article 17
54	3	27/09/2019	51°56.696'N	005°18.897'W	51°56.685'N	005°18.942'W	13:15	13:17	42.8	3	Mixed	Stony		SS.SMx.CMx	Cobbles and pebbles with gravel and coarse sand with aggregations of <i>Mytilus edulis</i> . <i>Sertularia argentea</i> (occ); juv. <i>Urticina</i> sp. (rare); <i>Anomia ephippium</i> (rare); <i>Corella parallelograma</i> (rare); <i>Pandalus montagui</i> (rare).	Article 17
46	3	27/09/2019	51°56.820'N	005°19.018'W	51°56.809'N	005°19.071'W	13:23	13:25	48.3	5	Mixed	Rocky		SS.SMx.CMx	Bedrock and boulders with sand waves. Toe of bedrock reef. Mobile coarse sand with shell debris. Foliose hydroid and bryozoan turf on bedrock and boulders. <i>Urticina</i> sp. (occ); <i>Flustra foliacea</i> (occ); <i>Halecium halecinum</i> (occ); <i>Spirobranchus</i> sp. (rare); <i>Alcyonium digitatum</i> (rare).	Article 17
48	3	27/09/2019	51°56.868'N	005°18.676'W	51°56.867'N	005°18.700'W	13:32	13:34	40.8	3	Sand	No	Subtidal sands and gravels	SS.SSa	Mobile fine sand waves at toe of bedrock reef.	Section 7
47	3	27/09/2019	51°56.961'N	005°18.827'W	51°56.961'N	005°18.854'W	13:40	13:42	47.2	3	Mixed	No		SS.SMx.CMx	Mobile fine sand at toe of bedrock reef. <i>Cellaria</i> sp. (rare); <i>Hydrallmania falcata</i> (occ); <i>Halecium halecinum</i> (occ); <i>Mytilus edulis</i> (rare); <i>Sagartia</i> sp. (rare); <i>Sabella pavonina</i> (rare).	No
52	3	27/09/2019	51°57.006'N	005°18.469'W	51°57.009'N	005°18.481'W	13:50	13:51	37.8	2	Sand	No	Subtidal sands and gravels	SS.SSa	Mobile sand with small amount of shell debris.	Section 7
53	3	27/09/2019	51°57.071'N	005°18.599'W	51°57.077'N	005°18.628'W	13:54	13:56	46.5	3	Rock	Rocky		CR.HCR.Xfa	Silty bedrock with hydroid and bryozoan turf. Impoverished reef community with sparse erect and foliose hydroids and bryozoans. <i>Cellaria</i> sp. (occ); encrusting orange sponge (rare); possible <i>Molgula manhattensis</i> (occ); <i>Urticina</i> sp. (rare); <i>Asterias rubens</i> (rare).	Article 17
51	3	27/09/2019	51°57.105'N	005°18.358'W	51°57.115'N	005°18.375'W	14:03	14:05	41.6	3	Rock	Rocky	Sponge and anthozoan communities on rock	CR.HCR.Xfa	Tideswept/high energy circalittoral bedrock with dense turf of encrusting and erect sponges and hydroids/bryozoans and anthozoans. Diverse community: <i>Crisia</i> sp. (rare); <i>Corynactis viridis</i> (occ); <i>Sagartia elegans</i> (occ); juv. <i>Antedon bifida</i> (rare).	Article 17; Section 7
50	3	27/09/2019	51°57.037'N	005°18.113'W	51°57.047'N	005°18.118'W	14:09	14:11	40.9	2	Coarse	No	Subtidal sands and gravels	SS.SMx.CMx	Coarse sand with gravel and shell debris.	Section 7
55	3	27/09/2019	51°56.949'N	005°18.016'W	51°56.954'N	005°18.999'W	14:18	14:19	42.3	4	Sand	No		SS.SSa	Sand with <i>Sabellaria spinulosa</i> crust with juv. <i>Mytilus edulis</i> . Mosaic of <i>Sabellaria spinulosa</i> tubes (com-abun) forming crust with patches of juv. <i>Mytilus edulis</i> (freq) with patches of <i>Leucosolenia botryoides</i> (porifera) (occ); <i>Chartella papyracea</i> (rare).	Not reef
39a	3	27/09/2019	51°56.758'N	005°17.966'W	51°56.777'N	005°17.955'W	14:24	14:26	37.8	4	Sand	No	Subtidal sands and gravels	SS.SSa	Mobile coarse sand with some shell debris. <i>Urticina</i> sp. (occ); <i>Pandalus montagui</i> (rare).	Section 7

Station No.	Area No.	Date	Coordinates Down		Coordinates Up		Time Down (GMT)	Time Up (GMT)	Depth (m)	Number of Photos	Substrate Type	Reef	Section 7 Habitat	Biotope	Additional Observations	Qualifying Habitat
			Lat	Long	Lat	Long										
39b	3		51°56.758'N	005°17.966'W	51°56.777'N	005°17.955'W	14:24	14:26	37.8	4	Rock	Rocky		CR.HCR.Xfa	Silty bedrock with hydroid and bryozoan turf. Impoverished reef community with sparse erect and foliose hydroids and bryozoans. <i>Cellaria sp.</i> (occ); <i>Urticina sp.</i> (rare); <i>Sagartia sp.</i> (rare); <i>Tubularia indivisa</i> (occ); <i>Halecium halecinum</i> (occ); <i>Pandalus montagui</i> (rare). <i>Sabellaria spinulosa</i> tubes (freq).	Article 17
40	3	27/09/2019	51°56.650'N	005°18.521'W	51°56.650'N	005°18.521'W	14:33	14:34	38.5	2	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Sandy gravel.	Section 7
49	3	27/09/2019	51°56.847'N	005°18.465'W	51°56.870'N	005°18.469'W	14:39	14:41	41.4	5	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Sandy gravel with <i>Mytilus edulis</i> and short hydroid and bryozoan turf. Juv. <i>Mytilus edulis</i> (com); <i>Sagartia sp.</i> (occ); <i>Asterias rubens</i> (occ); <i>Liocarcinus holsatus</i> (rare); <i>Flustra foliacea</i> (rare); <i>Cellaria sp.</i> (occ); <i>Sertularia argentea</i> (occ).	Not reef
5	1	27/09/2019	51°55.310'N	005°18.417'W	51°55.325'N	005°18.386'W	15:19	15:21	38.9	3	Mixed	Stony		SS.SMx.CMx.FluHyd	Cobbles and pebbles with ascidians and bryozoans. <i>Polycarpa rustica</i> (?) (occ); <i>Stolonica socialis</i> (?) (occ); <i>Alcyonidium diaphanum</i> (rare); <i>Sagartia sp.</i> (rare).	Article 17
4	1	27/09/2019	51°55.166'N	005°18.742'W	51°55.207'N	005°18.651'W	15:28	15:30	37.5	3	Mixed	Stony		SS.SMx.CMx	Boulders and cobbles with pebbles and hydroid and bryozoan turf. <i>Cellaria sp.</i> (rare); <i>Crisia sp.</i> (rare); <i>Spirobranchus sp.</i> (rare).	Article 17
3	1	27/09/2019	51°55.055'N	005°19.005'W	51°55.103'N	005°19.920'W	15:41	15:43	40.8	3	Mixed	Stony		SS.SMx.CMx	Boulders and cobbles with pebbles and hydroid and bryozoan turf. <i>Cellaria sp.</i> (rare); <i>Crisia sp.</i> (rare); <i>Spirobranchus sp.</i> (rare).	Article 17
68	5	27/09/2019	51°55.129'N	005°19.564'W	51°55.158'N	005°19.506'W	15:52	15:53	38.3	2	Rock	Rocky		SS.SMx.CMx	Boulders and cobbles at toe of bedrock reef. Impoverished hydroid and bryozoan turf with extensive encrusting sponges.	Article 17
68(2)	5	27/09/2019	51°55.142'N	005°19.603'W	51°55.160'N	005°19.569'W	16:01	16:04	39.5	3	Rock	Rocky		CR.HCR.Xfa	Impoverished bedrock reef. High sediment (silt) loading resulting in a sparse and impoverished hydroid and bryozoan turf. <i>Cellaria sp.</i> (occ); <i>Halecium halecinum</i> (occ); <i>Urticina sp.</i> (rare); <i>Calliostoma zizyphinum</i> ; Juv. <i>Alcyonium digitation</i> (rare); <i>Echinus esculentus</i> (rare). Unident. tubes/opening within the silty layer on the reef.	Article 17
69	5	27/09/2019	51°55.045'N	005°19.826'W	51°55.065'N	005°19.755'W	16:10	16:12	39.5	3	Rock	Rocky		CR.HCR.Xfa	Tideswept circalittoral bedrock reef. Silty hydroid and bryozoan turf. Dominated by <i>Cellaria sp.</i> (com) and <i>Crisia sp.</i> (com). Encrusting orange sponges attached to erect bryozoans (occ); <i>Ophiotrix fragilis</i> (rare); <i>Antedon bifida</i> (rare); <i>Corella parallelograma</i> (rare).	Article 17

B.2 West Anglesey

Table B2. West Anglesey Survey Log

Station No	Area No	Date	Coordinates Down		Coordinates Up		Time Down (GMT)	Time Up (GMT)	Depth (m)	Number of Photos	Substrate Type	Reef	Section 7 Habitat	Biotope	Additional Observations	Qualifying Habitat
			Lat	Long	Lat	Long										
97	AOI 4	07/09/2019	53°11.383'N	004°43.274'W	53°11.383'N	004°43.274'W	12:54	12:56	47.2	5	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx	Sands with occasional cobbles and pebbles with low erect hydroid/bryozoan turf and occasional/patchy erect <i>Sabellaria spinulosa</i> tubes. <i>Flustra foliacea</i> (freq); <i>Spirorhynchus</i> sp. (occ); <i>Nermetesia antennina</i> . Not reef.	Article 17. Patchy clumps/ Low quality reef. Section 7
96	AOI 4	07/09/2019	53°11.367'N	004°43.526'W	53°19.365'N	004°43.156'W	13:10	13:11	49.6	3	Sand	No	Subtidal sands and gravels	SS.SCS.CCS	Occasional cobble with shell debris and sand. <i>Flustra foliacea</i> (rare).	Section 7
95	AOI 4	07/09/2019	53°11.834'N	004°43.789'W	53°11.836'N	004°43.783'W	13:18	13:20	49	3	Coarse	No	Subtidal sands and gravels	SS.SMx.CMx.FluHyd	Occasional pebbles and gravel with sand. <i>Paguridae</i> (rare); <i>Spirobranchus</i> sp. (rare); Erect bryozoa - <i>Hydrallmania falcata</i> (?) (rare).	Section 7
94	AOI 4	07/09/2019	53°12.073'N	004°44.376'W	53°12.081'N	004°44.377'W	13:30	13:33	46.5	3	Coarse	No	Subtidal sands and gravels	SS.SMx.CMx.FluHyd	Occasional pebbles and gravel with sand. Rare <i>Spirobranchus</i> sp. Erect bryozoa - <i>Hydrallmania falcata</i> (?) (rare).	Section 7
93	AOI 4	07/09/2019	53°12.380'N	004°44.365'W	53°12.399'N	004°44.361'W	13:43	13:44	47.5	4	Coarse	No	Subtidal sands and gravels	SS.SMx.CMx.FluHyd	Cobble and pebbles (occ) with sand. <i>Spirobranchus</i> sp. (occ), <i>Spirorbis</i> sp. (occ); <i>Alcyonium digitatum</i> (rare); <i>Abietinaria abietinata</i> / <i>Sertularia</i> sp. (rare); <i>Flustra foliacea</i> (rare).	Section 7
92	AOI 4	07/09/2019	53°12.419'N	004°44.781'W	53°12.439'N	004°44.785'W	13:51	13:53	47.5	3	Coarse	No	Subtidal sands and gravels	SS.SMx.CMx.FluHyd	Cobble and pebbles (occ) with sand. <i>Spirobranchus</i> sp. (occ), <i>Spirorbis</i> sp. (occ); <i>Flustra foliacea</i> (rare). <i>Alcyonidium diaphanum</i> (?) (rare); <i>Polyides rotundus</i> (?) (rare).	Section 7
91	AOI 3	07/09/2019	53°13.806'N	004°40.483'W	53°13.846'N	004°40.505'W	14:26	14:28	40	1	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Shell debris and pebbles on sand.	Section 7
91 (2)	AOI 3	07/09/2019	53°13.717'N	004°40.487'W	53°13.726'N	004°40.397'W	14:41	14:42	40.9	4	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Shell debris and pebbles on sand. Frequent <i>Spirobranchus</i> sp. on pebbles.	Section 7
89	AOI 3	07/09/2019	53°13.683'N	004°41.371'W	53°13.717'N	004°41.363'W	14:53	14:54	42	2	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Sand with occ pebbles. <i>Paguridae</i> (in <i>Calliostoma zizyphinum</i> shell); rare foliose hydroids; <i>Polyides rotundus</i> (?) (rare).	Section 7
87	AOI 3	07/09/2019	53°13.709'N	004°42.082'W	53°13.724'N	004°42.075'W	15:03	15:05	45.7	4	Sand	No	Subtidal sands and gravels	SS.SSa	Barren sand with shell debris.	Section 7
88	AOI 3	07/09/2019	53°13.923'N	004°41.909'W	53°13.945'N	004°41.896'W	15:18	15:20	45.7	3	Coarse	No	Subtidal sands and gravels	SS.SMx.CMx	Cobble and pebble mosaic with sand and shell debris.	Section 7
86	AOI 3	07/09/2019	53°13.920'N	004°42.330'W	53°13.927'N	004°42.312'W	15:27	15:29	44.4	3	Sand	No	Subtidal sands and gravels	SS.SSa	Barren sand with shell debris.	Section 7
85	AOI 2	07/09/2019	53°13.739'N	004°44.859'W	53°13.773'N	004°44.844'W	15:58	15:50	47.2	2	Mixed	Stony		SS.SMx.CMx	Muddy pebbles with gravel mosaic with sand. <i>Calliostoma zizyphinum</i> (rare); <i>Spirorhynchus</i> sp. (rare); erect bryozoa/hydroids (rare); small encrusting orange sponge.	Article 17
84	AOI 2	07/09/2019	53°13.909'N	004°45.010'W	53°13.952'N	004°44.961'W	15:57	16:02	47.2	3	Mixed	Stony		SS.SMx.CMx	Muddy pebbles with gravel mosaic with sand. <i>Spirorhynchus</i> sp. (rare); erect bryozoa/hydroids (rare); burrowing anemone <i>Sagartia troglodytes</i> (?) (rare) interstitial space between pebbles; yellow erect sponge (rare) <i>Haliclona oculata</i> (?) (rare).	Article 17
83	AOI 2	07/09/2019	53°14.147'N	004°44.725'W	53°14.171'N	004°44.696'W	16:09	16:11	48.1	3	Mixed	Stony		SS.SMx.CMx.FluHyd	Silty pebbles with gravel mosaic with sand. <i>Spirorhynchus</i> sp. (rare); encrusting bryozoa (<i>Electra pilosa</i>) rare; erect bryozoa/hydroids (rare); burrowing anemone <i>Sagartia troglodytes</i> (?) (rare) interstitial space between pebbles; encrusting sponges (rare); erect sponge (rare) <i>Raspailia hispida</i> (?) (rare); <i>Flustra foliacea</i> (rare).	Article 17
82	AOI 2	07/09/2019	53°14.404'N	004°44.984'W	53°14.421'N	004°44.979'W	16.2	16:22	46.5	4	Mixed	No		SS.SMx.CMx	Silty pebbles with gravel mosaic. <i>Spirorhynchus</i> sp. (rare); Hydroid/bryozoan turf (occ).	Article 17
81	AOI 2	07/09/2019	53°14.785'N	004°44.904'W	53°14.828'N	004°44.881'W	16:30	16:32	47.4	2	Mixed	Stony		SS.SMx.CMx.FluHyd	Silty pebbles with gravel mosaic. <i>Spirorhynchus</i> sp. (rare); Hydroid/bryozoan turf (occ); <i>Flustra foliacea</i> (rare); encrusting orange sponge (rare); encrusting green sponge (rare); <i>Sabellaria spinulosa</i> crust (rare).	Article 17
80	AOI 2	07/09/2019	53°15.176'N	004°44.919'W	53°15.212'N	004°44.897'W	16:40	16:42	46.4	3	Mixed	Stony		SS.SMx.CMx	Boulder with muddy pebbles. <i>Flustra foliacea</i> (rare); <i>Sabellaria spinulosa</i> crust (rare) with bryozoan turf and rare erect hydroids. <i>Urticina</i> sp. in pebble matrix.	Article 17
78	AOI 1	07/09/2019	53°15.877'N	004°46.938'W	53°15.898'N	004°46.930'W	17:09	17:09	58	4	Mixed	Stony		SS.SMx.CMx	Cobbles and pebble and sand matrix. Short hydroid/bryozoan turf with rare encrusting yellow sponge and yellow erect sponge (rare) <i>Haliclona oculata</i> (?) (rare).	Article 17
79	AOI 1	07/09/2019	53°15.842'N	004°47.525'W	53°15.859'N	004°47.513'W	17:17	17:19	49.7	3	Mixed	Stony		SS.SMx.CMx	Pebble and sand matrix. Short hydroid/bryozoan turf with rare encrusting yellow sponge and rare <i>Sabellaria spinulosa</i> tubes. <i>Ocenebra erinacea</i> ; <i>Paguridae</i> ; <i>Palaemon</i> sp. shrimp.	Article 17

Station No	Area No	Date	Coordinates Down		Coordinates Up		Time Down (GMT)	Time Up (GMT)	Depth (m)	Number of Photos	Substrate Type	Reef	Section 7 Habitat	Biotope	Additional Observations	Qualifying Habitat
			Lat	Long	Lat	Long										
76	AOI 1	07/09/2019	53°16.097'N	004°48.555'W	53°16.106'N	004°48.534'W	17:29	17:30	56.5	4	Mixed	Stony		SS.SMx.CMx	Pebble and sand matrix. Sparse hydroid/bryozoan turf with <i>Spirobranchus</i> sp. (rare); possible <i>Sargartia</i> sp. (rare); ascidian turf (<i>Molgula</i> sp. (?) (rare)); <i>Pandalus montagui</i> ; juv <i>Liocarinus</i> sp.	Article 17
15	4	08/09/2019	53°12.836'N	004°47.931'W	53°12.821'N	004°47.923'W	08:51	08:54	40.3	3	Coarse	No	Subtidal sands and gravels	SS.SSa	Sand with shell debris. <i>Pandalus montagui</i> (rare).	Section 7
16	4	08/09/2019	53°12.752'N	004°47.740'W	53°12.742'N	004°47.737'W	09:00	09:02	44.4	3	Sand	No	Subtidal sands and gravels	SS.SSa	Mobile barren sand.	Section 7
17	4	08/09/2019	53°12.871'N	004°47.464'W	53°12.850'N	004°47.448'W	09:09	09:11	45.9	3	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Barren sand with shell debris.	Section 7
18	4	08/09/2019	53°12.983'N	004°47.520'W	53°12.968'N	004°47.511'W	09:18	09:20	44.5	4	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Barren sand with shell debris.	Section 7
20	4	08/09/2019	53°13.141'N	004°47.492'W	53°13.092'N	004°47.459'W	09:27	09:30	44.6	2	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Mobile barren sand with shell debris.	Section 7
21	4	08/09/2019	53°13.370'N	004°47.222'W	53°13.333'N	004°47.225'W	09:37	09:39	46.5	3	Sand	No	Subtidal sands and gravels	SS.SSa	Mobile barren sand.	Section 7
27	5	08/09/2019	53°13.562'N	004°48.125'W	53°13.550'N	004°48.116'W	09:53	09:55	45.5	3	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Barren sand with occasional gravel. Sand is mobile.	Section 7
23	5	08/09/2019	53°13.250'N	004°47.885'W	53°13.210'N	004°47.898'W	10:01	10:02	46.5	4	Sand	No	Subtidal sands and gravels	SS.SSa	Mobile barren sand.	Section 7
24	5	08/09/2019	53°13.414'N	004°48.341'W	53°13.392'N	004°48.322'W	10:11	10:14	45.5	4	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Sand with pebbles.	Section 7
56	7	08/09/2019	53°13.031'N	004°49.831'W	53°13.011'N	004°49.839'W	10:30	10:32	46.5	4	Mixed	No		SS.SMx	Silty pebbles with muddy sand. Palmate alga (freq); occasional erect hydroid/bryozoan turf with <i>Paguridae</i> ; <i>Pandalus montagui</i> (rare); sparse <i>Sabellaria spinulosa</i> tubes (rare).	
55	7	08/09/2019	53°13.330'N	004°49.964'W	53°13.302'N	004°49.982'W	10:41	10:42	47.6	3	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Shell gravel with sparse cobbles and pebbles. Some foliose hydroid/bryozoan turf (occ); <i>Flustra foliacea</i> (rare); possible <i>Polymastia mammilaris</i> (sponge) (rare).	Section 7
54	7	08/09/2019	53°13.639'N	004°50.061'W	53°13.617'N	004°50.067'W	10:51	10:52	46.5	3	Mixed	Stony		SS.SMx.CMx	Consolidated pebbles with cobbles and sand. <i>Balanus crenatus</i> (rare); <i>Spirobranchus</i> sp. (rare); sparse foliose hydroids (occ).	Article 17
45	9	08/09/2019	53°13.713'N	004°50.780'W	53°13.670'N	004°50.817'W	11:01	11:04	51.7	3	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Stable pebbles and gravel. <i>Paguridae</i> ; <i>Hydrallmania falcata</i> (rare).	Section 7
44	9	08/09/2019	53°13.505'N	004°50.685'W	53°13.460'N	004°50.638'W	11:15	11:17	52.7	2	Coarse	No	Subtidal sands and gravels	SS.SCS.CCS	Sand with frequent pebbles. <i>Spirobranchus</i> sp. (rare) with isolated erect hydroids (rare).	Section 7
43	9	08/09/2019	53°13.349'N	004°50.965'W	53°13.337'N	004°50.972'W	11:35	11:36	53	4	Mixed	Stony		SS.SMx.CMx	Consolidated cobble, pebble, gravel mosaic with sand. Erect foliose hydroid/bryozoan turf (occ); <i>Asterias rubens</i> (rare).	Article 17
42	9	08/09/2019	53°13.178'N	004°50.879'W	53°13.162'N	004°50.901'W	11:42	11:45	51.9	5	Mixed	Stony		SS.SMx.CMx	Consolidated cobble, pebble, gravel mosaic with sand. Erect foliose hydroid/bryozoan turf (occ); <i>Asterias rubens</i> (rare).	Article 17
41	9	08/09/2019	53°13.012'N	004°51.182'W	53°13.983'N	004°51.214'W	11:50	11:54	54.6	5	Mixed	Stony		SS.SMx.CMx	Consolidated cobble, pebble, gravel mosaic with sand. Foliose hydroid/bryozoan turf (occ).	Article 17
57	7	08/09/2019	53°14.063'N	004°49.946'W	53°14.051'N	004°49.924'W	12:34	12:35	46.2	3	Mixed	No		SS.SMx.CMx	Pebbles and gravel with sand. Erect foliose hydroid/bryozoan turf (occ); <i>Macropodia tenuirostris</i> (rare).	No
51	7	08/09/2019	53°14.301'N	004°50.050'W	53°14.301'N	004°50.050'W	12:32	12:33	46.9	3	Mixed	Stony		SS.SMx.CMx	Consolidated cobble, pebble, gravel mosaic with sand. Sparse foliose hydroid/bryozoan turf (occ) with encrusting sponges (rare) and <i>Balanus crenatus</i> (rare). <i>Asterias rubens</i> .	Article 17
50	7	08/09/2019	53°14.431'N	004°49.911'W	53°14.432'N	004°49.921'W	12:51	12:53	46.2	8	Mixed	Stony		SS.SMx.CMx.FluHyd	Consolidated cobble, pebble, gravel mosaic with sand. Foliose hydroid/bryozoan turf (freq) with encrusting sponges (rare) and <i>Balanus crenatus</i> scars (freq). <i>Psammechinus miliaris</i> (rare); <i>Flustra foliacea</i> (rare).	Article 17
49	7	08/09/2019	53°14.511'N	004°50.495'W	53°14.517'N	004°50.507'W	13:01	13:03	48.1	0	Mixed	Stony		SS.SMx.CMx.FluHyd	Consolidated cobble, pebble, gravel mosaic with sand. Foliose hydroid/bryozoan turf (freq) with encrusting sponges (occ) and <i>Balanus crenatus</i> scars (freq); notable orange encrusting sponge; <i>Spirobranchus</i> sp. (common); possible <i>Tubularia indivisa</i> (freq).	Article 17
48	7	08/09/2019	53°14.699'N	004°50.059'W	53°14.695'N	004°50.034'W	13:11	13:13	46.3	5	Mixed	Stony		SS.SMx.CMx	Consolidated cobble, pebble, gravel mosaic with sand. Foliose hydroid/bryozoan turf (freq) and <i>Balanus crenatus</i> (rare); <i>Asterias rubens</i> (rare). Silty in places.	Article 17.
47	7	08/09/2019	53°14.770'N	004°50.603'W	53°14.779'N	004°50.580'W	13:22	13:25	45.6	6	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx	Pebbles and gravel with <i>Sabellaria spinulosa</i> crust (occ); sparse bryozoan turf (rare) and isolated encrusting sponges; <i>Paguridae</i> (rare); <i>Asterias rubens</i> (rare).	Article 17. Patchy Low-quality reef. Section 7

Station No	Area No	Date	Coordinates Down		Coordinates Up		Time Down (GMT)	Time Up (GMT)	Depth (m)	Number of Photos	Substrate Type	Reef	Section 7 Habitat	Biotope	Additional Observations	Qualifying Habitat
			Lat	Long	Lat	Long										
60	6	08/09/2019	53°15.330'N	004°50.424'W	53°15.330'N	004°50.424'W	13:39	13:41	44.1	5	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx	Pebbles consolidated by <i>Sabellaria spinulosa</i> crust with erect hydroid and bryozoan turf. Solitary ascidians present.	Article 17. Patchy Low-quality reef. Section 7
59	6	08/09/2019	53°15.425'N	004°50.429'W	53°15.442'N	004°50.455'W	13:47	13:50	45.6	7	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx	Pebbles consolidated by <i>Sabellaria spinulosa</i> crust with erect hydroid and bryozoan turf but may also be <i>Polymastia mammillaris</i> ; <i>Macropodia tenuirostris</i> (rare); <i>Echinus esculentus</i> (rare).	Article 17. Patchy Low-quality reef. Section 7
63	8	08/09/2019	53°15.464'N	004°49.697'W	53°15.467'N	004°49.694'W	14:00	14:01	44.5	5	Mixed	Stony		SS.SMx.CMx	Pebbles and silty gravel with foliose hydroid/bryozoan turf (occ) and <i>Balanus crenatus</i> (rare).	Article 17
73	8	08/09/2019	53°15.523'N	004°49.662'W	53°15.533'N	004°49.641'W	14:06	14:08	44.7	3	Mixed	Stony		SS.SMx.CMx	Consolidated cobble and pebbles with frequent <i>Spirobranchus sp.</i> and foliose hydroid/bryozoan turf (occ).	Impoverished Article 17
69	8	08/09/2019	53°15.620'N	004°49.719'W	53°15.630'N	004°49.782'W	14:14	14:16	48.1	4	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx	<i>Sabellaria spinulosa</i> reef.	Article 17, Section 7
72	8	08/09/2019	53°15.637'N	004°49.589'W	53°15.646'N	004°49.568'W	14:20	14:23	46.1	3	Mixed	No		SS.SMx.CMx	Silty consolidated cobbles with frequent <i>Spirobranchus sp.</i> (dead?).	No
68	8	08/09/2019	53°15.685'N	004°49.717'W	53°15.697'N	004°49.718'W	14:28	14:31	47.9	3	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx	<i>Sabellaria spinulosa</i> reef (old).	Section 7
67	8	08/09/2019	53°15.725'N	004°49.769'W	53°15.763'N	004°49.751'W	14:35	14:39	46.9	3	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx	<i>Sabellaria spinulosa</i> crust.	Section 7
64	8	08/09/2019	53°15.790'N	004°49.932'W	53°15.802'N	004°49.931'W	14:46	14:48	49.2	3	Mixed	No		SS.SMx.CMx	Cobbles and pebbles and silty gravel.	No
62	8	08/09/2019	53°15.725'N	004°50.047'W	53°15.758'N	004°50.004'W	15:08	15:09	48.9	3	Mixed	No		SS.SBR.PoR.SspiMx	Pebbles and gravel with <i>Sabellaria sp.</i> clumps.	No
61	8	08/09/2019	53°15.810'N	004°50.047'W	53°15.814'N	004°50.041'W	15:15	15:17	46.4	4	Mixed	No		SS.SBR.PoR.SspiMx	Silty cobbles with <i>Sabellaria sp.</i> clumps and hydroid/bryozoan erect turf. <i>Paguridae</i> .	No
65	8	08/09/2019	53°15.712'N	004°49.889'W	53°15.734'N	004°49.874'W	15:25	15:27	48.2	1	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx	<i>Sabellaria spinulosa</i> reef (old).	Article 17 - although may be deceased reef? Section 7
66	8	08/09/2019	53°15.701'N	004°49.809'W	53°15.712'N	004°49.817'W	15:33	15:35	49.4	5	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx	Pebble and gravel matrix with <i>Sabellaria sp.</i> clumps (old). <i>Flustra foliacea</i> (occ); <i>Pandalus montagui</i> (rare).	Article 17. Patchy clumps/ Low quality reef. Section 7
30	2	08/09/2019	53°14.681'N	004°48.221'W	53°14.703'N	004°48.198'W	15:53	15:55	50.6	5	Mixed	No		SS.SMx.CMx	Silty gravel with isolated <i>Sabellaria spinulosa</i> tubes. <i>Flustra foliacea</i> (rare).	Not reef.
39	3	08/09/2019	53°14.914'N	004°48.516'W	53°14.939'N	004°48.477'W	16:03	16:05	53.7	5	Sand	Biogenic	Subtidal sands and gravels	SS.SBR.PoR.SspiMx	Pebbles with <i>Sabellaria spinulosa</i> clumps. <i>Asterias rubens</i> (rare); <i>Spirobranchus sp.</i> (occ.); <i>Pandalus montagui</i> (occ.); <i>Macropodia tenuirostris</i> (rare); <i>Cancer pagurus</i> (rare); <i>Ocenebra erinacea</i> (rare).	Article 17. Patchy clumps/ Low quality reef. Section 7
28	2	08/09/2019	53°15.137'N	004°48.339'W	53°15.154'N	004°48.333'W	16:11	16:13	54.3	3	Mixed	No		SS.SMx.CMx	Gravel with sand. <i>Paguridae</i> (rare); <i>Flustra foliacea</i> (rare).	No
37	3	08/09/2019	53°15.277'N	004°48.686'W	53°15.304'N	004°48.658'W	16:20	16:23	53.3	4	Mixed	No		SS.SMx.CMx	Pebbles with gravel. <i>Paguridae</i> (rare).	

Contact Us

ABPmer

Quayside Suite,
Medina Chambers
Town Quay, Southampton
SO14 2AQ

T +44 (0) 23 8071 1840

F +44 (0) 23 8071 1841

E enquiries@abpmer.co.uk

www.abpmer.co.uk

