Connecting Conwy Project – Post-reef Imagery Analysis (2025)

Dec / 2025

Imagery Analysis Report

Site

Conwy Bay, North Wales

Prepared for

Connecting Conwy Project

Prepared by

ENVISION

PREPARED FOR	Connecting Conwy Project
TITLE	Conwy Bay Post-Reef Imagery Analysis (2025)
PROJECT REF.	2025-176
DOCUMENT ID.	ENV-20251217258886415

DOCUMENT CONTROL

Version	Originator	Date	Status	Reviewed - Edited	Date
1	Charlotte Aldis	15/12/2025	Draft	Alison Benson	18/12/2025

Version	Status	Approved	Date
1	Draft	Ian Sotheran	18/12/2025

FILE P:\2025-176-WOP-CONWY_BAY_POST_REEF_IMAGERY_ANALYSIS\06_REPORTING\2025-176-WOP-CONWY_BAY_POST_REEF_IMAGERY_ANALYSIS_Report_20251218.docx

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1. Introduction

The #NNF3 Connecting Conwy Project was evolved from work established through the Wild Oysters Project: Conwy Bay (2020–2023) and the #NNF2 Restoring Wild Oysters project (2023–2025) restoring a native oyster (*Ostrea edulis*) reef in Conwy Bay, on the north-west cost of Wales (Figure 1). As part of the baseline monitoring for the oyster reef restoration, underwater imagery surveys were planned in the designated reef site and a control site before (pre-reef) and after reef restoration (post-reef) (Figure 1).

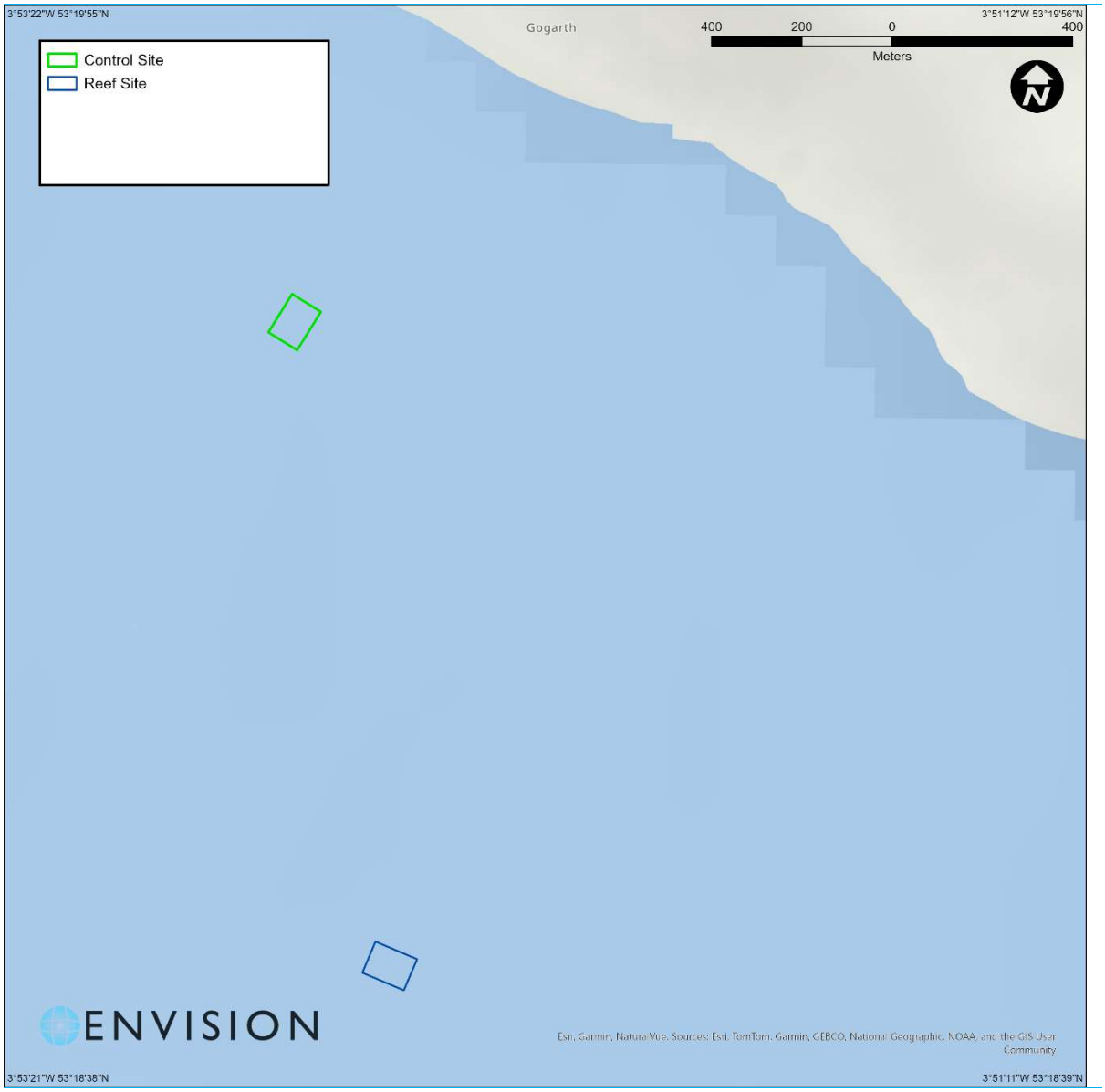

Figure 1.
Location of Conwy Bay reef restoration survey areas, showing control site and reef site.

Previously, underwater imagery surveys and associated analysis were carried out during a scoping survey conducted in the vicinity in June 2022 to inform site selection. Additional surveys were completed before any seabed restoration activities had taken place in May 2023 (pre-reef) as a baseline, and in August 2024 after the addition of limestone gravel cultch (post-limestone). Seabed restoration activities to create the experimental native oyster reef at Conwy Bay were conducted in June 2025

with the deployment of scallop shell cultch and oysters within a part of the reef site. Underwater imagery surveys have been undertaken in August 2025 (post-reef), with transect locations shown in Figure 2 and Figure 3. ENVISION were commissioned to analyse 200 images (100 reef site images and 100 control site images). This report summarises the analyses of these images.

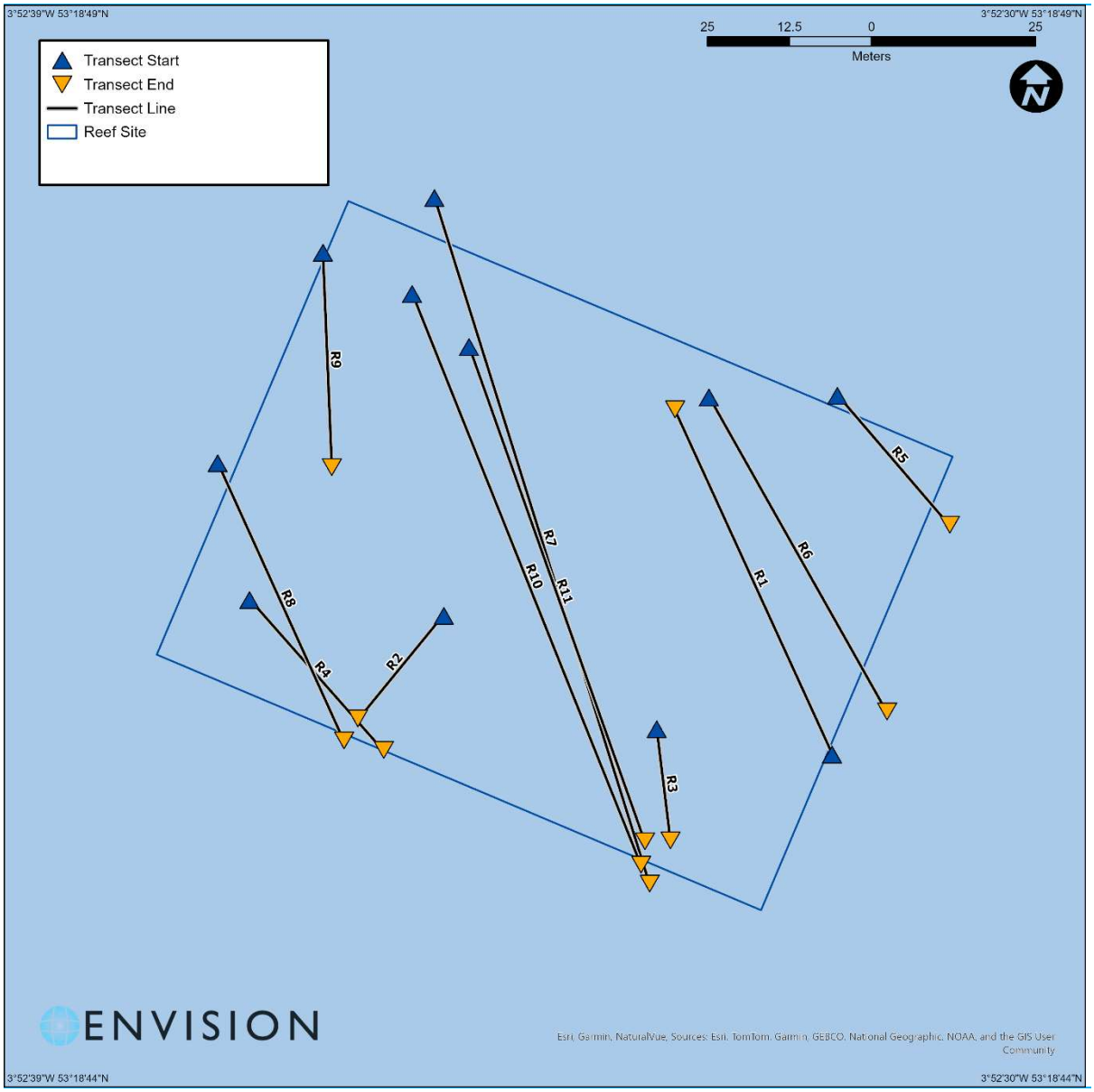

Figure 2.
Post-reef imagery survey transect locations in reef site, August 2025, Conwy Bay.

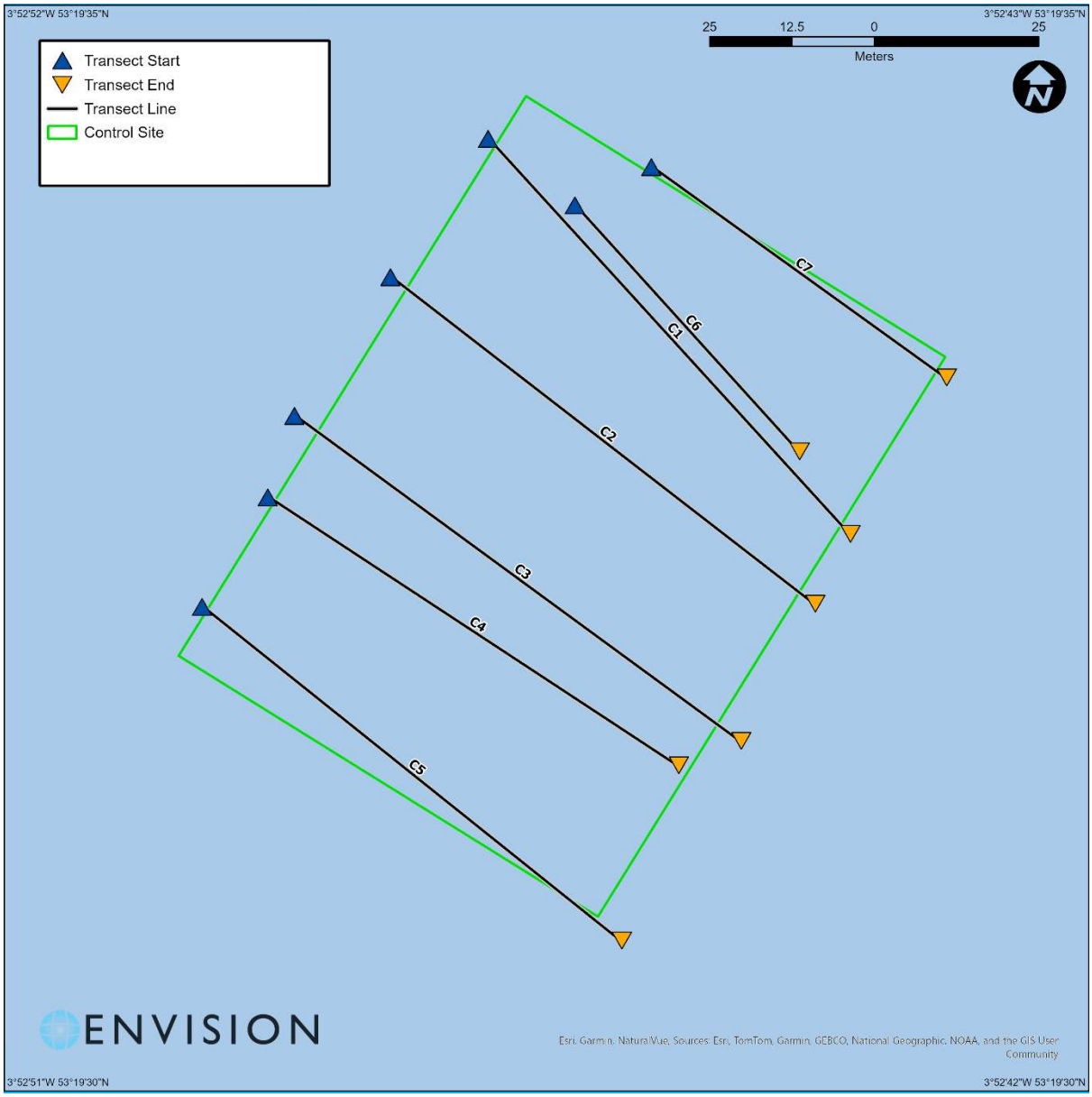

Figure 3.
Post-reef imagery survey transect locations in control site, August 2025, Conwy Bay.

2. Methodology

Imagery was reviewed, processed, and analysed in accordance with current guidelines, such as the standards for analysis in Visual Seabed Surveys (BS EN 16260:2012) and Turner *et al.*, (2016)[1]. The imagery has also been reviewed for features of conservation interest (FOCI), including Annex I reef assessment following the appropriate JNCC guidance notes (Gubbay, 2007[2]; Irving, 2009[3]; Golding *et*

[1] *Turner, J.A., Hitchin, R., Verling, E., van Rein, H. 2016. Epibiota remote monitoring from digital imagery: Interpretation guidelines.*

[2] *GUBBAY, S. 2007. Defining and managing Sabellaria spinulosa reefs. Report of an interagency workshop. JNCC Report No. 405*

[3] *Irving, R. 2009. The identification of the main characteristics of stony reef habitats under the Habitats Directive. Summary report of an inter-agency workshop 26-27 March 2008. JNCC Report No. 432*

al., 2020[4]). The main purpose of the analysis of imagery was to identify what fauna and broadscale habitats existed in a still image and to provide quantitative and semi-quantitative data. Post-reef imagery has also been reviewed to record parameters relating to the oyster reef (where imagery quality allowed) including percent coverage of cultch shell cover (Scallop shell).

The results of analyses are described in this report and provided in the MS Excel spreadsheet proformas, along with an image reference collection for each site, which include the habitats and taxa recorded.

2.1. Still Imagery Analysis

Enumeration of taxa from still images was undertaken within BIIGLE[5], with abundance counts for solitary and erect taxa added as point annotations. Where colonial/encrusting taxa were observed in still imagery, taxa were recorded using percentage cover. Annotations from BIIGLE were exported in Excel spreadsheets and translated into the results proforma spreadsheet as required.

Taxa were identified visually and taxonomic guides and illustrations, along with websites (e.g., MarLIN, Habitas, SMarTaR-ID) were used to confirm and assist with identifications. All taxonomic names used were checked with reference to the World Register of Marine Species (WoRMS). Where an analyst was uncertain of identification of epifauna at a certain taxonomic level, then a broader taxonomic level or morphological group was used.

All data were recorded as each still image was analysed and an EMODNET[6]/MEDIN[7] compliant proforma spreadsheet was used to input imagery data and metadata, with reference to the latest species dictionary from the World Register of Marine Species (WoRMS) database.

A reference collection was built as the analysis progressed to aid quality control (QC) and consistency of identification during analysis, along with providing example imagery for the species and habitats observed. Good quality images were noted and collated for each taxon and habitat identified.

Frame captures of the imagery were taken and the image was then reviewed, and the taxon/annotation label was highlighted with a box (Figure 4). The file was then saved with the taxon/morphology name and the site identification/image name forming the filename structure (e.g., Necora_puber_RT7_2025-08-15 - 094429).

[4] *Golding. N., Albrecht. J., McBreen. F. 2020. Refining criteria for defining areas with a 'low resemblance' to Annex I stony reef; Workshop Report. JNCC Report No. 656, JNCC, Peterborough, ISSN 0963-8091*

[5] *https://biigle.de/*

[6] *European Marine Observation and Data Network, https://emodnet.ec.europa.eu/en*

[7] *Marine Environmental Data and Information Network. https://medin.org.uk/*

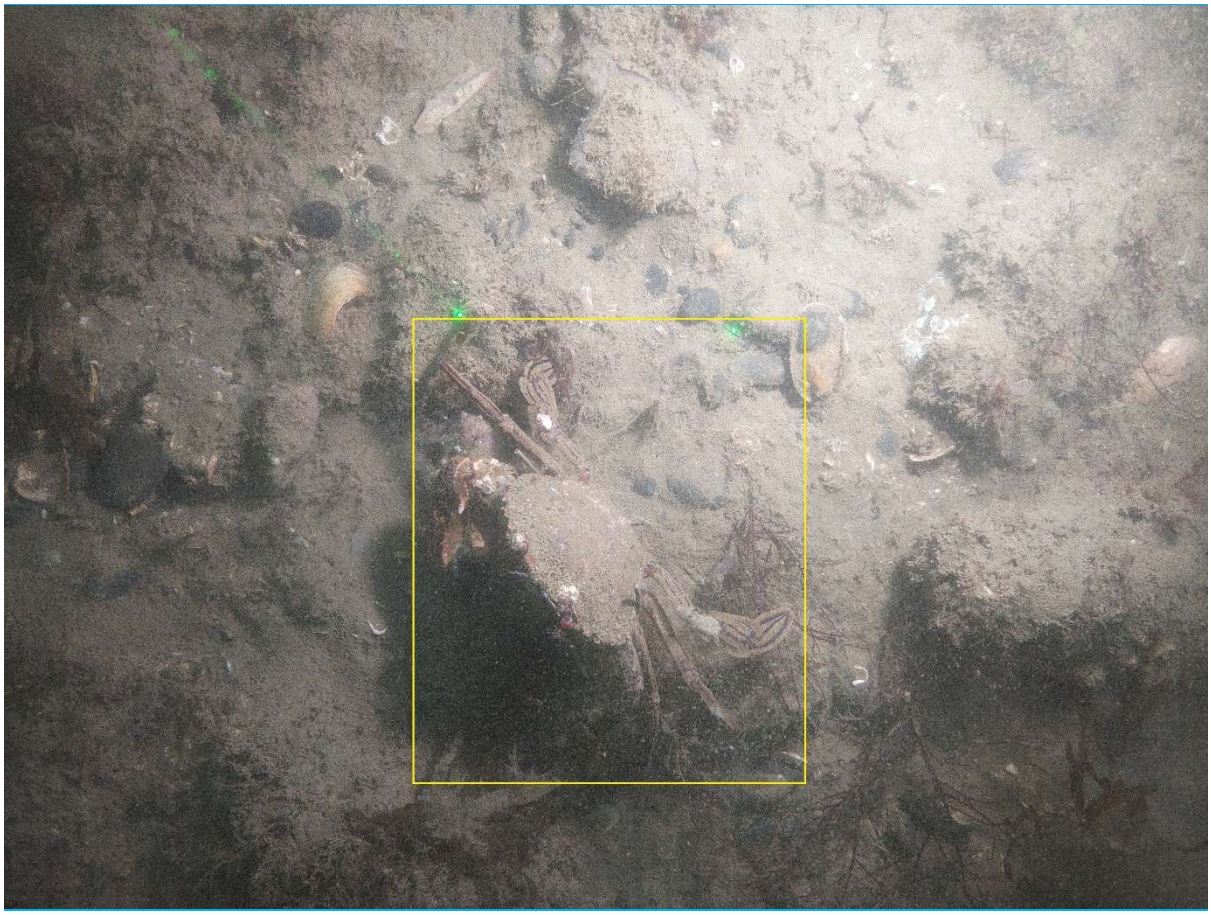

Figure 4.
Example of reference collection image (Necora_puber_RT7_2025-08-15 – 094429.jpg).

In addition to a taxon/annotation label reference collection, a substrate/habitat reference collection was also built with good images of each habitat/biotope recorded. Again, the files were saved and named with substrate/habitat/feature name and station reference/image filename as part of the filename (IR.MIR.KR.XFoR_CT5_2025-08-15 - 113601.jpg).

3. Results

A total of 200 still images were analysed from the post reef 2025 survey, 100 from the reef site and 100 from the control site.

3.1. Image Quality

Imagery was assessed using the NMBAQC image quality categories (Table 1). The majority of the post-reef imagery was assessed as 'Good' or 'Poor'. A total of 82 images were allocated the quality category 'Good', 115 images were allocated 'Poor', and three images were recorded as 'Very Poor'. Reduction in quality of imagery was mainly due to disturbed sediment from the camera system resting on the seabed.

Table 1.
Summary of NMBAQC image quality categories (Turner et al., 2016[1]).

Quality Category	Proportion of Image Negatively Affected	Organism Enumeration	Biotopes
Excellent	<5%	Quantitative	Level 5
Good	5-20%	Quantitative	Level 5
Poor	20-50%	Qualitative	Level 3
Very Poor	50-80%	Not recommended	Level 2/3
Zero	>80%	Data not usable	Data not usable

It should be noted that two images within CT7 (2025-08-15 - 120007.jpg and 2025-08-15 - 120017.jpg) are of the same area of seabed, however differed in quality with '2025-08-15 - 120017.jpg' recorded as 'Poor' and '2025-08-15 - 120017.jpg' recorded as 'Good'. These images were both analysed independently due to this, with comments left for both within the imagery analysis proformas.

3.2. Broadscale Habitats and Taxa

From the still imagery analysis, it was recorded that the seabed at the Conwy Bay sites was largely comprised of mixed sediment with some hard substrate and a notable presence of silt, with red branching and brown macroalgae, faunal turf, encrusting taxa and a variety of other epifauna.

The post reef imagery analysis recorded a total of five broadscale habitats. The reef site had a total of five broadscale habitats, with 'Subtidal Mixed Sediment' recorded in 69 images, 'Moderate Energy Infralittoral Rock' recorded in 23 images, 'Subtidal Sand' recorded in three images, 'Artificial Substrate' recorded in three images and 'Subtidal Coarse Sediment' recorded in two images. The broadscale habitat 'Artificial Substrate' was created by ENVISION for the purposes of this analysis due to the presence of cultch (scallop shells) from the deployment of the native oyster reef. The control site had a total of three broadscale habitats with 'Moderate Energy Infralittoral Rock' recorded in 53 images, 'Subtidal Mixed Sediment' recorded in 39 images and 'Subtidal Sand' recorded in nine images.

Within the control site taxa included anemones (recorded as Anthozoa, Actiniaria, Sagartiidae, *Urticina*), gastropods (Gastropoda, Trochidae), worms (*Sabellaria spinulosa*, Terebellidae, Echiura, Phoronids), fish (Actinopterygii, Gobiidae), decapods (Caridea, *Necora puber*) and hydroids (Sertulariidae). Within the reef site taxa included anemones (recorded as Actiniaria, Anthozoa, *Urticina*), worms (*Lanice conchilega*, Sabellidae, Terebellidae, *Tubulanus, Sabella pavonia*), fish (*Callionymus*, Actinopterygii, Gobiidae) and decapods (Paguridae, *Necora puber*). Across both sites, encrusting taxa (Serpulidae), red macroalgae (Rhodophyta), brown macroalgae (Phaeophyceae), tunicates (*Clavelina lepadiformis*), foliose Bryozoa, encrusting sponge and massive sponges (Porifera) were also present.

It should be noted that no native oysters '*Ostrea edulis*' were identified within the post-reef imagery at either the reef or control site. This could be due to the significant amount of silt present across the imagery. Cultch (scallop shells) was identified in 12 images within the reef site imagery, these were allocated a percentage of 'artificial substrate' as detailed in the associated imagery analysis proforma spreadsheets.

3.3. Biotope Allocation

A total of seven habitats/biotopes were recorded within the post-reef still imagery. Within the control site, five habitats/biotopes were observed. The substrate was largely comprised of silt covered cobbles or boulders, recorded as 'Moderate energy infralittoral rock' (IR.MIR) in 11 images and 'Dense foliose red seaweeds on silty moderately exposed infralittoral rock' (IR.MIR.KR.XFoR) in 42 images, where macroalgae dominated the epifauna. The habitat 'Infralittoral mixed sediment' (SS.SMx.IMx) was identified in 26 images where the substrate consisted of sand, silt, pebbles and shells along with notable presence of macroalgae and the habitat ''Subtidal mixed sediment' (SS.SMx) was recorded in 12 images where little identifiable epifauna was observed. The habitat 'Infralittoral muddy sand' (SS.SSa.IMuSa) was observed in the remaining nine images within the control site, where sand was observed with little epifauna and notable silt presence.

Within the reef site, six habitats/biotopes were observed. The substrate was largely comprised of silt covered pebbles and shells, recorded as 'Infralittoral mixed sediment' (SS.SMx.IMx) in 69 images. Silt covered cobbles or boulders were also present, with 'Moderate energy infralittoral rock' (IR.MIR) recorded in five images and 'Dense foliose red seaweeds on silty moderately exposed infralittoral rock' (IR.MIR.KR.XFoR) in 18 images, where macroalgae dominated the epifauna. Within the remaining images, three were allocated the habitat 'Infralittoral muddy sand' (SS.SSa.IMuSa), two were allocated the habitat 'Subtidal coarse sediment' (SS.SCS) where cobbles and pebbles were present along with gravel and sand, and the final three images were allocated the ENVISION created habitat/biotope 'Artificial Substrate' to indicate the presence of cultch (scallop shells) within the reef site.

The habitats/biotopes identified are summarised in Table 2 and example images are provided in

Table 3, with the spatial distribution presented in Figure 5 and Figure 6. Habitats and conservation features for each station are provided in Table 4, and associated metadata shown in Table 5.

Table 2.
Habitats/biotopes identified during the Conwy Bay post-reef still imagery analysis (2025).

Habitat/Biotope (MHC)	MHC Description
Artificial Substrate	Cultch laid during reef deployment
IR.MIR	Moderate energy infralittoral rock
IR.MIR.KR.XFoR	Dense foliose red seaweeds on silty moderately exposed infralittoral rock
SS.SMx	Sublittoral mixed sediment
SS.SMx.IMx	Infralittoral mixed sediment
SS.SSa.IMuSa	Infralittoral muddy sand
SS.SCS	Sublittoral coarse sediment (unstable cobbles and pebbles, gravels and coarse sands)

Table 3.
Images illustrating the habitats/biotopes identified during the Conwy Bay post-reef still imagery analysis (2025).

IR.MIR 	IR.MIR.KR.XFoR 
SS.SMx 	SS.SMx.IMx 
SS.SSa.IMuSa 	SS.SCS 

Artificial Substrate 	

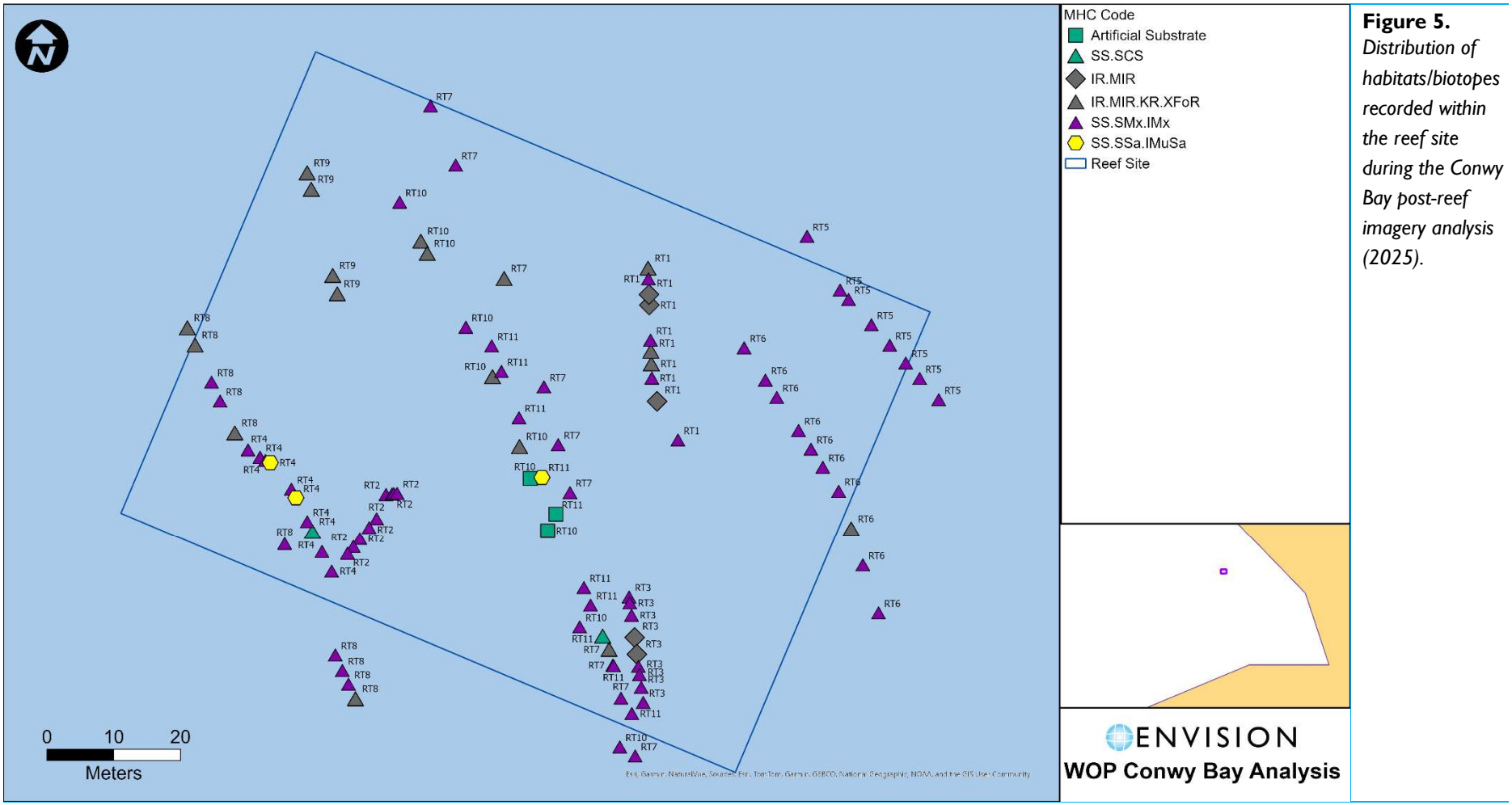

Figure 5.
Distribution of habitats/biotopes recorded within the reef site during the Conwy Bay post-reef imagery analysis (2025).

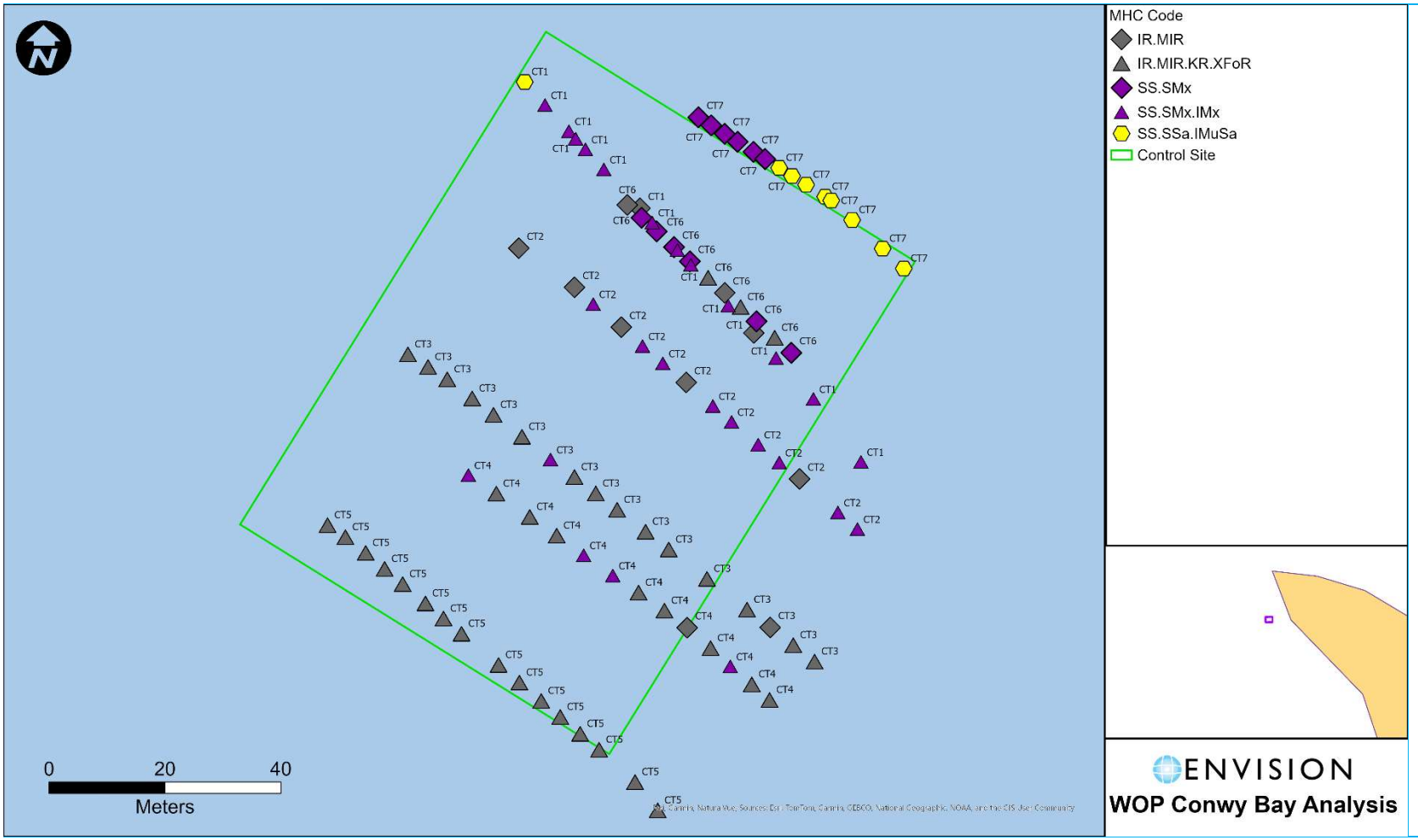

Figure 6. *Distribution of habitats/biotopes recorded within the control site during the Conwy Bay post-reef imagery analysis (2025).*

3.4. Features of Conservation Interest

The post-reef imagery was reviewed for Annex I features and potential Annex I stony reef was identified. However, when determining whether an area of the seabed should be considered as Annex I stony reef, four characteristics (composition, elevation, extent, or biota) are scored to meet the criteria required to be considered as contributing to the Marine Natura site network of qualifying reefs in terms of the EU Habitats Directive (see Appendix B). Due to the analysis only being undertaken on still imagery, the extent of any possible Annex I stony reef cannot be evaluated. Therefore, potential Annex I stony reef features have been identified in images where a minimum of 10% hard substrate with appropriate elevation and biota (i.e. bedrock, boulders or cobbles) was present, and was recorded as 'Potential Stony reef' in 164 images.

An important caveat to note is that restoration activities involved the deployment of limestone cultch in the reef site of gravel graded between 20-100mm in size., similar hard substrate to Annex I stony reef. Potential Annex I stony reef features were not identified in images of the reef site prior to any deployment activities from 'pre-reef' imagery analysis (ENVISION, 2023). Sparse *Sabellaria spinulosa* was recorded in the control site post-reef imagery but was observed to be encrusting and in low densities, therefore no *Sabellaria* biotopes or reef were identified.

3.5. Litter and Anthropogenic Impacts

No instances of litter or clear occurrences of any other anthropogenic impacts were observed within the post-reef imagery.

3.6. Reference Collection

The collection includes 59 images of the taxa/faunal groups and seven images of the habitats/biotopes identified within the post-reef imagery.

NB: Where taxon have been identified to a high taxonomic level (Family or higher) then an example of that taxon has been provided e.g., Brachyura. However, this taxon can cover a range of species, and it should not be considered as the only example.

3.7. Quality Control of Still Imagery Analysis

3.8. Methods

Quality control (QC) was carried out on the majority of the annotations on the still images with a second analyst reviewing the imagery and results within BIIGLE using the LARGO[8] function (Label Review Grid Overview). LARGO allows annotations with the same annotation label to be viewed as thumbnails in a regular grid, which can then be selected to change labels, attach new labels, or delete labels more efficiently. Whilst undertaking the analysis, the analysts noted any issues that led to ambiguity in either the annotation of epifauna or proforma information recording process. For labels

[8] *https://biigle.de/manual/tutorials/largo/largo*

or categories where ambiguity occurred most often, each category was reviewed using LARGO by two analysts and a collective decision made to amend annotations where inconsistencies had occurred.

Using these methods, 100% of annotations were checked in BIIGLE for any misidentification or inconsistencies. Notes were made from this review and recorded for reporting purposes and to detail any actions taken and common issues.

3.8.1. Discrepancies

The quality control process showed a good degree of consistency in the results between the original analysers and the QC analyser and reflects a confidence in the quality of the analysis. Where there were discrepancies between the conclusions of the original analyst and the QC analyst, the issues were explored and are summarised below. The checks and amendments made during the QC of the BIIGLE analysis were recorded in a spreadsheet detailing all QC procedures, to aid the reporting process.

Discrepancies in the analysis were often related to taxa or features of a cryptic nature, which meant they could be overlooked within imagery where sediment or lighting prevented certain identification. Examples of such taxa/features were decapods such as Paguridae, small bony fish and worms such as *Lanice conchilega*. There were also some discrepancies in the percentage cover of macroalgae, unidentifiable turf and unidentifiable crust, however these differences were minor. Additionally, small variations were observed in the percentage cover of substrate; however, all outcomes still aligned with the same broadscale habitat classification. Where analysts identified epifauna to different taxonomic levels, differences were discussed, and amended throughout the dataset where required.

4. Appendices

4.1. Appendix A: Conwy Bay Post-Reef Survey (2025) Transect Information

Table 4.
Broadscale habitat, MHC code and Annex I habitats identified within each transect within the Conwy Bay post-reef imagery analysis (2025).

Site	Transect	Broadscale Habitat	MHC Biotope Code	Annex I
CONTROL	CT1	Moderate Energy Infralittoral Rock / Subtidal Mixed Sediment / Subtidal Sand	IR.MIR / SS.SMx.IMx / SS.SSa.IMuSa	Potential Stony Reef / No Stony Reef
CONTROL	CT2	Moderate Energy Infralittoral Rock / Subtidal Mixed Sediment	IR.MIR / SS.SMx.IMx	Potential Stony Reef / No Stony Reef
CONTROL	CT3	Moderate Energy Infralittoral Rock / Subtidal Mixed Sediment	IR.MIR / IR.MIR.KR.XFoR / SS.SMx.IMx	Potential Stony Reef
CONTROL	CT4	Moderate Energy Infralittoral Rock / Subtidal Mixed Sediment	IR.MIR / IR.MIR.KR.XFoR / SS.SMx.IMx	Potential Stony Reef
CONTROL	CT5	Moderate Energy Infralittoral Rock	IR.MIR.KR.XFoR	Potential Stony Reef
CONTROL	CT6	Moderate Energy Infralittoral Rock / Subtidal Mixed Sediment	IR.MIR / IR.MIR.KR.XFoR / SS.SMx.IMx	Potential Stony Reef
CONTROL	CT7	Subtidal Mixed Sediment / Subtidal Sand	SS.SMx / SS.SSa.IMuSa	Potential Stony Reef / No Stony Reef
REEF	RT1	Moderate Energy Infralittoral Rock / Subtidal Mixed Sediment	IR.MIR / IR.MIR.KR.XFoR / SS.SMx.IMx	Potential Stony Reef / No Stony Reef
REEF	RT2	Subtidal Mixed Sediment	SS.SMx.IMx	Potential Stony Reef / No Stony Reef
REEF	RT3	Moderate Energy Infralittoral Rock / Subtidal Mixed Sediment	IR.MIR / SS.SMx.IMx	Potential Stony Reef / No Stony Reef
REEF	RT4	Subtidal Mixed Sediment / Subtidal Sand / Subtidal Coarse Sediment	SS.SMx.IMx / SS.SSa.IMuSa / SS.SCS	Potential Stony Reef / No Stony Reef
REEF	RT5	Subtidal Mixed Sediment	SS.SMx.IMx	Potential Stony Reef
REEF	RT6	Moderate Energy Infralittoral Rock / Subtidal Mixed Sediment	IR.MIR.KR.XFoR / SS.SMx.IMx	Potential Stony Reef
REEF	RT7	Moderate Energy Infralittoral Rock / Subtidal Mixed Sediment	IR.MIR.KR.XFoR / SS.SMx.IMx	Potential Stony Reef
REEF	RT8	Moderate Energy Infralittoral Rock / Subtidal Mixed Sediment	IR.MIR.KR.XFoR / SS.SMx.IMx	Potential Stony Reef / No Stony Reef

Site	Transect	Broadscale Habitat	MHC Biotope Code	Annex I
REEF	RT9	Moderate Energy Infralittoral Rock	IR.MIR.KR.XFoR	Potential Stony Reef
REEF	RT10	Moderate Energy Infralittoral Rock / Subtidal Mixed Sediment / Artificial Substrate	IR.MIR.KR.XFoR / SS.SMx.Imx / Artificial Substrate	Potential Stony Reef / No Stony Reef
REEF	RT11	Subtidal Mixed Sediment / Subtidal Sand / Subtidal Coarse Sediment / Artificial Substrate	SS.SMx.IMx / SS.SSa.IMuSa / SS.SCS / Artificial Substrate	Potential Stony Reef / No Stony Reef

Table 5.
Transect information for Conwy Bay post-reef underwater imagery survey (2025).

SITE	TRANSECT	LATITUDE START	LONGITUDE START	DEPTH START (m)	LATITUDE END	LONGITUDE END	DEPTH END (m)
CONTROL	CT1	53° 19.564734	-3° 52.805208	6.4	53° 19.544	-3° 52.7418	6.3
CONTROL	CT2	53° 19.538256	-3° 52.746498	6.6	53° 19.5320	-3° 52.7343	6.7
CONTROL	CT3	53° 19.553286	-3° 52.818114	6.5	53° 19.526958	-3° 52.756398	7
CONTROL	CT4	53° 19.5530	-3° 52.8415	7	53° 19.5182	-3° 52.7513	7
CONTROL	CT5	53° 19.537572	-3° 52.830432	7	53° 19.5105	-3° 52.7724	7.5
CONTROL	CT6	53° 19.5708	-3° 52.7801	8.2	53° 19.5507	-3° 52.7489	8.1
CONTROL	CT7	53° 19.5740	-3° 52.7697	8.4	53° 19.556898	-3° 52.7289	8.3
REEF	RT1	53° 18.762	-3° 52.5375	3.6	53° 18.790002	-3° 52.559598	3.4
REEF	RT2	53° 18.7643000	-3° 52.6026000	3.4	53° 18.77	-3° 52.593	3.1
REEF	RT3	53° 18.7639	-3° 52.5616	3.5	53° 18.7546000	-3° 52.5595000	3.5
REEF	RT4	53° 18.7741	-3° 52.6177	3.4	53° 18.76173	-3° 52.598994	3.6
REEF	RT5	53° 18.791466	-3° 52.53738	3.4	53° 18.7808	-3° 52.5217	3.5
REEF	RT6	53° 18.7912	-3° 52.5550	3.6	53° 18.7654	-3° 52.5300	3.5
REEF	RT7	53° 18.8073	-3° 52.5930	3.5	53° 18.7510348	-3° 52.5622831	3.8
REEF	RT8	53° 18.7853	-3° 52.6223	3.7	53° 18.7624772	-3° 52.6044515	4
REEF	RT9	53° 18.8027000	-3° 52.6082000	3.7	53° 18.7849000	-3° 52.6066000	-
REEF	RT10	53° 18.7994	-3° 52.5959	4.2	53° 18.7525825	-3° 52.5634954	4.3
REEF	RT11	53° 18.7951	-3° 52.5880	4	53° 18.7545	-3° 52.5630	4.4

4.2. Appendix B: Annex I Stony Reef Assessment

The 'reefiness' of stony reefs can be assessed using the guidance and definitions within Irving 2009[3] with updated guidance provided recently (Golding *et al.*, 2020[4]).

Characteristic	Not a 'stony reef'	'Resemblance' to being a 'stony reef'		
		Low[2]	Medium	High
Composition:	**<10%**	10-40% Matrix supported	**40-95%**	**>95% Clast supported**
Notes: Diameter of cobbles / boulders being greater than 64mm. Percentage cover relates to a minimum area of 25m². This 'composition' characteristic also includes 'patchiness'.				
Elevation:	**Flat seabed**	<64mm	**64mm-5m**	**>5m**
Notes: Minimum height (64mm) relates to minimum size of constituent cobbles. This characteristic could also include 'distinctness' from the surrounding seabed. Note that two units (mm and m) are used here.				
Extent:	**<25m²**	← **>25m²** →		
Biota:	**Dominated by infaunal species**			**>80% of species present composed of epifaunal species**

Figure 7. *Table 3, from Irving (2009[3]).*

When determining whether an area of the seabed should be considered as Annex I stony reef, if a 'low' is scored in any of the four characteristics (composition, elevation, extent or biota), as shown in Figure 7, then a strong justification would be required for this area to be considered as contributing to the Marine Natura site network of qualifying reefs in terms of the EU Habitats Directive.

The updated guidance (Golding *et al.*, 2020[4]) states that if the majority (three or more) of the criteria exceed 'Low', then this strong justification could result in classifying the area as having 'medium resemblance' to Annex I stony reef. Guidance on how to assess each criterion has been updated from Golding *et al.*, 2020[4].

CRITERION: Composition of reef – Assessment of the substrata of the seabed is used to determine the composition of substrate types.

Composition across the area being considered should be at least 10% cobbles (greater than 64mm in minimum diameter) or boulders (greater than 256mm in diameter). This 10% should be considered across the entire area (or at least across the minimum extent of 25m2). Stony reef habitat is inherently patchy in nature, and although composition is not a measure of patchiness it should take patchiness into account (i.e., on a patchy reef the percent cover of cobbles should take into account areas where cobbles are sparse or absent as well as areas where cobbles are abundant). Composition can be assessed using in-situ (diver) or remote (underwater imaging systems such as drop-camera/Remotely Operated Vehicle) or using acoustic remote sensing such as side-scan sonar or multibeam echosounder backscatter data.

CRITERION: Elevation of reef – Elevations of substrata is determined from any rocky protrusions rising form the seabed or where cobbles or boulders are proud of the seabed.

Elevation of the area under consideration should generally be greater than 64mm. However, matrix supported cobbles >64mm in diameter (partially buried in a sediment matrix) may still function ecologically as a reef with an associated reef community yet have an elevation less than 64mm. Where

the elevation is less than 64mm, particles must have a diameter greater or equal to 64mm to be considered as stony reef. This criterion can include consideration of topographic distinctness from the surrounding seafloor, noting the requirement for the Annex I reef to "arise from the sea floor". Clast size (considered above in composition) could be used as an approximate proxy for elevation. Topographic distinctness (height of the feature) in its broadest term, is best assessed using side-scan sonar or multibeam bathymetry data.

CRITERION: Extent of reef –extent measured from video imagery is limited to the field of view, and habitat extents are likely to be larger than the linear belt transect sampled therefore extent of reef areas can be assessed from SSS and MBES data.

Extent of the area under consideration should be greater than 25m^2 (e.g., 5m x 5m / 10m x 2.5m). Note that the inherent patchiness of stony reef should be taken into account when considering extent. For example, individual patches may measure less than 25m^2, but the whole area of patchy reef may exceed 25m^2.

CRITERION: Biota supported by reef – Taxa from video analysis can be biased towards epifaunal taxa and infauna data will be used in addition to these data were available. In addition, the biota component of reef can be assessed based on diversity and morphology (reefs tend to have higher diversity).

Biota associated with the area should typically be dominated by epifaunal species. Some areas of seabed subject to scour/disturbance may have an impoverished epifaunal community, yet may still function ecologically as a reef5. Biota should be considered across the entire area being considered under the extent criteria, not just the cobble/boulder fraction being used to consider the composition criteria, reflecting the prevalence of an epifaunal or infaunal community. However, more detailed guidance on the biota criterion is currently being developed, with respect to assessing which biological communities are typically associated with Annex I stony reef. This may include consideration of particular species which could be used as a proxy for stability.

Sites which are scored as medium or high reefiness for composition, elevation and biota characteristics will be allocated as potential Annex I reef.