Natural England Commissioned Report NECR125

Offshore monitoring of Annex I reef habitat present within the Isles of Scilly Special Area of Conservation (SAC)

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Foreword

Natural England commission a range of reports from external contractors to provide evidence and advice to assist us in delivering our duties. The views in this report are those of the authors and do not necessarily represent those of Natural England.

Background

Under the requirements of the EU Habitats Directive the UK Government has established a series of Special Areas of Conservation (SACs) which, with Special Protection Areas, form a series known as Natura 2000 (N2K). Articles 11 and 17(1) of the Habitats Directive require that member states regularly assess the ecological condition of the designated features within the N2K series. Condition Assessment of European Marine Sites is carried out on a six yearly cycle, and it is the responsibility of Natural England to report this to Europe through the JNCC (Joint Nature Conservation Committee).

One of the qualifying marine features for SAC designation is the Annex 1 reef habitat. This report describes results from an interdisciplinary field survey (combining new acoustic sidescan and multibeam data together with ground-truthing video and stills) to determine the presence, extent and quality of Annex 1 reef habitats (chiefly upstanding reef, boulder and flat bedrock) within the outer Isles of Scilly SAC.

The information presented provides a baseline against which any future changes in condition can be detected, as well as providing a preliminary view of feature condition.

Some comparison has been made between results arising from the 2011 surveys and those from Munro and Nunny (1998). There were only a few instances where both investigations surveyed the same areas, but the 2011 surveys did reveal some areas of reef which had previously been recorded as sediment habitat.

This report is being published to inform managers and to allow others to review the work, as well as to develop and adapt monitoring programmes for this and other SACs.

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Further information
This report can be downloaded from the Natural England website: **www.naturalengland.org.uk**. For information on Natural England publications contact the Natural England Enquiry Service on 0845 600 3078 or e-mail **enquiries@naturalengland.org.uk**.

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Executive Summary

This report describes the results from an interdisciplinary field survey aimed at identifying the location, extent and condition of Annex I habitat features in the Isles of Scilly Special Area of Conservation (SAC). The habitat features of interest are: (i) vertical rock; and (ii) subtidal boulder and cobble communities. Information is presented on the presence, extent and condition of Annex I reef within the SAC and is intended to serve as a baseline for future monitoring of the identified features.

New acoustic sidescan and multibeam data were acquired from around the Isles complex and within the broader SAC area, together with ground-truthing samples (video and stills) representative of distinct acoustic signatures. Analysis of acoustic data revealed several distinct acoustic signatures relating to different rock types; upstanding reef, boulder and cobble reef and flat bedrock. These have been catalogued, described and matched with the observed video records. A level of confidence was applied to the acoustic signatures in relation to Annex I reef (low, medium and high). The extent of high confidence reef (upstanding reef and large boulders) was estimated at 809 hectares and extended 0.5 – 1.5 nautical miles from the coast. Biotopes identified within this area were assigned to one (or a combination) of five European Nature Information System (EUNIS) classifications: A3.2142; A4.121; A4.131; A4.132; and A4.139, which were characterised by species such as: kelp *Laminaria spp.*(A3.2142 only); the Jewel anemone *Corynactis viridis*, Devonshire cup coral *Caryophyllia smithii*; Ross coral *Pentapora fascialis;* Plumose anemone *Metridium senile;* Dead man' s fingers *Alcyonium digitatum;* Axinellid sponges; and the Pink sea fan *Eunicella verrucosa*. Low lying boulders and raised bedrock found within the medium confidence Annex I reef (covering 393 hectares) contained biotope A4.2122 (characterised by *P. fascialis* and *C. smithii*). The area of flat bedrock was not classed as Annex I reef and was ascribed to the EUNIS classes A4.2 and A4.21.

The condition of Annex I reef was determined by assessing the presence and quality of pink sea fans *Eunicella verrucosa* and Ross coral *Pentapora fascialis* colonies. Pristine examples of *E. verrucosa* were found at four sites in the south and north east of the Isles. *P. fascialis* was found at the majority of sites confidently assigned as Annex I reef and were generally large colonies, in good condition. Silted/aging colonies were observed at sites off the northern coast but their condition could not be attributed to impacts other than natural pressures.

The results arising from the 2011 surveys have been compared with those from Munro and Nunny (1998). However, this comparison was limited since there were only a few instances where both investigations surveyed the same areas. Nevertheless, the 2011 surveys did reveal some areas of reef which had previously been recorded as sediment habitat.

Recommendations are made for future monitoring of the area given the limitations in survey techniques that are suitable for Annex I habitats.

Offshore monitoring of Annex 1 reef habitat present within the Isles of Scilly Special Area of Conservation (SAC)

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1 Background and Introduction

1.1 Background and Study Area

The natural environment of the Isles of Scilly

The Isles of Scilly lie 28 miles (45 km) from Land's End and are the most south westerly part of Britain. They consist of over 200 low-lying granite islands and rocks and are England's only oceanic archipelago. The unique combination of a relatively isolated location, over 4,000 years of human occupation, and an extreme maritime climate, have resulted in the development of an island complex of special cultural and wildlife importance.

The designation of the islands as an Area of Outstanding Natural Beauty (AONB), Conservation Area and Heritage Coast reflects the exceptional quality of their environment. The Conservation Area and the AONB boundaries are coincidental and cover the entire archipelago. In addition, there are several nature conservation designations that reflect the importance of these features; namely 26 Sites of Special Scientific Interest (SSSI), many of which are components of the Isles of Scilly Special Protection Area (SPA), Ramsar designated sites for breeding seabirds, and a Marine Special Area of Conservation (SAC) (Figure 1).

The Isles of Scilly Marine Special Area of Conservation (SAC)

The Isles of Scilly are a unique and biologically rich archipelago of international importance for its marine conservation interest; hence the designation of the Isles of Scilly Special Area of Conservation (SAC) in 2000 under the 1994 Habitat Regulations[1] (the UK statute for the implementation of the EC Habitats Directive 1992[2]). The primary reason for the site's designation is the presence of Annex I habitats. One of these Annex I habitats, and the focus of this study, is Rocky Reef.

Rocky reefs are defined by the Joint Nature Conservation Committee (JNCC) as:

> *''Bedrock or stable boulders and cobbles arise from the surrounding seabed creating a habitat that is colonised by many different marine animals and plants''*

In particular, the Isles of Scilly SAC is designated for the following rocky reef sub-features and species relevant to the sublittoral survey area, as detailed in the Isles of Scilly Management Scheme 2010 (Natural England, 2010):

> **Vertical Rock:** supporting Jewel anemones *Corynactis viridis*, yellow staghorn sponge *Axinella dissimilis*, dead man's fingers *Alcyonium digitatum*, sunset cup corals *Leptosammia pruvoti* and erect sponge communities.
>
> **Subtidal rock and boulder communities:** rock surfaces covered by encrusting animals such as anemones, sponges and hydroids as opposed to seaweeds. The presence and condition of species such as *Eunicella verrucosa* and cup corals

[1] The Conservation (Natural Habitats, &c.) Regulations 1994, Statutory Instrument No. 2716.

[2] Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna.

Parazoanthus anguicomis are of particular importance as they are indicators of the health of the rocky seabed.

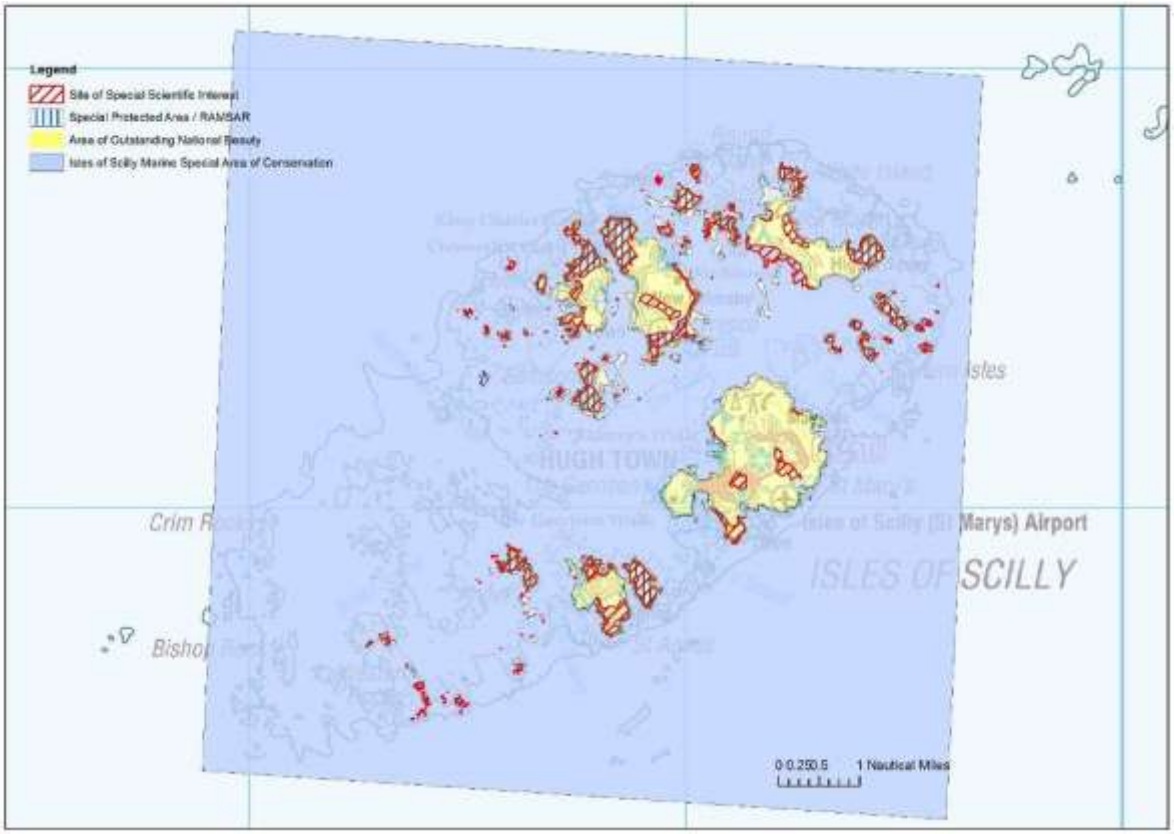


Figure 1 Survey area: Isles of Scilly SAC (dark blue square)

Natural England are responsible for assessing the condition of Annex I features of the Isles of Scilly (IoS) nature conservation designations, and for providing advice to relevant authorities regarding their management, protection and enhancement on a 6-yearly cycle.

1.2 Links to Plan of Action

The principal objectives of the IoS surveys were:

- to determine the **presence**, **extent** and **quality** of Annex I reef habitats (chiefly upstanding reef, boulder and flat bedrock) within the outer IoS SAC, which will provide a baseline to allow any future changes in condition to be detected and provide a preliminary view of feature condition; and

- to identify and record the nature and location of any obvious human impacts identified within or near the sites.

2 Survey Design and Methods

2.1 Planning: including site/station selection

Nearshore and offshore surveys of the IoS rocky reef were conducted on separate occasions in 2011. In May 2011, the Cornwall Inshore Fisheries and Conservation Authority (CIFCA) vessel, Saint Piran, was used to obtain sidescan data of the northern and eastern nearshore region. A review of the sidescan data identified areas of differing reef types which were classified as:

- Type 1 – Upstanding/pinnacle
- Type 2 – Low profile/flat rocky outcrop
- Type 3 – Boulder/cobble

A Remotely Operated Vehicle (ROV) was deployed from CIFCA vessels Kerwyn and Saint Piran, in July 2011, at selected sites in order to ground-truth the potential reef types. On a separate survey in 2010, Saint Piran also undertook some limited sidescan survey within the eastern part of the SAC.

In November 2011, Cefas Endeavour was used to obtain sidescan and multibeam data from the deeper, offshore region parallel to the near shore survey with additional coverage of the western side of the Isles. Drop camera transects, targeting potential reef types, were selected in real-time using multibeam bathymetry displayed by the vessel's Olex system (version 7.3, www.olex.no) (Figure 2).

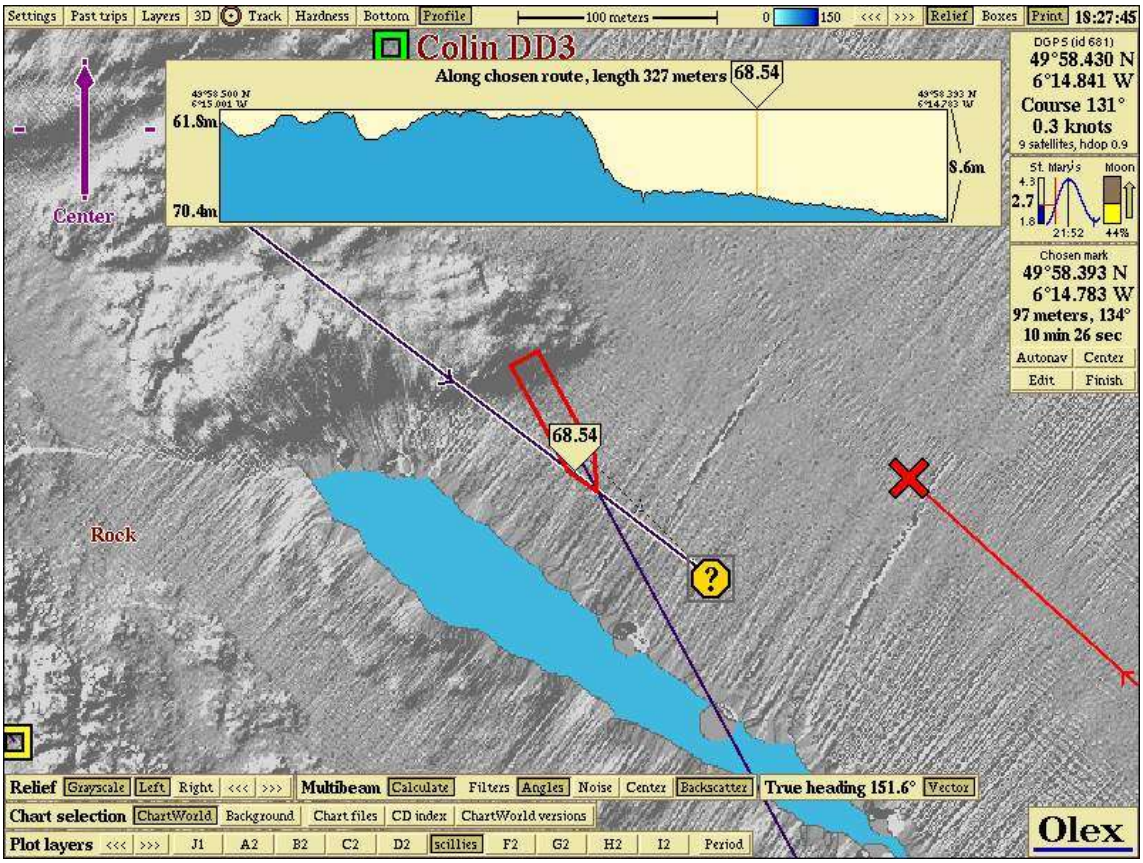


Figure 2 Olex display in real time of vessel position over multibeam imagery. The top panel shows the bathymetric profile over the arrowed line in the main display

2.2 Acoustic and geophysical methods

- *Nearshore survey*

  This survey was conducted using an Edgetech 4200MP 300/600kHz sidescan sonar system running with Edgetech DISCOVER acquisition software. A Furuno GP36/37 GPS with IALA differential corrections was used to provide positional data. The system was towed on a marked umbilical to provide layback information. Towing speed was variable, depending on prevailing weather conditions, so as to acquire the best quality data possible. It was possible, by observing the waterfall sonar record as it was acquired, to make a rapid assessment of ground type, which allowed the survey to be adapted, thus reducing survey time over areas of featureless or mobile sandy seabed.

- *Offshore survey*

  Multibeam bathymetry (Kongsberg EM3002D) and sidescan sonar (Edgetech 4200MP 300/600kHz) were used to map the geophysical features of the sea floor within the IoS SAC. The sidescan was positioned using a combination of Thales 3011 DGPS position and cable layback entered into the Discover logging and software package. Raw JSF and XTF files were generated in real time. The multibeam system was deployed on the drop keel. This was lowered to its full extent (~3m) to minimise the effect of bad weather on the signal. Positioning was obtained using a Cnav 3050 DGPS with kinematic position derived from the St Mary's reference station and corrected for the multibeam heads with an MRU5 motion reference unit. The track plot and 3D map of the seafloor derived from the multibeam was visible in real time using an Olex system. This allowed potential areas of rocky reef to be identified and sites selected for the deployment of drop down video. The inshore survey ROV video stations and any observed fixed gear marks were also plotted on Olex.

2.3 Video sampling methods

- *Nearshore survey*

  Video footage of Type 1 (upstanding/pinnacle) habitat, was obtained using a Videoray Pro Remote Operated Vehicle (ROV) fitted with a forward facing wide angle colour camera recording direct to a Sony-HD700E DV tape recorder. The vessels own GPS was used to record position. The ROV was also secured in a drop down frame and towed over predicted Type 2 (low profile/flat rocky outcrop) and Type 3 (boulder/cobble) habitats.

- *Offshore Survey*

  The survey employed a Kongsberg OE14-208 camera (video and stills) system, deployed in a drop camera frame.

Figure 3 Drop camera frame with video and stills cameras and lighting configured according to MESH ROG

The drop video camera and stills system was set up following Common Standards Monitoring (JNCC, 2004), and in particular the Mapping European Seabed Habitats (MESH) recommended guidelines (ROG) for underwater video and photographic imaging techniques[3]. The camera was placed in a drop down frame along with two Cefas high intensity LED striplights. A Cefas quad Laser scaler was aimed along the boresight of the camera to give reference dimensions on the seabed as the frame varied in altitude. Video data was recorded on a Sony GV-HD700E in DV tape format. The video and stills were annotated with time and position using a GPS referenced video overlay. The drop frame height was controlled via a winch operator in sight of the video feed.

On arrival at each site, the drop camera system was deployed from the side gantry and lowered into position just off the seabed. Once the camera was in position the ship moved along the transect under dynamic positioning at a speed of 0.2 knots. A real-time video link was fed to two monitors positioned in the dry laboratory where a) scientists could observe the footage in order to provide a summary of habitat types and dominant fauna present and b) to allow the winch operator to see when the camera needed to be lifted and lowered depending on the bathymetry of the seabed (to avoid damaging the reef habitat and species). Video footage was acquired for the full length of each transect, and still images were taken at 1 minute intervals where possible. In practice, these were collected on an opportunistic basis due to weather and limitations of swell waves.

Logsheets were populated for each station with the time, position and water depth at the start and end of each transect along with a brief summary of the main habitat types and species present. A media catalogue was populated to show which tape or disk contained the video footage acquired at each station. Still images were downloaded from the camera system at regular intervals and were stored and backed up on two separate portable hard drives.

2.4 Fisheries liaison

A Natural England representative was onboard RV Cefas Endeavour for the entire survey in November 2011, and was in continuous contact with fisheries representatives on the Isles of Scilly. In addition, two local pilots on board RV Cefas Endeavour for the survey duration also assisted with the fisheries liaison as necessary.

[3] Reference URL: http://www.searchmesh.net/PDF/GMHM3_Video_ROG.pdf

2.5 Sample processing/analysis methodologies

- *Acoustic*

The raw XTF data files were ordered into a Cefas standard data structure for processing. TEI's ISIS and Tritonmap software packages were used to process the files into rendered geotiffs in WGS84/UTM 29N co-ordinates. As processing progressed, the record was inspected for variances in intensity. A set of best gain correction settings was established and applied in a consistent manner across the survey area. The data contained significant noise artefacts due to the marginal weather conditions during both the inshore and offshore surveys. During the offshore survey, the sidescan was not deployed for all planned survey lines due to the poor weather and presence of fixed gear in certain locations.

The raw multibeam data was processed using CARIS HIPS. Tidal information was gathered using a CNAV 3050 Kinematic DGPS receiver tied in to OSNET corrections. Tide height data was smoothed and extracted to reduce the tide on the bathymetry. The soundings were cleaned and smoothed using CARIS to IHO order 1. This cleaning resulted in the elimination of large amounts of poor or noisy data resulting from inclement weather conditions. The back-scatter component was extracted using FM and was found to be less susceptible to the noise.

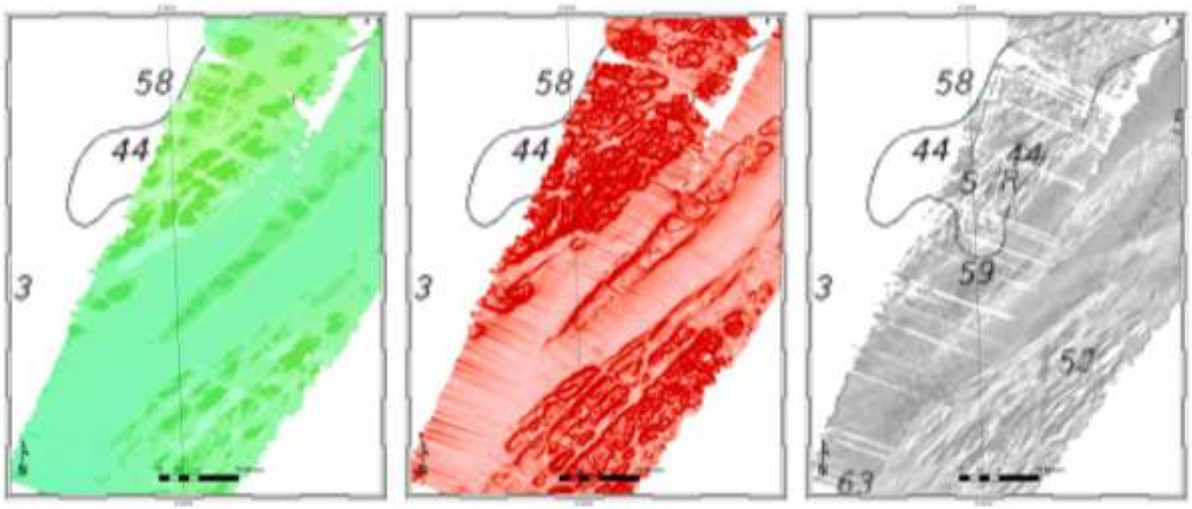


Figure 4 Example images of bathymetry derivatives used to emphasise reef features

Left (green) = BPI, Centre (red) = Slope, and Right (grey) = multibeam backscatter, before compositing.

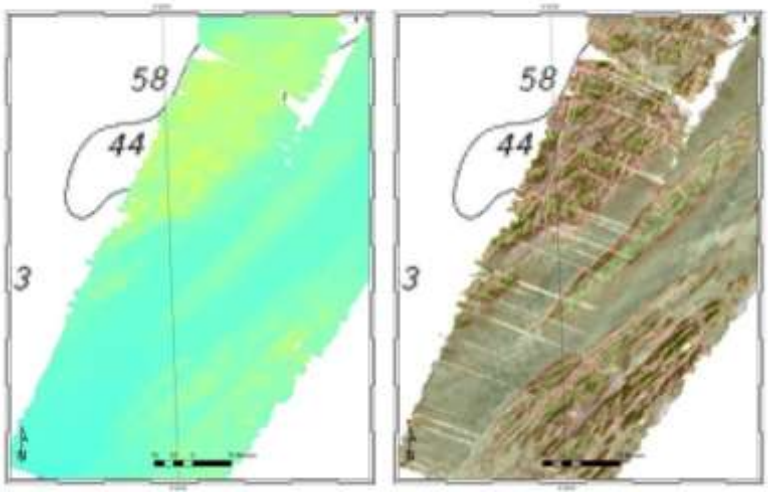


Figure 5 Left: Colour mapped bathymetry and Right: Composite enhanced image

Seafloor classification techniques are based on methods used by Lundblad and others, 2006 and Mortensen and others, 2009. These methods used derivatives of the multibeam bathymetry; slope (measure of feature steepness) and Bathymetric Position Index (BPI) (measure of change in seabed topography) to enhance the features present in the data. The derivatives were extracted from the multibeam bathymetry using ARC GIS V9.3 and were used to aid manual interpretation of the data (Figure 4). Each layer was mapped in a distinct colour (green for BPI, red for slope and grey for backscatter), which increases in intensity as the derivative values increases. Using differing transparencies, a composite image was formed. From this image the acoustic features could be emphasised in a clear manner and were independent of water depth.

The composite image produced (Figure 5) was used in conjunction with the sidescan image to manually interpret and map acoustically distinct features that could be attributed to rocky habitat. This interpreted layer was ranked as high medium and low confidence based purely on the acoustic record. Ground-truth information from the video tows was then used to inform and modify this interpretation.

- *Video*

Each video tow was analysed by repeated viewing, firstly to detect and record any changes in biotope across the entire transect, and secondly, to describe the physical features and quantify the epifaunal species characterising each biotope. Physical features recorded included the proportion of different substrate types, inclination, texture, stability and evidence of siltation. Epifauna were quantified according to the MNCR SACFOR abundance scale (S = Superabundant, A = Abundant, C = Common, F= Frequent, O = Occasional, R = Rare). Each video transect was given a European Nature Information System (EUNIS) biotope classification code based on the physical features of the substrate and the species present.

Drop down video

Where more than one biotope was evident within a tow, each segment was analysed separately, georeferenced and given a EUNIS biotope code. Following Cefas' in-house procedures, three representative photographic stills were analysed (where possible) from each of the different habitats identified from the video.

ROV video

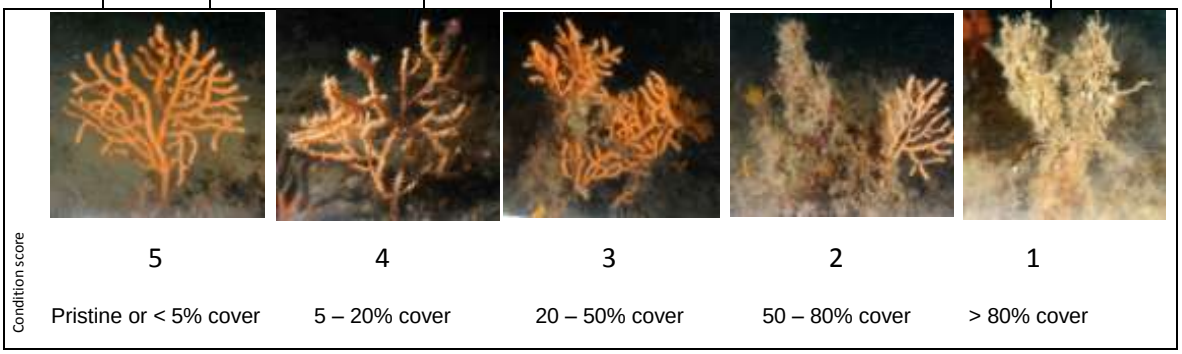
ROV videos were only georeferenced at the start and end of the tow using the ships GPS, therefore more than one biotope was assigned when different habitats were observed along the video transect. No stills were taken during the ROV surveys.

Condition assessment

Condition assessments for the 'Ross Coral' *Pentapora fascialis* and 'Pink sea fan' *Eunicella verrucosa* were undertaken for each video tow. Each *E.verrucosa* encountered was awarded a 'condition score' ranging from 1 to 5 (Table 1), whilst *P. fascialis* colonies were described as poor to good condition.

Table 1 Condition assessment for *E. verrucosa* (from Irving & Northern 2012)

Score	% cover	Comment
5	Pristine or < 5%	No epibiota (or hardly any).
4	5% - 20%	Partial covering of sea fan by epibiota.
3	20% - 50%	Up to half of sea fan affected by epibiota.
2	50% - 80%	A large proportion of the sea fan has epibiota covering it, with only a small amount of 'healthy' fan apparent.
1	> 80%	Dense cover (almost total) of epibiota.



All information extracted from the video and stills samples was recorded on the MNCR Habitat recording forms (see Appendices for summary information).

Information from the diving survey undertaken in July 2011 (Irving and Northern, 2012) was used to supplement the data gathered by video, although only 2 sites were located in the acoustic survey area.

2.6 Data QA/QC

All activities in the field have been performed according to the recommendations in the following documents:

- Recommended operating guidelines for underwater video and photographic imaging techniques[4]

[4] Reference URL: http://www.searchmesh.net/PDF/GMHM3_Video_ROG.pdf

2.7 MBES (bathymetry and backscatter) and Sidescan (including maps)

The Isles of Scilly are formed from granite which is part of a significant subterranean batholith ranging from the Haig Fras cSAC, lying west of the Isles, to mainland Dartmoor. In the Isles of Scilly, the bathymetry from the shallow nearshore quickly drops to depths of 60 to 90m within a few kilometres around the entire island. Subtidal rock consists of rocky granite reef fringing the coastline adjacent to hard shores or cliffs, and offshore granite bedrock reefs emerging from the sediment.

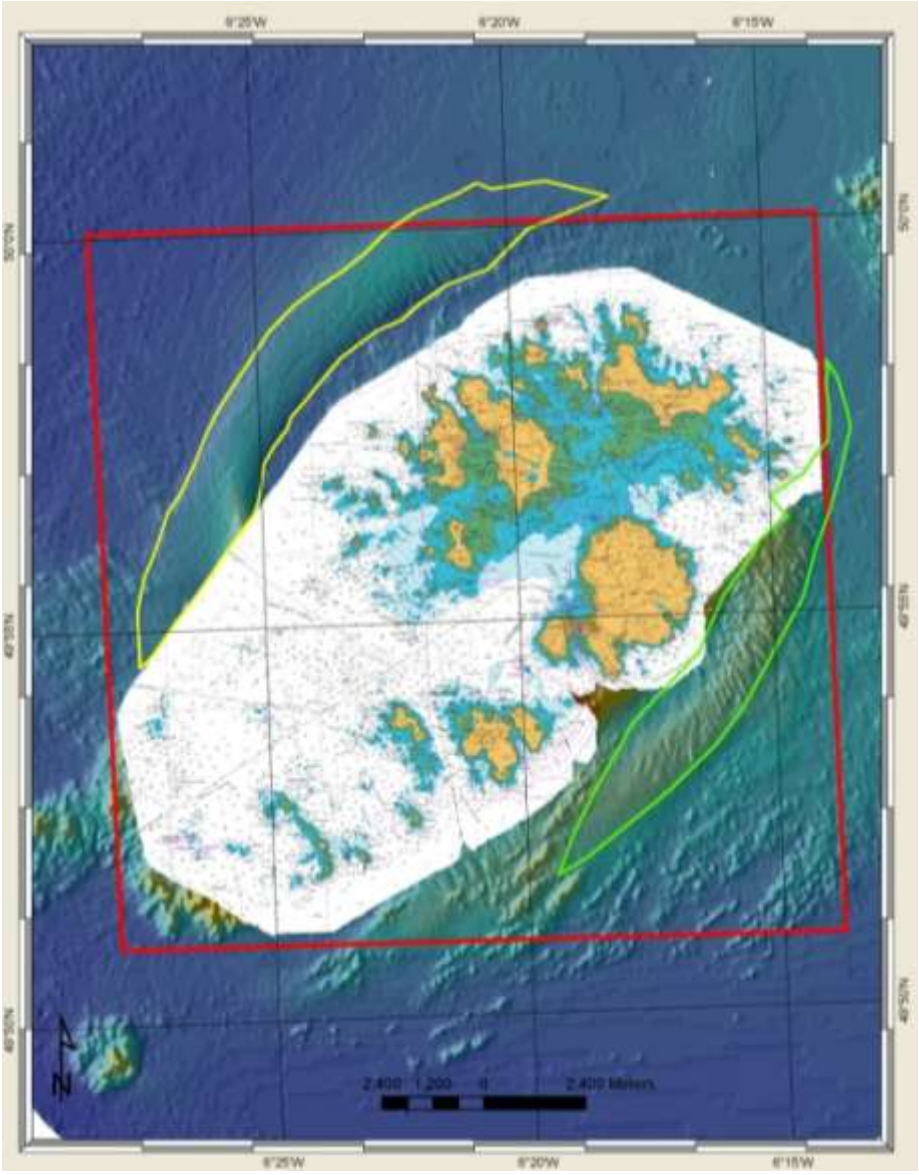


Figure 6. Astrium derived bathymetric data around the Isles of Scilly, the SAC is outlined in red and the two banks in yellow (West Bank) and green (East Bank)

It is likely that ice sheets extended as far as the north coast in the quaternary period and that erosion may have formed the sediment banks that exist to the north-west and south-east of the Isles (Figure 6). These banks have no charted name; therefore this report will refer to them as East Bank and West Bank (all other names are derived from the admiralty chart). In the Isles of Scilly, this erosion derived sediment is generally of a coarse grained nature. Out in the deeper oceanic region the seabed becomes flat and featureless but structure seen in the bathymetry (Figure 6) indicate the rock forming the Isles is still emergent from the seabed to the northeast, south and southwest.

Marine submergence (sea level rise) may account for the existence of ledges found around the 50 metre contour, which may be relic shorelines (Figure 7). These ledges are sometimes cut through with sediment filled gullies. The gullies resemble drowned river valleys, or rias, as they align with the sounds and bays, especially in the northeast of the Isles.

Boulder beaches which exist at current sea levels may also be repeated at lower levels on the surrounding slopes, which give rise to a complex and changeable seabed morphology around the Isles.

Figure 7. Sediment filled channel feature (red line) cutting through ledges (Blue lines) off Tean Sound

- *Acoustic coverage*

The 2010 sidescan survey conducted on Saint Piran only encompassed a small area extending east of Crow Sound. In 2011, collection of data in both surveys was hampered by strong south westerly winds and severe sea conditions. During the 2011 sidescan survey, Saint Piran was unable to venture out beyond the Western Rocks to the south and Men-a-vaur in the north. Similarly Cefas Endeavour was, at times, limited to operating the multibeam sonar in the lee of the Isle to the north east. The weather also rendered the sidescan data, taken on Cefas Endeavour, unusable, therefore most of the acoustic coverage was biased to the north and east (Figure 8).

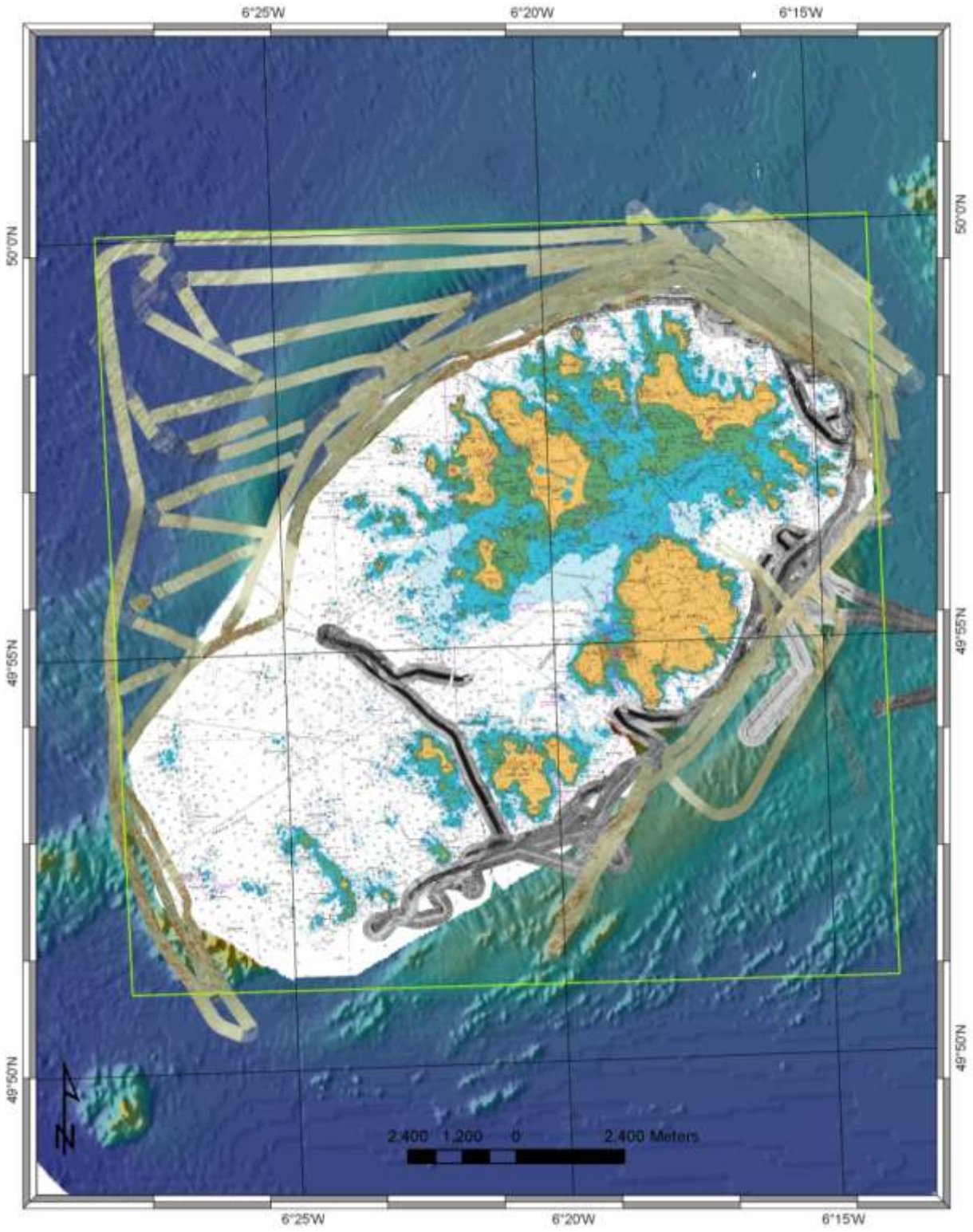


Figure 8. Acoustic coverage of surveys in 2010 and 2011 sidescan coverage is depicted in grey and multibeam in red/green

Features identified utilising the three datasets (Astrium, multibeam and sidescan) were found to be highly correlated. Figure 9 (right image) illustrates where the change in multibeam features correspond with the sweeping circular northern edge of the West Bank deposit and the large sandwave field to the north west. In the centre of the Figure 9 (left image), a rocky reef was identified by both the sidescan and multibeam data.

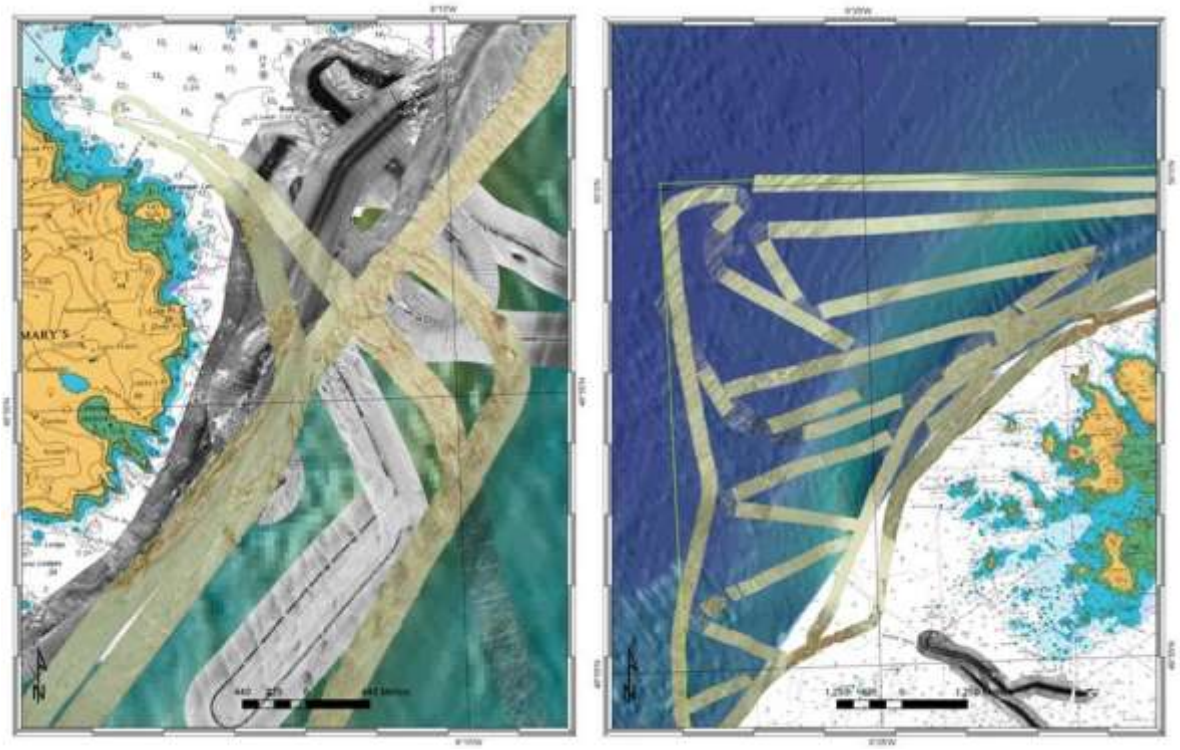


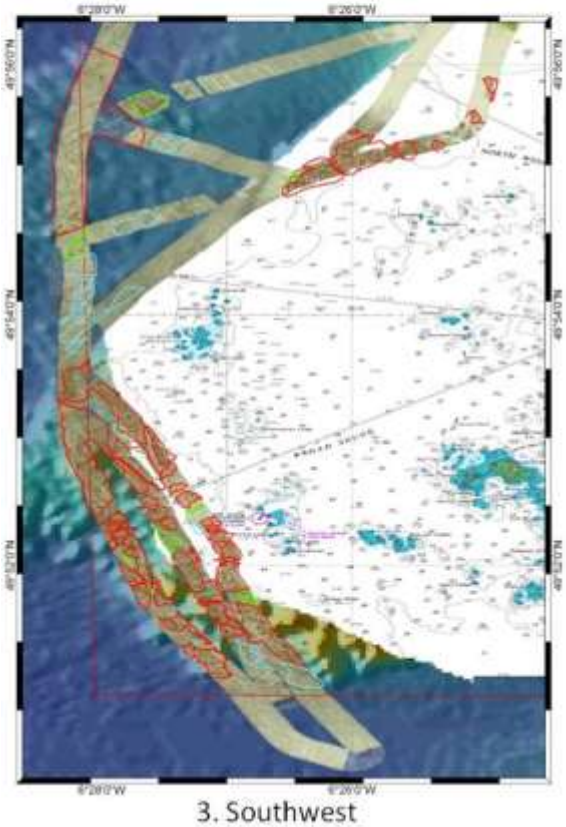
Figure 9. Area showing the geographic correlation of (left) sidescan (grey) and multibeam bathymetric data (green/blue) and (right) the background astrium data with multibeam

The location of reef features, defined by manual interpretation of acoustic images, is portrayed in Figure 10 (images 1-8). The deepest region (~90m) in the north west of the SAC (Figure 10, image 1) displays a predominantly sediment covered bedrock signature with occasional exposure. The backscatter infers this is extremely patchy and bathymetry shows that it is flat. There is a clear line displayed in the Astrium bathymetry and backscatter data, inferring an increase in sediment as the West Bank develops to the south and east. This bank displays large sandwaves to the northeast, which are detected in the bathymetry (a similar bank exists on the opposite side of the Isles).

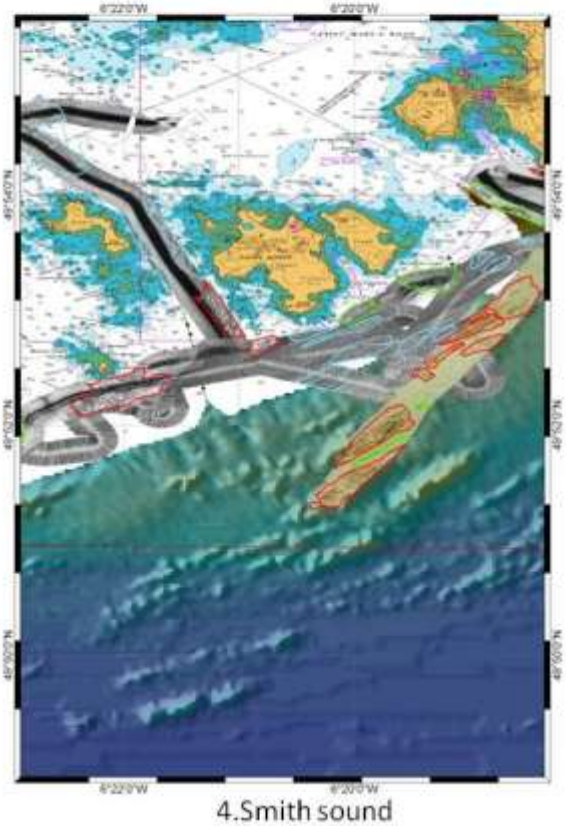
On the southern edge of the survey coverage, by Carntop, Carnbase and Steeple Rock there are deep upstanding reef features surrounded by fine sediments as inferred from the very low backscatter value found in the mouth of the North West Passage (Figure 10, image 2).

1.Northwest

2.North West Passage



3. Southwest



4.Smith sound

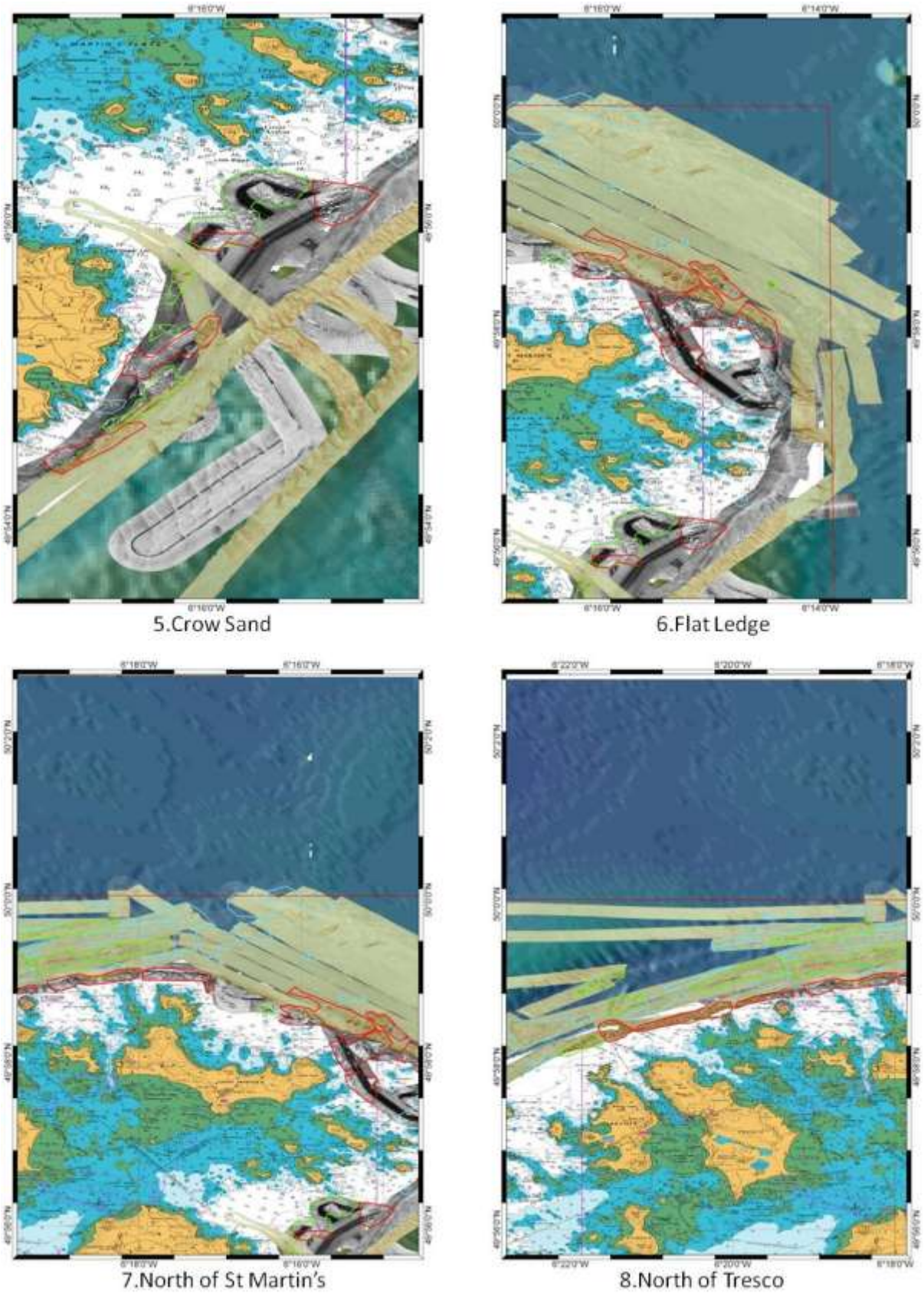


Figure 10. Images 1-8: acoustic track and rock features around the Isle of Scilly complex. The SAC boundary is plotted as a straight red line, the sidescan image is depicted in grey and the multibeam as a composite grey/red/green image. The manual interpretation of reef feature location is displayed as high certainty (red polygons) medium certainty (green polygons) and low certainty (blue polygons)

Southwards, along the western edge of the SAC, the seabed displays increasing roughness with more flat but exposed bedrock. This develops into more deep upstanding reef off Broad Sound (Figure 10, image 3) and continues past Bishop Rock to the southern boundary of the SAC. The Astrium Bathymetry indicates this reef is likely to extend further west of the SAC boundary.

Along the southern SAC boundary the acoustic coverage is limited to inshore areas. This was due to the very challenging weather conditions. However, in the last few hours of the survey additional acoustic data were collected over some charted shoals to the south of St Agnes that were 40 metres high, in 50 metre surrounding depths (Figure 10, image 4). These proved to be emergent reef and the Astrium bathymetry infers this chain of reef could be quite extensive (extending some 1.5 Nautical miles south of the SAC boundary, and to the south east boundary corner). Further inshore, sidescan images show reef extending out from Gorregan, Melledgan and up into Smith Sound off Ragged Rock. There are similar structures south of St Agnes, Gugh and the Spanish Ledges (Figure 10, image 5).

Across St Mary's sound, the substrate becomes flat and sedimentary, with further rock outcrops evident south of St Mary's, before again changing to sediment in Crow Sound (Figure 10, image 5). Further offshore, extensive sand waves and megaripples, approximately 1 nautical mile wide, are apparent over the East Bank. The East Bank was found to extend around the Eastern Isles before dissipating into a deep flat seabed found in the north east of the SAC boundary. Around Trinity Rock and Ridge, rock outcrop is evident on the sidescan image but is relatively limited due to the proximity of the East Bank. The same proximity exists from the Eastern Isles northwards to Hard Lewis Rocks, the north east tip of the Isles of Scilly.

On the north coast the reef again extends approximately 0.5 nautical miles from Flat Ledge (Figure 10, image 6), before hugging the shoreline again at the Brewer and Baker rocks (Figure 10, image 7). About 1.3 nautical miles north east from these rocks there are an unusual cluster of low lying banks in an otherwise flat seabed. This area was ground-truthed and is presented further in the next section (Figure 18). The form of upstanding reef lying close to the shoreline is maintained moving south westwards to Westward Ledge. Here, at 70 metres depth, a fairly extensive low lying bedrock structure was identified, with ledges running parallel to the shoreline and gullies radiating out from the sounds (Figure 10, image 8). This structure becomes increasingly covered by the sediment of the West Bank.

2.8 Seabed imagery

The position of video ground-truthing sites are shown in Figure 11.
Each location, along with associated example images of each habitat, is described below.

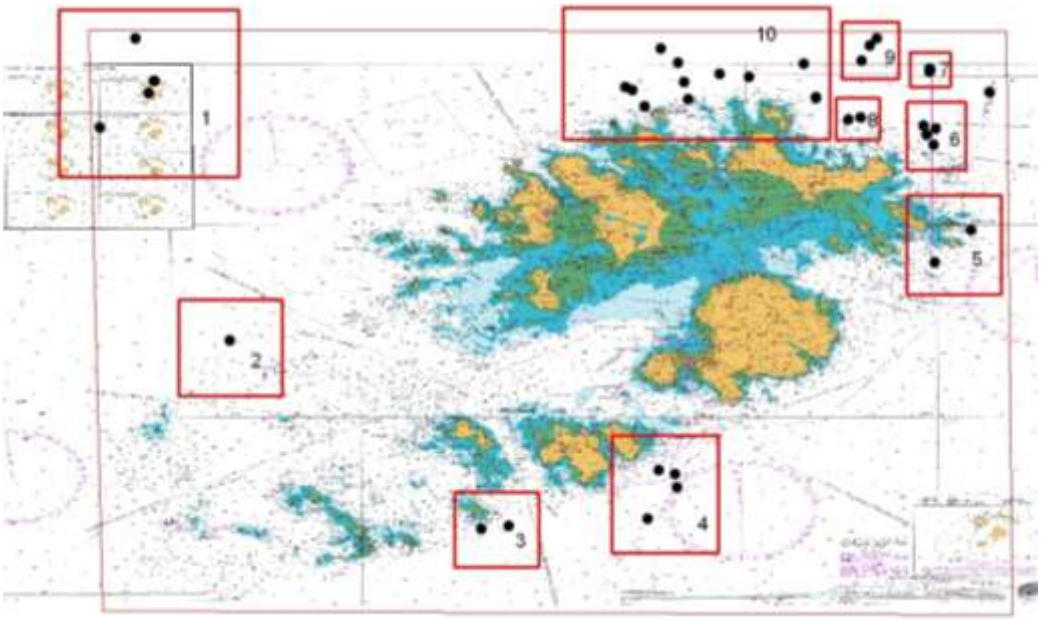


Figure 11. Positions of video tows grouped by location

1. North west region

   The deep (~90m) region in the north-west corner of the SAC was ground-truthed by four camera tows. The videos and stills showed similar substrate and species composition at all four sites. The substrate was generally a veneer of sand or coarse substrate (cobbles/gravel) on bedrock, characterised by faunal turf (Crisiidae and *Cellaria* sp.) and the brittlestar, *Ophiocomina nigra.* This habitat also dominated the offshore region to the north of the Isles of Scilly.

2. North of Carntop (west of North West Passage)

   This area was characterised by complex boulder and cobble reef in 56-65m, with a diverse array of axinellid sponges. *Pentapora fascialis*, *Caryophyllia smithii* and *Corynactis viridis* were abundant, with frequent observations of *Eunicella verrucosa (*see top image, Figure 13).

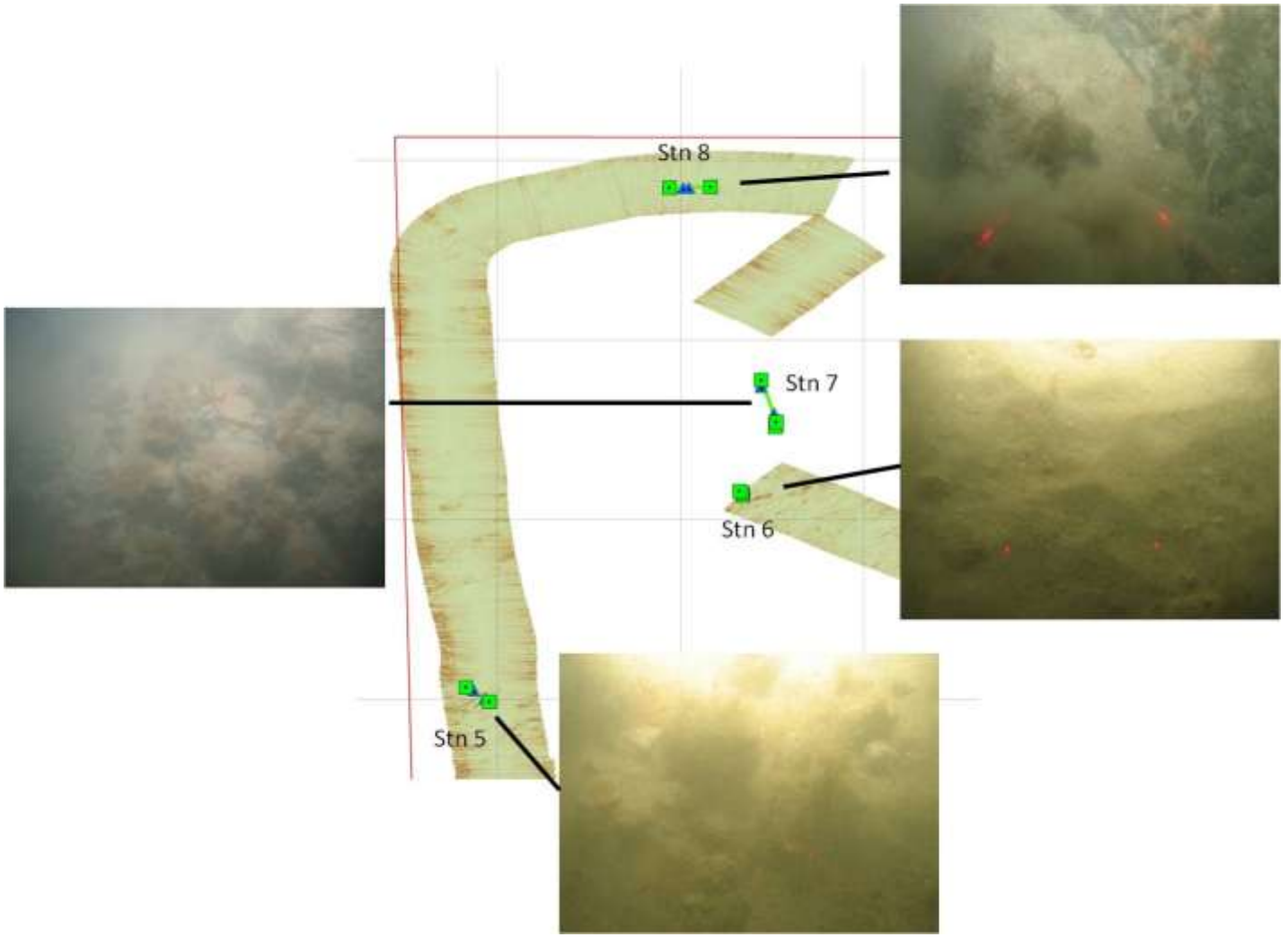


Figure 12. North-west region of the Isles of Scilly SAC in 90m water depths. Red line denotes SAC boundary, green squares = start and end of video transect, blue triangles = stills positions

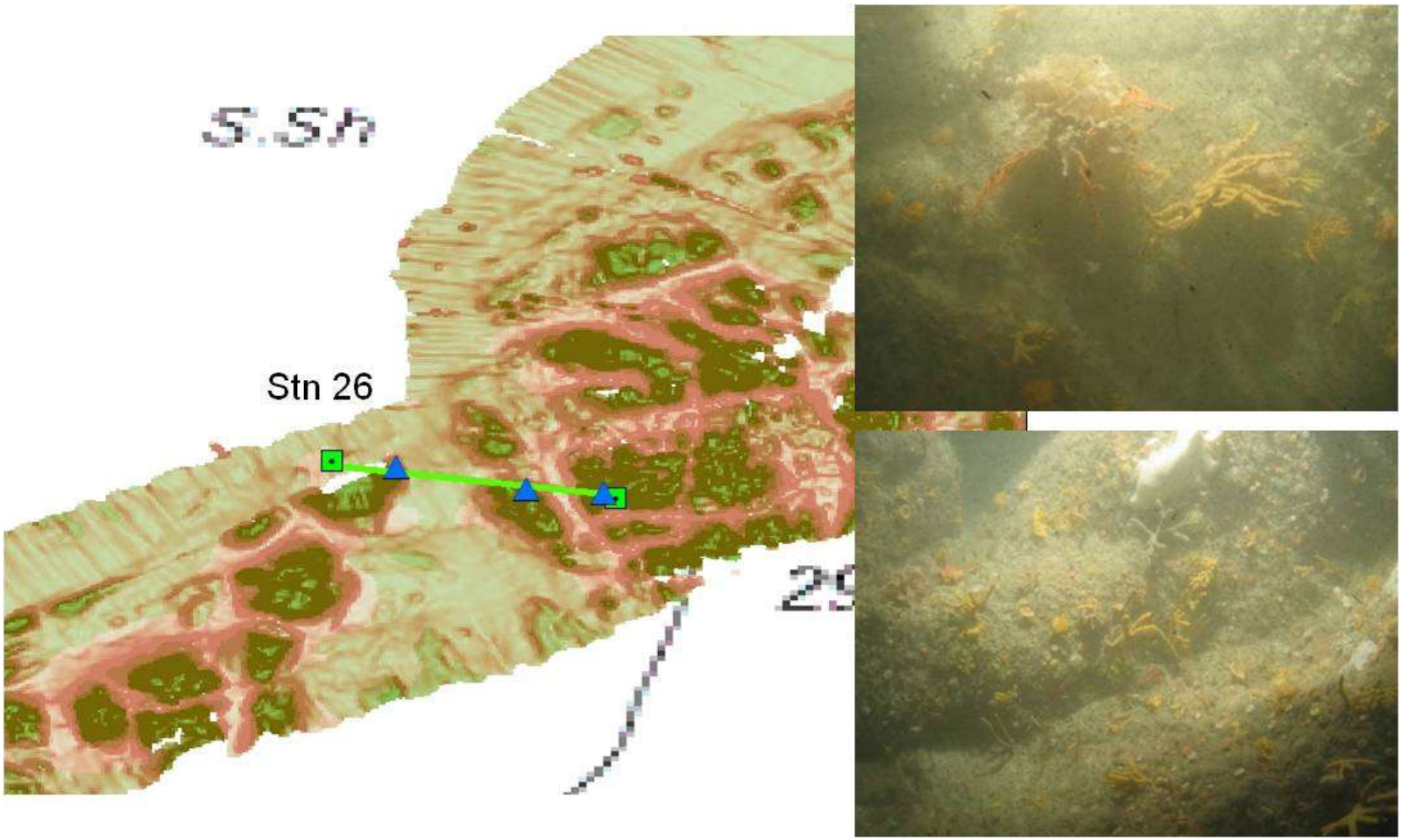


Figure 13. Stn 26, North of Carntop (56-65m water depth). Top image shows *E. verrucosa*, axinellid sponges and *P. fascialis* and *C. smithii.* Lower image shows a diverse array of axinellid sponges (Green squares = start and end of video transect, blue triangles = stills positions)

3. South of Melledgan

   This area was characterised by large boulders and upstanding reef islands surrounded by coarse rippled undulating sands with gravels and pebbles in furrows. The site closest to shore (S4) was in water depths of 43m with the vertical extent of the reef ranging 22m, whilst S1 was located in depths of 62m, with vertical extent of 10m. The reefs were colonised by faunal turf, *Metridium senile*, *Sagartia elegans* and axinellid sponges. *Corynactis viridis* was abundant on the vertical faces of the boulders/upstanding reef. *Eunicella verrucosa* and *Pentapora fascialis* were both present in this region (Figure 14).

4. South of Gugh

   The reef structure seen in the four ROV transects (Figure 15) ranged from upstanding reef and boulders at DD3 and SE6A to low-lying boulder/bedrock and cobble reef at SE2A and DD2 (depth ~60-66m). The upstanding reef and boulders were characterised by *Alcyonium digitatum*, axinellid sponges and *Metridium senile*, whilst the cobble reefs were characterised by faunal turf and small *Pentapora fascialis* colonies. One station (Gugh Reef) targeted by the diving survey undertaken in July 2011 corresponds with the general location of DD3. The dive site was selected to characterise the reef sub-feature 'circalittoral vertical rock' and ranged from 23-28m. Characteristic species included *Laminaria* spp., and other algae on the reef pinnacle, with the deeper vertical rock surface dominated by *M. senile*, *P. fascialis*, *Corynactis viridis, Caryophyllia smithii, A. digitatum and Cliona celata*. DD3 was located slightly south of Gugh Reef in 32-61m water depth and was characterised by a similar species complement with additional records of the echinoderms *Echinus esculentus, Holothuria forskali* and *Luidia ciliaris*. Common occurrences of a yellow sponge, identified as *Cliona celata*, were also observed at DD3. This species was absent from the shallower diving survey. An armoured cable was also visible in the DD2 transect.

5. East of Great Arthur

   Two video transects undertaken in the nearshore survey did not fully overlay the acoustic record due to inaccuracy of geographical positioning. Both of these transects (DD4 and 08) contained isolated boulder groups on a sandy seabed. DD4 was located in 44m depth, whilst ROV 08 was shallower, at 30m, with a vertical extent of 10m. The characteristic species included axinellid sponges, *Pentapora fascialis*, *Alcyonium glomeratum*, *Corynactis viridis* and an occasional *Eunicella verrucosa (*Figure 16*)*.

6. North East of Saint Martin's (north of Flat ledge)

   The area north east of Saint Martin's, in the vicinity of Flat Ledge, was characterised by upstanding reef and boulders to the south and boulder/cobble reef north of a sandy gully (see Figure 17). The water depth increased from 44m to 72m with increasing distance from land. *Eunicella verrucosa* was observed in the ROV 05 transect, whilst *Pentapora fascialis*, *Corynactis viridis*, and *Caryophyllia smithii* were also common. The feather star, *Antedon bifida* was also commonly observed within the *Pentapora* colonies along transects 13 and 14. One diving site (NW of Flat ledge), surveyed in July 2011 for sponge dominated bedrock and boulder communities, was located slightly south west of ROV 05 in 23-28 m water depth. The characteristic species identified at both the ROV and dive sites were comparable, with *C. viridis* and *Metridium senile* dominating, with occasional to frequent observations of *E. verrucosa.*

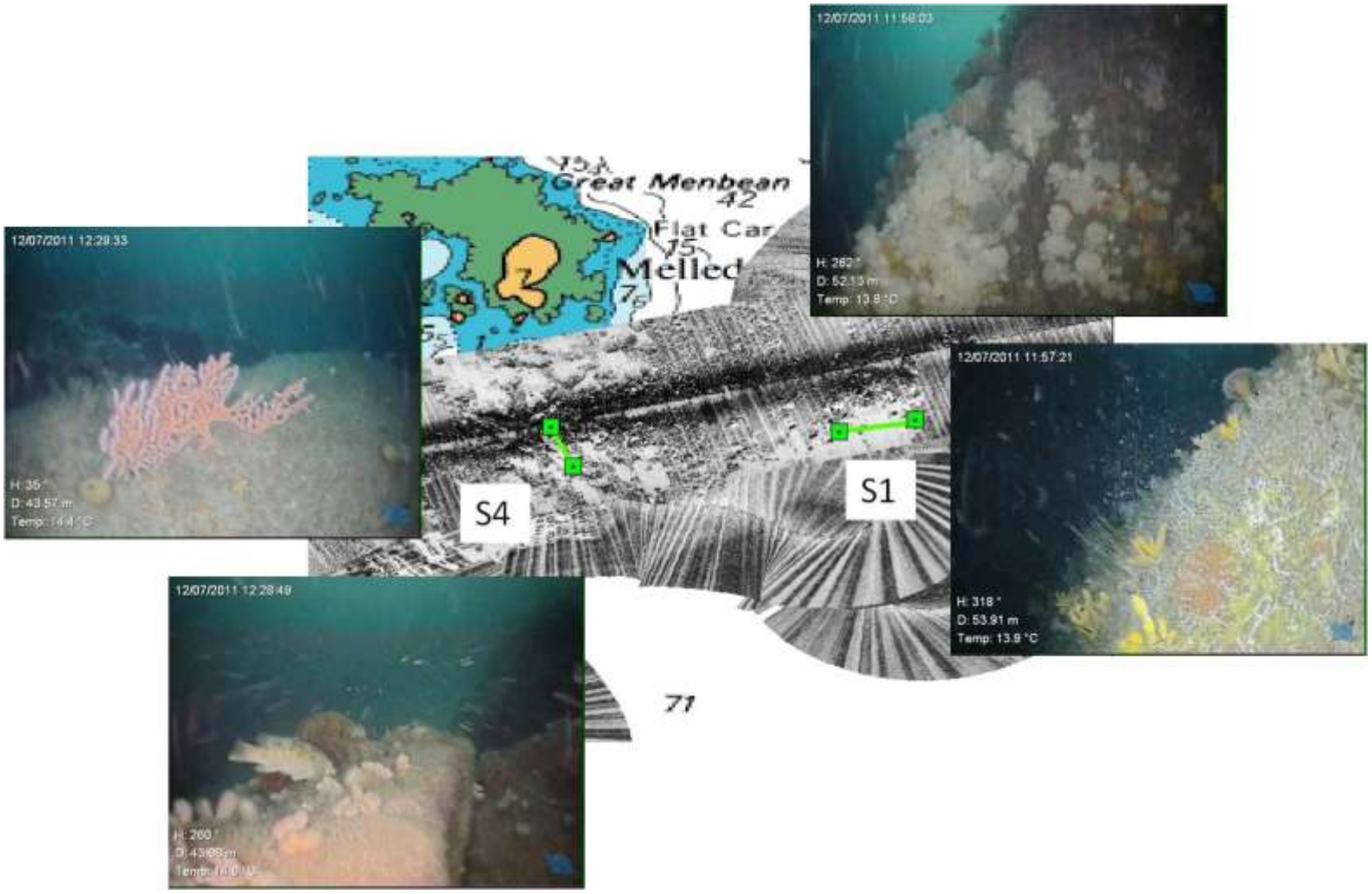


Figure 14. Boulder and upstanding reef at ROV stations S1 and S4, south of Melledgan. Top left image shows a pristine condition *E. verrucosa* on large boulder at S4 (43m deep). Top right image shows abundant *M.senile* on upstanding reef at S1 (52m)

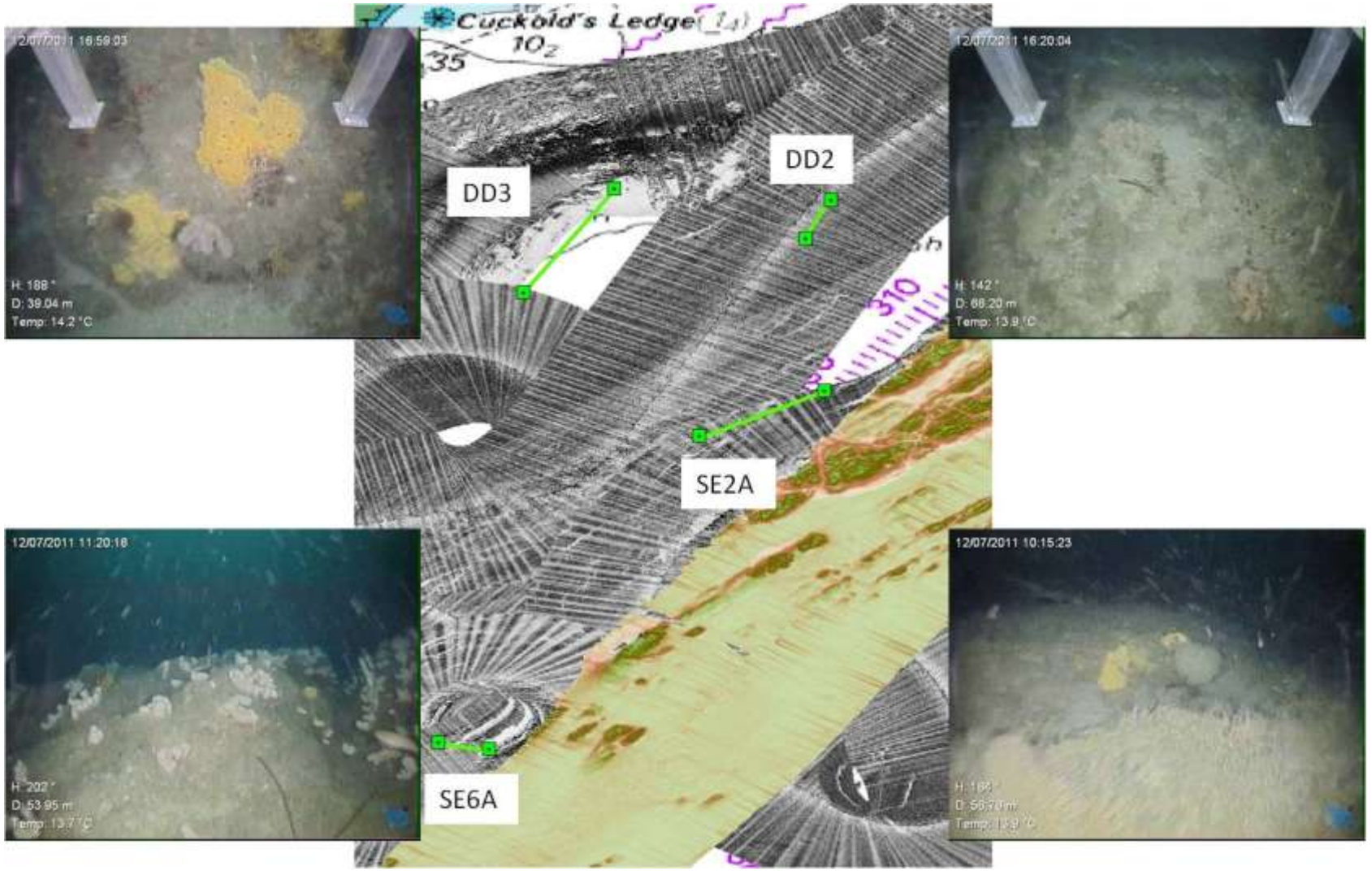


Figure 15. Boulder and cobble reef south of Gugh. Top left image at DD3 shows *Cliona celata* and *Alcyonium* sp. (39m water depth). Top right image shows sparse *Pentapora fascialis* (66m). Bottom left image shows abundant *Alcyonium digitatum* (53m). Bottom left image shows *C. celata* and faunal turf (58m). Green squares = start and end of video transect

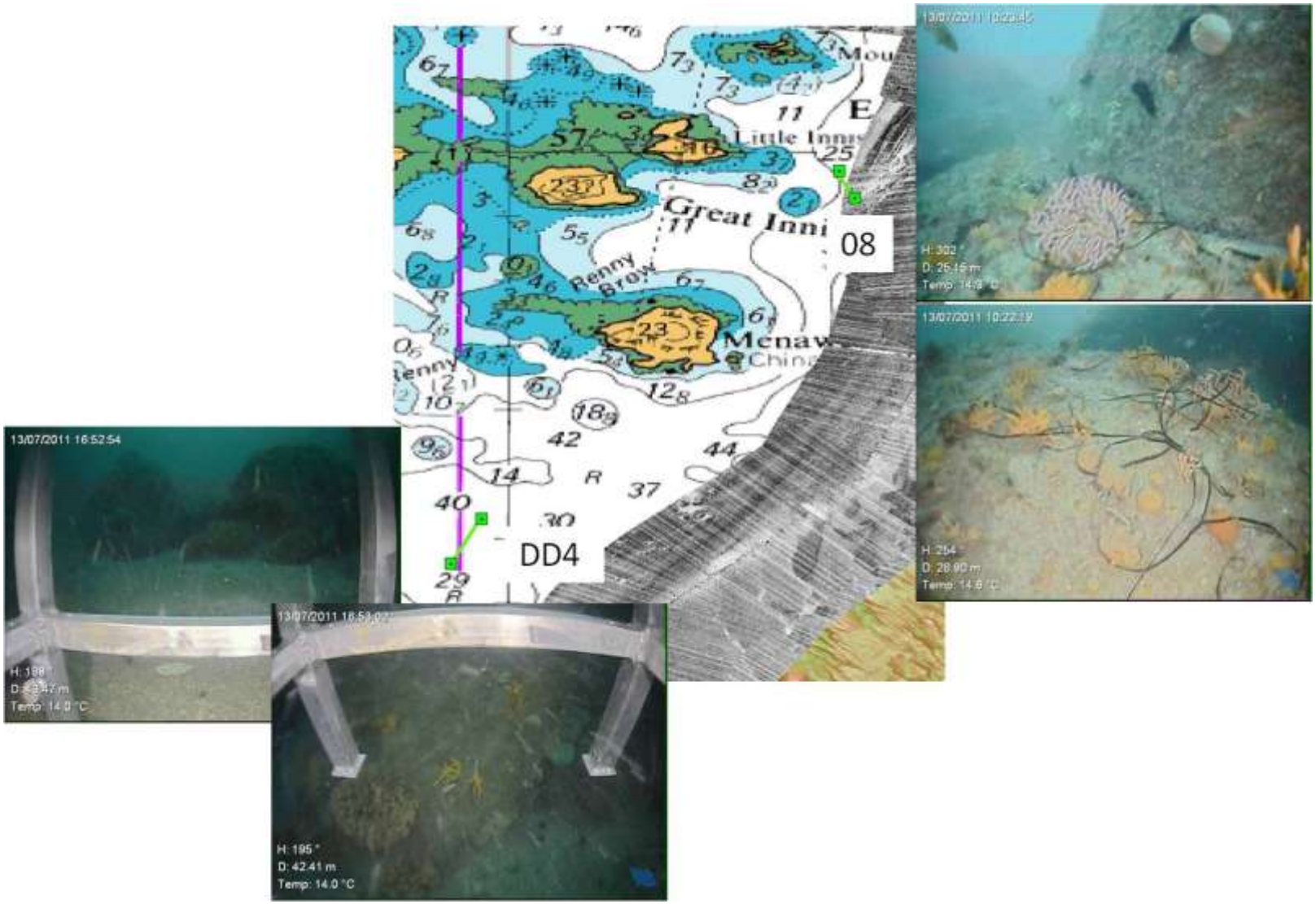


Figure 16. Upstanding reef east of Great Arthur. Top right images show pristine examples of *Eunicella verrucosa* in water depths of 25-28m. Bottom left images show boulder islands (42 m) with *Pentapora fascialis* and axinellid sponges

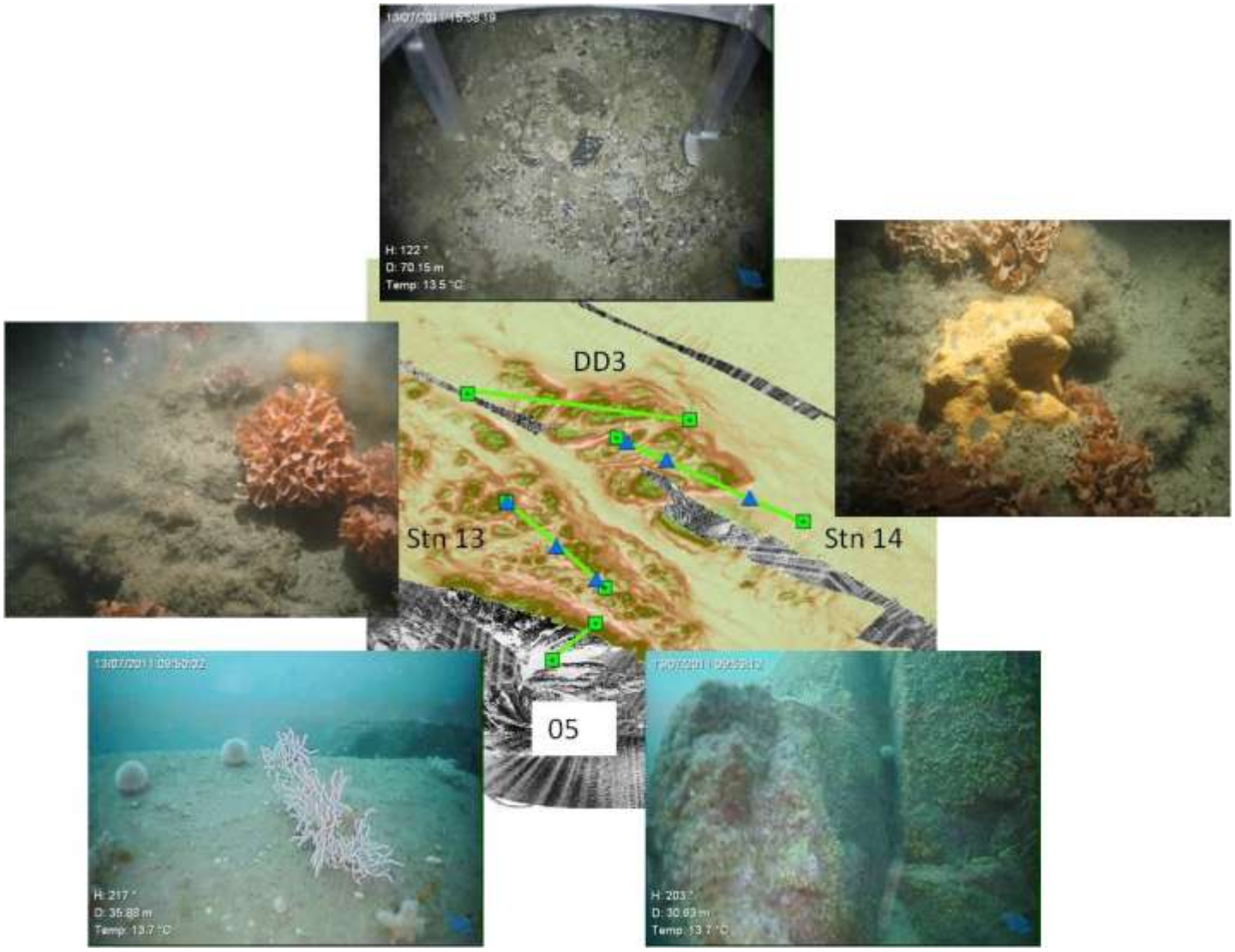


Figure 17. Upstanding reef and low-lying boulders north of Flat ledge (depth ranges from 30-35 m at stn 05 to 70 m at DD3). *Eunicella verrucosa* and *Pentapora fascialis* present (green squares = start and end of video transect, blue triangles = stills positions)

7. Sand features North of Saint Martin's

   In the offshore region, north east of Saint Martin's, a number of low lying features at 80m depth were observed on the acoustic track. A video transect of one of the features revealed it as a rippled silted sand wave with no fauna visible. This feature contrasted with the adjacent flat seabed which were characterised by faunal turf and *Ophiocomina nigra* (Figure 18).

8. John Thomas Ledges

   Two video tows were undertaken in the vicinity of John Thomas' Ledge (JT and ROV 01; Figure 19). The JT transect surveyed an area of upstanding reef characterised by *Corynactis viridis* on the vertical faces of the rock and *Pentapora fascialis* on the flatter areas. The pinnacle of the rock was dominated by *Laminaria* spp. and other algae. ROV 01 was characterised by isolated boulders dominated by sponges surrounded by bioturbated sand with *Lanice conchilega*, *Cerianthus* sp. and red algae (Rhodophyta)

9. North east boundary

   The substrate in the north east of the SAC was similar to the north-west corner. The video transects were located in 76-79 m water depth and were characterised by flat bedrock with a veneer of sand or coarse sediments (Figure 20). The video ground-truthing of a low lying feature on the acoustic data at station 19 identified the substrate as a rippled sand, similar in nature to the feature at station 16 (Figure 18). The dominant species at stations 18 and 20 were *Ophiocomina nigra* and faunal turf of hydroids and bryozoans.

10. North of Saint Martin's

    The Annex 1 reef of the northern Isles of Saint Martin's and Tresco does not extend far from the coastline (Figure 21). Ground-truthing at three stations nearest to the coast (N2 and N3 north and north east of Round Island, and Stn 17 east of White Island) revealed the substrate as boulder (N3, Stn 17) and pinnacle reef (N2). Further north the acoustic signature shows flat and low relief bedrock (75-80m). A number of camera tows along this low-lying feature revealed similar habitat across the whole area; flat to slightly raised bedrock with a veneer of sand or silt. Species characterising this habitat included *Ophiocomina nigra* and faunal turf. *Pentapora fascialis* and *Corynactis viridis* were also visible at stations along the raised ridges. *P. fascialis* colony condition was poor to moderate, with aging and new growth evident and high siltation.

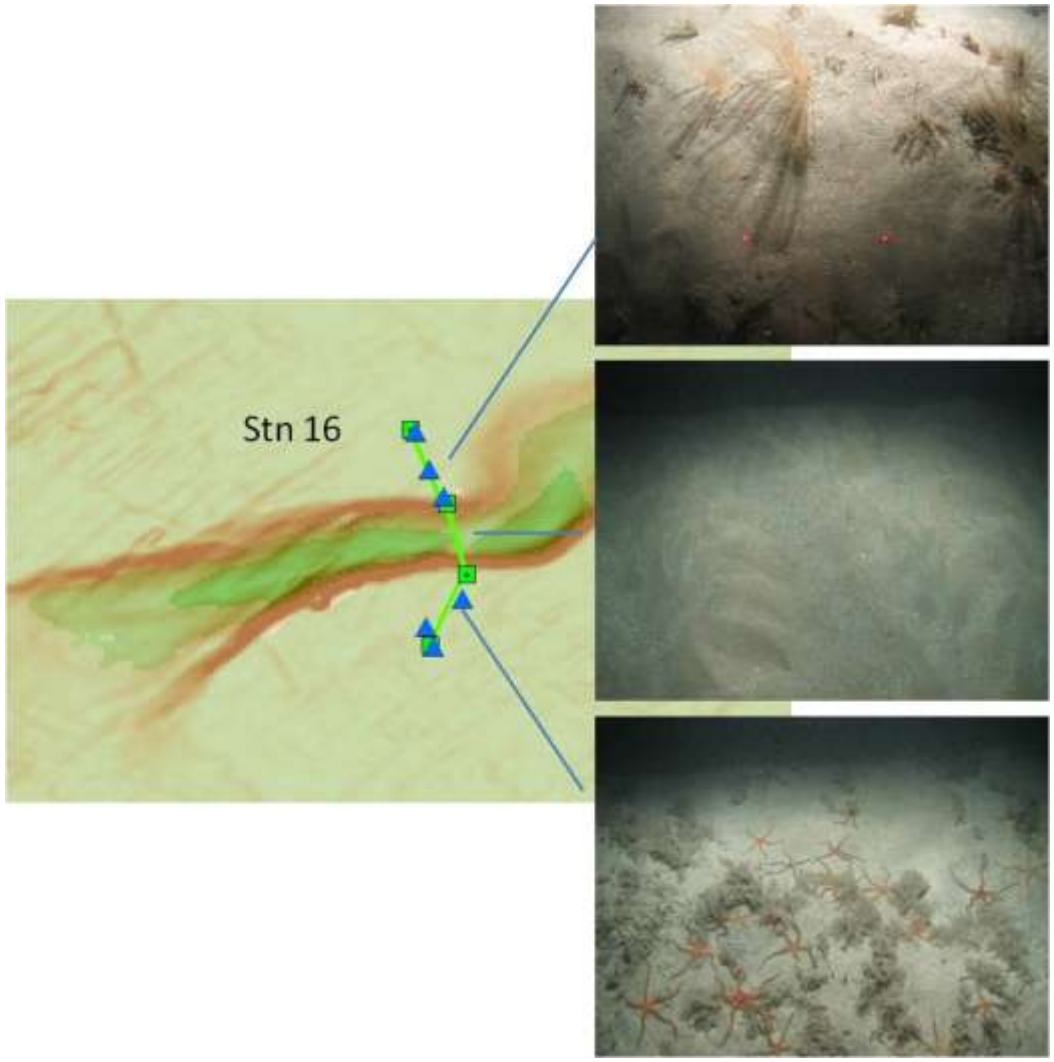


Figure 18 Low lying sand bank north of Saint Martin's (80m water depth). Top image shows *Nemertesia* sp. and short faunal turf on sand. Centre image shows rippled sand of the low lying ridge, devoid of fauna. Bottom image shows *Ophiocomina nigra* and short faunal turf on sand veneered bedrock. Green squares = start and end of video transect, blue triangles = stills positions

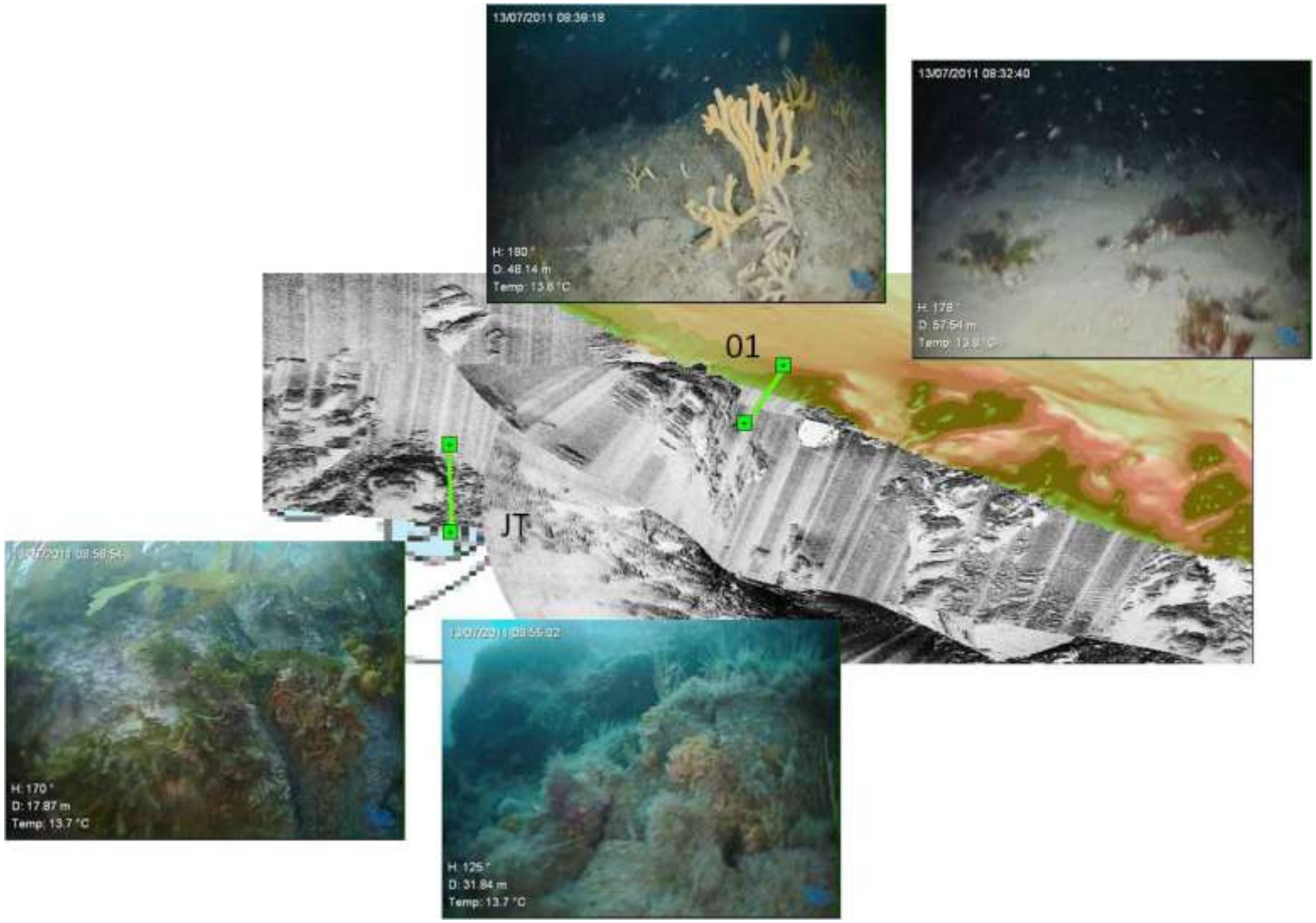


Figure 19 John Thomas ledges. Top left images shows axinellid sponges on boulder (48m depth). Top right image shows sand with biogenic structures and RHODOPHYTA (57m depth). Bottom images are of John Thomas ledge top (left) with *Laminaria* spp (17m depth). and bottom (right) *Pentapora fascialis* and sponges (31m depth). Green squares = start and end of video transects

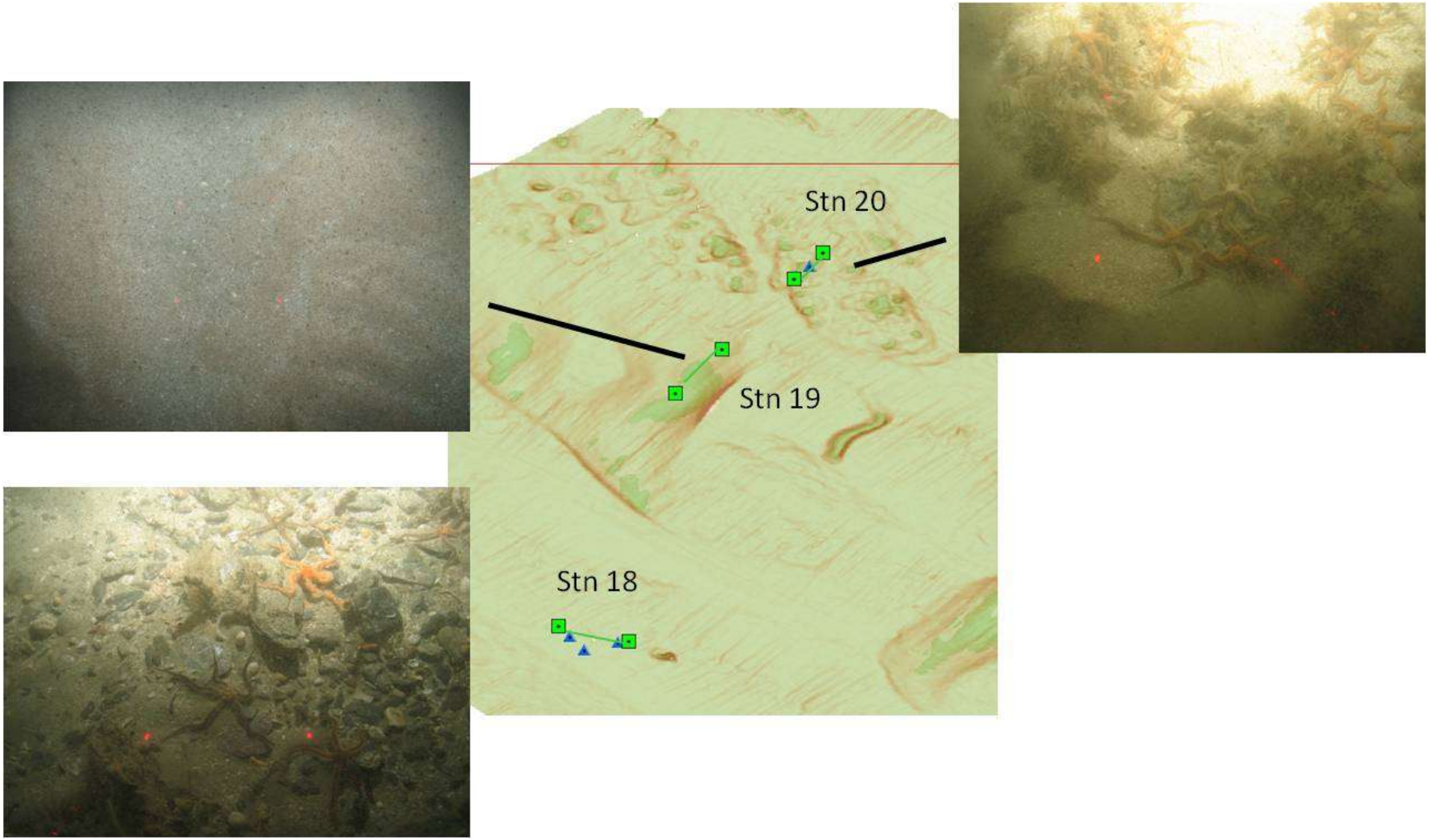


Figure 20 Offshore north eastern boundary of the Isle of Scilly SAC (red line denote SAC boundary, green squares = start and end of video transect, blue triangles = stills positions)

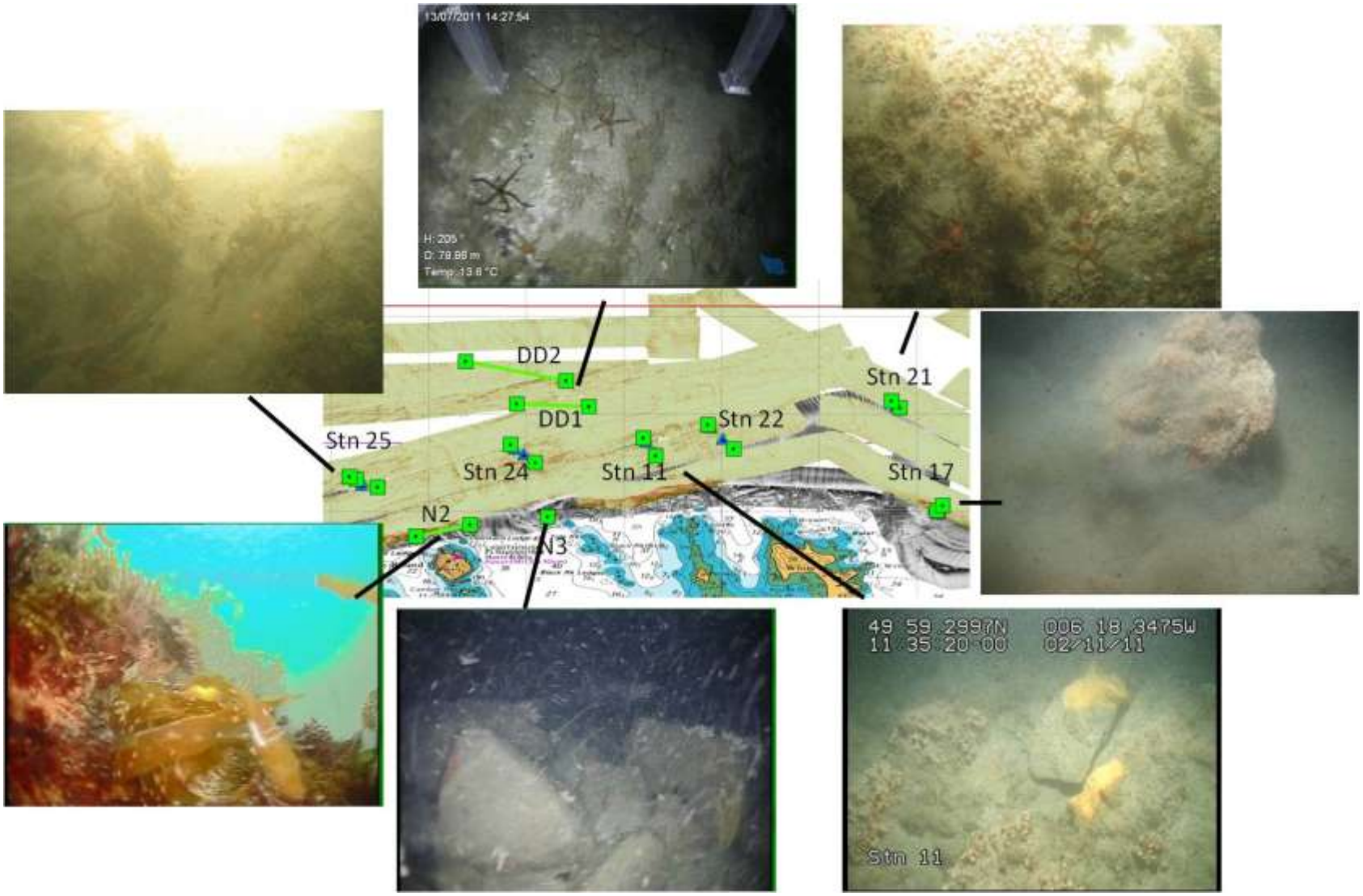


Figure 21 North of Saint Martin's along low-lying ridges. (Red line denotes SAC boundary, green squares = start and end of video transects, blue triangles = stills positions)

2.9 Biotopes

Fifteen biotopes or biotope combinations were identified from the video tows and examples of these can be found in section 0. Video transects that crossed areas with upstanding reef/boulder and sediment combinations were given 2 biotope codes, although the species recorded were generally associated with the rock habitat. In some instances, where upstanding and boulder reef were identified, several biotopes may have been present due to vertical inclination and complexity of the habitats. Using the georeferenced DDV system, different biotopes were only recorded if they continued for more than 1 minute. This method may differ from the way diver transects are recorded as the towed systems survey a larger geographic area. The absence of georeferencing using the ROV system did not allow the sectioning of the video. Therefore, although all visible species were noted according to the SACFOR scale, only the dominant biotope(s) were recorded.

The majority of ground-truthing stations were located in depths >50m, which is beyond the depth range of the data used to define many of the Marine Habitat Classification (MHC) and EUNIS biotopes (except deep sea bed (>200m) biotopes classified under EUNIS A.6). The final biotope classifications are, therefore, tentative.

Biotopes A4.2 (Moderate Energy Circalittoral Rock) and A4.21 (Echinoderms and crustose communities) were dominant in the offshore region to the north of the Isles (Figure 22).

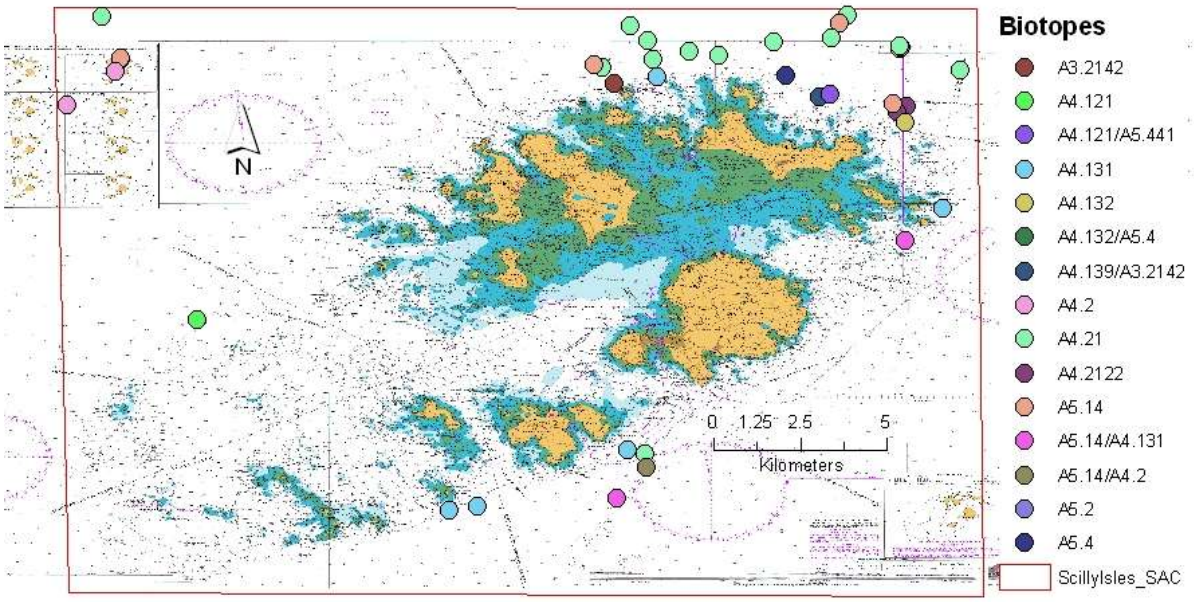


Figure 22 Biotope classifications (EUNIS)

Upstanding or complex boulder reefs were generally classified to one of four biotopes:

- A4.121: *Phakellia ventilabrum* and Axinellid sponges on deep, wave-exposed circalittoral rock
- A4.131: Bryozoan turf and erect sponges on tide-swept circalittoral rock
- A4.132: *Corynactis viridis* and a mixed turf of crisiids, *Bugula*, *Scrupocellaria*, and *Cellaria* on moderately tide-swept exposed circalittoral rock
- A4.139: Sponges and anemones on vertical circalittoral bedrock

Although *Eunicella verrucosa* was identified at 6 sites (Figure 23), none of the biotopes could be confidently assigned to A4.1311: *Eunicella verrucosa* and *Pentapora foliacea* on wave-

exposed circalittoral rock, due to their low numbers, therefore a higher level EUNIS classification was assigned (A4.131).

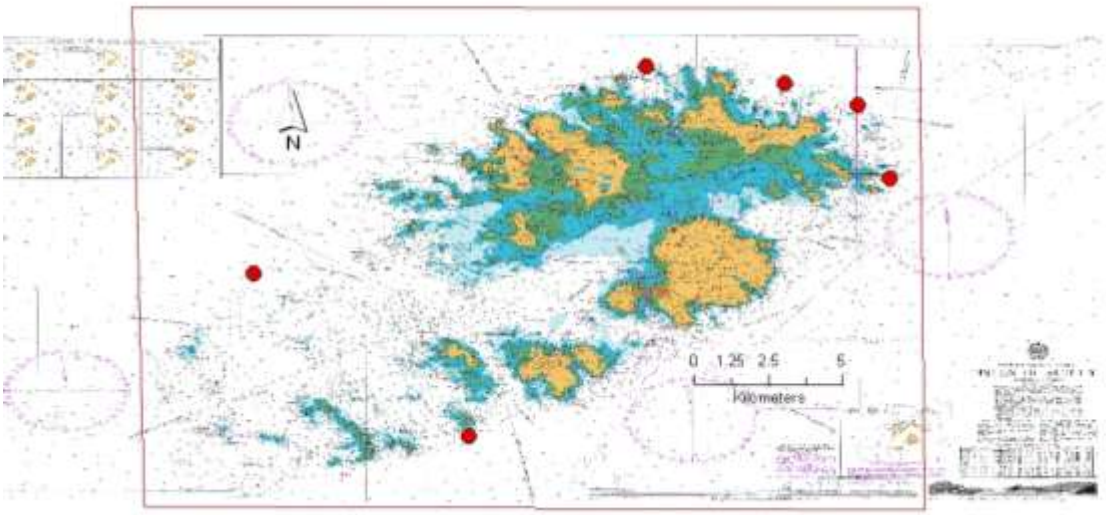


Figure 23 Location of *Eunicella verrucosa* as observed from the 2011 video surveys

- *Species of interest*

Eunicella verrucosa (Pink sea fan)

Eunicella verrucosa is listed under the UK BAP priority marine species[5] due to its vulnerability to physical disturbances (divers, fishing gear), nutrient enrichment and possible negative effects of climate change relating to colonisation by the warm water barnacle (*Solidobalanus fallax*). Limited numbers of *E. verrucosa* were identified at 6 sites around the Isle of Scilly complex. The condition of *E. verrucosa* ranged from poor (1) to excellent (5) with the majority described as condition 3-5.

Table 2 Results of the condition assessment of *E. verrucosa* identified during the 2011 video surveys

	***Eunicella verrucosa* condition score**				
Station code	5	4	3	2	1
ROV S4	x		xx		
ROV 05	x				
ROV JT					x
ROV 08	x				
ROV N3	x				
Stn 26			xxx	x	

Palinurus elephas (Crawfish or Spiny lobster)

P. elephas was observed at 3 sites (Figure 24). This species is also listed as a UK BAP priority marine species[6] due to its recent decline, largely as a result of its low resilience (sexual maturity at 4-5 years, lives up to 25 years), intense historical exploitation and continued decline through non-selective fishing.

[5] Reference URL: http://jncc.defra.gov.uk/page-5167

[6] Reference URL: http://jncc.defra.gov.uk/page-5167

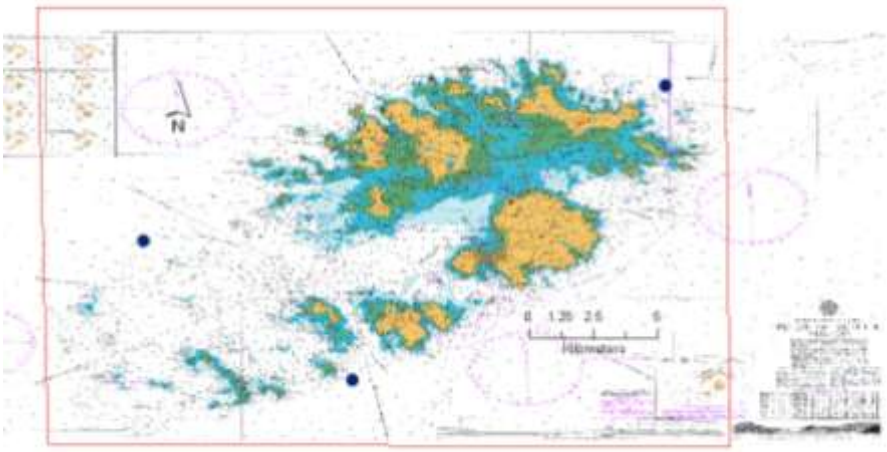


Figure 24 Location of *Palinurus elephas* as observed from the 2011 video surveys

Pentapora fascialis (Ross coral)

Colonies of the bryozoan *P. fascialis* was observed at the majority of stations containing raised bedrock, boulder or upstanding reef (Figure 25). Although not listed under any importance categories, this species is relatively long lived (5-10 years), acts as host for a variety of other bryozoan species and provides shelter for numerous other fauna (Hayward and Ryland, 1979). Good condition *P. fascialis* colonies were observed where the bedrock/boulders were complex in the south and north east, whilst silted and aging colonies were observed at sites off the northern coast on low-lying boulders/cobbles.

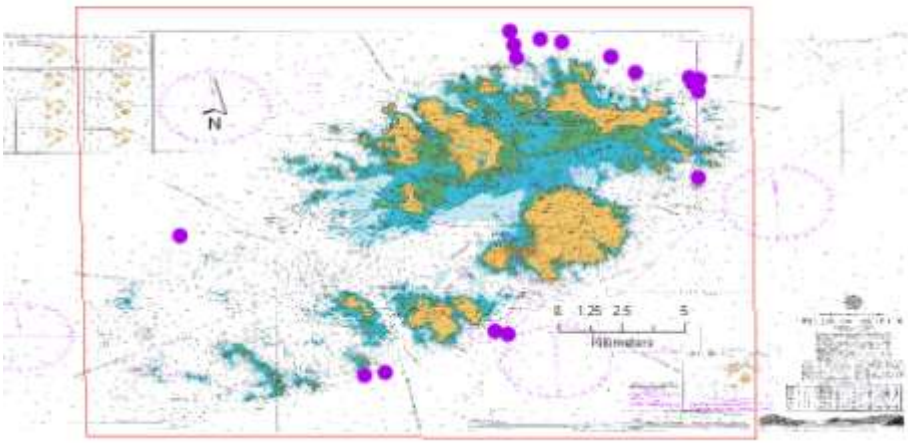
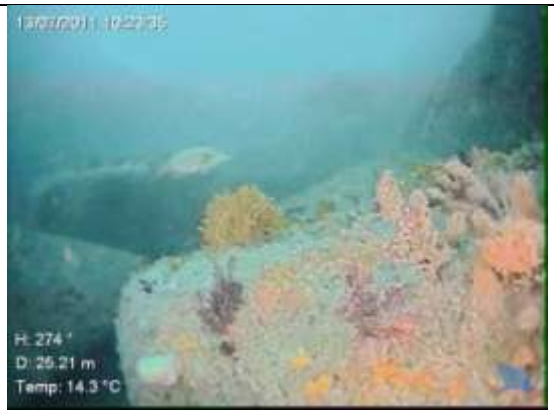
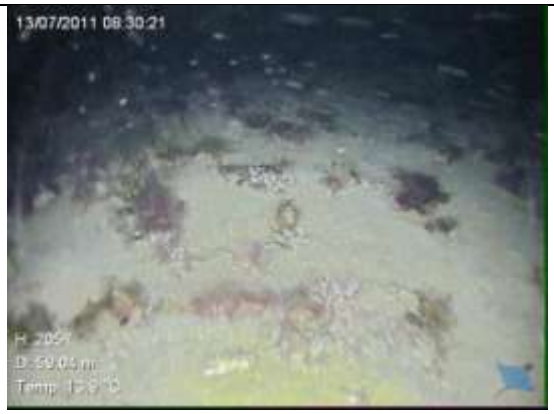


Figure 25 Location of *Pentapora fascialis* as observed from the 2011 video surveys

2.10 Example stills of biotopes identified

Biotope and stations	EUNIS Code	
***Laminaria hyperborea* park and foliose red seaweeds on moderately exposed lower infralittoral rock** IR.MIR.KR.Lhyp.Pk Stn N2, Stn JT	**A3.2142**	
***Phakellia ventilabrum* and Axinellid sponges on deep, wave-exposed circalittoral rock** CR.HCR.DpSp.PhaAxi Stn_01, Stn 26_1	**A4.121**	
Bryozoan turf and erect sponges on tide-swept circalittoral rock CR.HCR.XFa.ByErSp Stn DD3 (12/07/11), SE6A, DD4, 08, N3, S1, S4	**A4.131**	
Corynactis viridis and a mixed turf of crisiids, Bugula, Scrupocellaria, and Cellaria on moderately tide-swept exposed circalittoral rock CR.HCR.XFa.CvirCri Stn 17_1, 05	**A4.132**	

Sponges and anemones on vertical circalittoral rock CR.HCR.XFa.SpAnVt JT	**A4.139**	
Moderate energy circalittoral rock CR.MCR Stn 5_1, Stn 6_2, Stn 7_1, SE2A	**A4.2**	
Echinoderms and crustose communities CR.MCR.EcCr Stn 8_1, Stn 11_1, Stn 15_1, Stn 16_1, Stn 16_3, Stn 18_1, Stn 20_1, Stn 21_1, Stn 22_1 Stn 24_1, Stn 25_1, DD1, DD2 (12/7/11)	**A4.21**	
***Carophyllia smithii* and sponges with *Pentapora foliacea*, *Porella compressa* and crustose communities on wave-exposed circalittoral rock** CR.MCR.EcCr.CarSp.PenPcom Stn 13_1, Stn 14_1	**A4.2122**	

Circalittoral coarse sediment SS.SCS.CCS Stn 6_1, Stn 7_2, Stn 19_1, Stn 25_2, DD3, DD4, SE2A, SE6A	**A5.14**	
Sublittoral sands and muddy sands SS.Ssa Stn 16_2	**A5.2**	
Sublittoral mixed sediment SS.SMx Stn 17_1, Stn 17_2	**A5.4**	
Cerianthus lloydii and other burrowing anemones in circalittoral muddy mixed sediment SS.SMx.CMx.ClloMx 01	**A5.441**	

2.11 Broadscale habitat maps

The biotope map reported in Munroe and Nunny (1998), has been overlain with the new data interpretation of Annex 1 reef identified from the 2011 surveys (Figure 26). The layers containing cobble/boulder/rock were set to a light green leaving the layers not associated with Annex 1 reef visible. A mismatch in substrate is noticeable in certain locations, for instance, reef has been positively identified west of the North West Passage which had previously been identified as wave exposed coarse shell sand. Also of note are areas north of Flat Ledge (previously classified as deep wave exposed fine sand) and east of Saint Marys (previously classified as exposed medium sand), which have how been confirmed as Annex 1 reef by the 2011 surveys. The amount of overlap between the new (2011) and old (1998) data is minimal, therefore only a small proportion of the 1998 map could be updated using the 2011 survey results. The 1998 biotope map did not extend to the western boundary of the SAC, therefore, further acoustic work will be required to confirm the extent of Annex 1 reef identified in 2011 in the south west corner of the SAC.

2.12 Anthropogenic impacts

Fixed fishing gear was observed on both surveys over offshore reefs to North, South and West. A potting line was observed in the video at Stn 11. However, these characterisation surveys were not designed to assess the effects of fishing activity on the reef communities. Two plastic bags were observed on the seabed at ROV station 01 and an armoured cable was observed in the ROV video DD2 (12_07_11) in the south east.

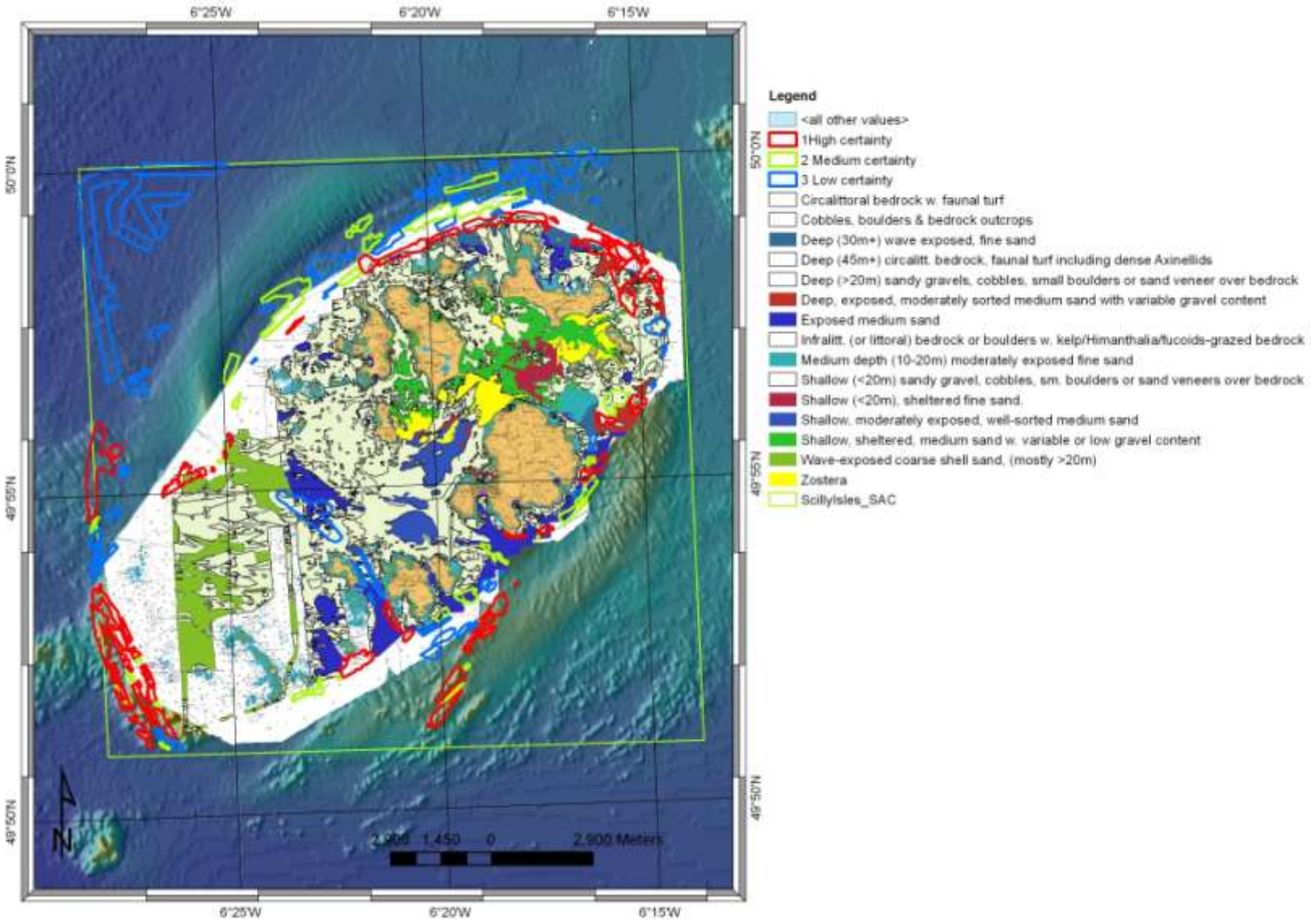


Figure 26 Update of habitat map (Munroe and Nunny, 1998) showing location of Annex 1 reef identified during the 2011 surveys

3 Discussion

3.1 Summary of habitats recorded

The presence and extent of Annex I rocky reef sub-features (as defined by the Isle of Scilly Management scheme 2010) has been determined by acoustic and video ground-truthing on two survey occasions in 2011. The combined surveys confirmed the presence of upstanding and boulder reefs (high confidence Annex 1 reef) up to 0.5-1.5 nautical miles off the coast, covering a total of 809 hectares. These complex rock formations were assigned to one (or combination) of five EUNIS classifications; A3.2142, A4.121, A4.131, A4.132 and A4.139 characterised by species such as *Laminaria spp.*(A3.2142 only), *Corynactis viridis*, *Caryophyllia smithii*, *Pentapora fascialis*, *Metridium senile*, *Alcyonium digitatum*, axinellid sponges and *Eunicella verrucosa*. Low lying boulders and raised bedrock found within the medium confidence Annex I reef (covering 393 hectares) contained biotope A4.2122 (characterised by *P. fascialis* and *C. smithii*). The area of flat bedrock was not classed as Annex I reef and was ascribed to EUNIS classes A4.2 and A4.21. Further areas of sandy and coarse sediment were found in the offshore region and ascribed to EUNIS biotopes A5.4, A5.441, A5.2 and A5.41. The results arising from the 2011 surveys were compared with those from Munro and Nunny (1998). However, this comparison was limited since there were only a few instances where both investigations surveyed the same areas. Nevertheless, the 2011 surveys did reveal some areas of reef which had previously been recorded as sediment habitat.

3.2 State of Annex I features within sites

Condition of Annex I reef was determined by assessing the presence and quality of *Eunicella verrucosa* and *Pentapora fascialis* colonies. *E. verrucosa* was observed in 6 video tows, with condition ranging from poor to excellent. Pristine examples of *E. verrucosa* were found at four sites in the south and north east of the Isles. *P. fascialis* was found at the majority of sites confidently assigned as Annex I reef and were generally large colonies and in good condition. Silted/aging colonies were observed at sites off the northern coast.

3.3 Identification of appropriate indicators to assess state of features

Common standards monitoring guidance for littoral rock and inshore sublittoral rock (JNCC, 2004) lists three mandatory components to monitor, these are: (i) extent of the entire feature; (ii) biotope composition; and (iii) distribution/spatial pattern of biotopes. Concentrating on the sub-features of interest to this investigation (that is, vertical rock and subtidal boulder and cobble communites), their extent, diversity and distribution have been partially recorded by this study.

It is unlikely that the Annex I reef identified with high confidence will change significantly, however the lower relief areas may become covered by sediment on occasions (as evidenced in the ground-truth videos), therefore this must be taken into consideration when reassessing the presence and extent of the reef during future monitoring.

Future monitoring should include condition assessments of long-lived species such as *Eunicella verrucosa* and *Pentapora fascialis* and the presence/condition of axinellid sponges, such as *Axinella infundibuliformis* and *Axinella dissimilis*. Currently, formal condition scoring systems have only been developed for *E. verrucosa*. To ensure future surveys are comparable, formal scoring systems should be implemented for *P. fascialis* and erect/branching sponges which can be utilised for both diving and remotely operated surveys.

Further acoustic and camera surveys are recommended to determine the full extent of reef features in the southern region of the SAC for the data to provide a complete baseline for future monitoring surveys.

3.4 Data limitations

- *Acoustic*

Ideally, full (100%) acoustic data coverage would be collected to confidently assess the extent and presence of a submarine feature. Limited time (two days) was available for acoustic survey and ground-truthing of the survey area. The nearshore was, therefore, prioritised as it was predicted that this was the most likely area for Annex I reef to be located. The offshore areas of the SAC were partially covered, although further effort is recommended in the south to cover areas of potential reef. The acoustic coverage was also affected by the ships ability to work in extreme weather in the near shore, and direction of the prevailing winds. The data processing for the bathymetry required a significant amount of time and resource (for filtering and manual inspection to identify and reject bad soundings due to weather).

Data from sidescan and bathymetry surveys does not normally include turns at the start and end of the survey line. However, much of the data was gathered in tight navigational circumstances, and in this case judgement was made that data contained in 'turns' would be retained and processed. However, this 'turn' data contains distortion that may not be understood by the wider audience. Manual interpretation in some areas was therefore based on expert judgement using geographically overlapping data.

- *Seabed imagery*

A number of limitations in the survey data collected were identified in terms of robustly assessing the necessary features of interest (and their associated attributes):

- Full acoustic coverage was not attained due to adverse weather conditions. Therefore, the full extent of Annex I reef is not known.

- Weather affected the quality of the video and stills from the drop camera survey. This will have affected the final biotope assignments at some sites due to poor visibility hindering identification of substrate and species compositions.

- The ROV video did not display coordinates. Therefore, return to particular features of interest will be difficult.

- Still images were not taken with the ROV survey. Therefore, the species recorded may not be accurate and will require further ground-truthing.

Whilst application of the SACFOR scale, to video transects or still images, is appropriate to inform patterns in biotopes and/or community characteristics of a given habitat, it can still only be considered to be qualitative (or semi-quantitative) data at best. Additional difficulties arise when attempting to use such data for the purposes of setting statistically robust measures of current (or changing) condition or status of the attributes of interest. These include inherent subjectivity (in terms of sediment descriptions and faunal identifications) which can be ameliorated to some extent by consistency in the post-processor and application of appropriate QA processes. Furthermore, the effective acquisition of quantitative data (to which statistically robust analyses can be applied) is challenging when attempting to extract such data from images where the field of view is variable (for example, drop camera and diver surveys). For the current survey, quantitative data was only recorded consistently for *Eunicella verrucosa* condition assessment.

3.5 Survey limitations

The survey was designed within the time allotted, the navigational obstacles, and vessel manoeuvrability. For the acoustic survey, this meant that a conventional parallel line survey could not be used. Therefore, as an initial plan, a series of expanding straight lines surrounding the Isles was devised. To further maximise the time allowed (24 hours for acoustic survey and 24 hours for ground-truthing) the transits between ground-truth stations were treated as survey lines, which allowed some coverage without dedicated survey lines being in place. This places geographic gaps in the survey area which cannot be assessed for reef presence.

Survey time and weather conditions also affected the maximum number and locations of ground-truthed sites. Most ground-truthing sites were located in the north as this area was less affected by the adverse weather conditions. This left areas of potential Annex I reef without ground-truthing.

3.6 Anthropogenic impacts

Whilst static fishing (potting) was observed within the survey areas, the current surveys were not designed to assess the effects of fishing on the reef communities.

4 Conclusions

The acoustic and video surveys undertaken in 2011 provide new data from the Isles of Scilly SAC and provide an initial characterisation of the presence, extent and species composition of Annex I reef. Further survey work using acoustic and DDV methods is needed to finalise the reef assessment in the south west of the SAC where, due to survey time constraints, the extent and condition of Annex I reef is still unknown. Comparison of the new data collected in 2011 with the 1998 survey by Munroe and Nunny, revealed the presence of Annex I reef where the area had previously been predicted as sedimentary habitat.

The extent, diversity and distribution of Annex I reef have been quantified within the limitations of the surveys. Since quantitative faunal data cannot be easily gathered from hard substrate features, no statistically robust metric can be provided on which to base future statistical comparisons. The physical attributes of the reef itself provide an element of protection from most of the direct human activities observed in the area, which are either limited to sedimentary habitats or of little consequence to the physical integrity of the reef. Therefore, condition monitoring of species such as *Eunicella verrucosa* and *Pentapora fascialis*, along with major changes in the species composition of the 5 main Annex I related biotopes recorded will provide a more suitable indicator of feature condition. Six reference sites, identified during the current surveys, would be suitable for *E. verrucosa* condition monitoring using remote video techniques. However, these sites must be accurately georeferenced to ensure future monitoring is comparable.

5 Acknowledgements

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7 Appendices

7.1 Summary of video information

Event Date	Video Sample Ref	Brief Habitat Description	Gear	Start Time	End Time	Duration	Start	End	Sea Level Upper	Sea Level Lower	5.Biotope (EUNIScode)	Classification (MNCR descriptor)	Biotope Key (MNCRcode)
03/11/2011	26_1	Boulder and cobble reef with a diverse array of Axinellid sponges.	DDV	06:53:40	07:18:00	00:24:20	49 55.1989N, 006 26.0624W	49 55.2192N, 006 26.2135W	56	65	A4.121	*Phakellia ventilabrum* and Axinellid sponges on deep, wave-exposed circalittoral rock	CR.HCR.DpSp.PhaAxi
03/11/2011	25_1	Bedrock partially covered by sand.	DDV	05:17:40	05:31:20	00:14:00	49 59.1254N, 006 19.7614W	49 59.1664N, 006 19.8715W	73	77	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	25_2	Rippled sands possibly overlying bedrock. Cliona celata and occasional faunal turf.	DDV	05:31:20	05:35:10	00:04:00	49 59.1664N, 006 19.8715W	49 59.1788N, 006 19.9069W	73	77	A5.14	Circalittoral coarse sediment	SS.SCS.CCS

03/11/2011	24_1	Bedrock/boulders with Corynactis and faunal turf. Shelly gravel and sand between boulders.	DDV	04:31:10	04:50:30	00:19:00	49 59.2511N, 006 18.9529W	49 59.3433N, 006 19.0797W	72	76	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	22_1	Mosaic of sand scoured rock, cobbles and gravel on bedrock with small boulders.	DDV	02:48:10	03:21:10	00:33:00	49 59.3214N, 006 17.9371W	49 59.4451N, 006 18.0695W	75	75	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	21_1	Bedrock partially covered with sand, gravel/pebbles, some cobbles. Faunal turf and Ophiocomina.	DDV	01:59:50	02:14:40	00:15:00	49 59.5326N, 006 17.0848W	49 59.5677N, 006 17.1279W	75	77	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	20_1	Cobbles	DDV	01:15:40	01:26:30	00:11:00	49 59.9366N, 006 15.9369W	49 59.9627N, 006 15.9088W	77	77	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	19_1	Rippled coarse sands and gravels.	DDV	00:39:30	00:56:30	00:17:00	49 59.8224N, 006 16.0564W	49 59.8661N, 006 16.0096W	75	76	A5.14	Circalittoral coarse sediment	SS.SCS.CCS

02/11/2011	18_1	Gravel/pebble ribbons on bedrock with veneer of coarse rippled sands. Ophiocomina nigra, sponges.	DDV	23:45:40	00:07:10	00:22:00	49 59.5890N, 006 16.1734W	49 59.5734N, 006 16.1022W	79	79	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	17_1	Isolated boulders on sandy gravel. Faunal turf, Corynactis, Pentapora fascialis, Cliona celata.	DDV	21:54:50	22:55:00	00:08:00* see comments	49 59.0007N, 006 16.8907W	49 59.0052N, 006 16.8938W	66	77	A4.132/A5.4	Corynactis viridis and a mixed turf of crisiids, Bugula, Scrupocellaria, and Cellaria on moderately tide-swept exposed circalittoral rock/Sublittoral mixed sediment	CR.HCR.Xfa.CvirCri/SS.SMx
02/11/2011	17_2	Mixed sediment of gravel, sand, silt and cobbles. Some faunal turf and Pentapora.	DDV	22:55:00	23:04:50	00:09:00	49 59.0052N, 006 16.8938W	49 59.0316N, 006 16.8659W	66	77	A5.4	Sublittoral mixed sediment	SS.SMx
02/11/2011	16_1	Gravelly sand veneer on bedrock. Ophiocomina nigra and faunal turf.	DDV	20:44:20	20:53:30	00:09:00	49 59.4133N, 006 15.1165W	49 59.4377N, 006 15.1040W	80	80	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr

02/11/2011	16_2	Mobile coarse sand ripples and silt.	DDV	20:53:30	21:02:00	00:09:00	49 59.4377N, 006 15.1040W	49 59.4621N, 006 15.1105W	80	80	A5.2	Sublittoral sands and muddy sands	SS.Ssa
02/11/2011	16_3	Cobbles and coarse sediment on bedrock. Faunal turf, urticina, Ophiocomina nigra.	DDV	21:02:00	21:09:40	00:07:00	49 59.4621N, 006 15.1105W	49 59.4876N, 006 15.1230W	80	80	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	15_1	Flat, partially exposed bedrock with veneer of coarse sediment. Ophiocomina nigra and faunal turf.	DDV	19:43:30	20:08:00	00:25:00	49 59.0878N, 006 14.1796W	49 59.0111N, 006 14.1318W	79	79	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	14_1	Silted boulder/cobble reef with Pentapora, Corynactis, Caryophyllia and faunal turf.	DDV	18:05:40	18:36:30	00:31:00	49 58.5144N, 006 15.0149W	49 58.4018N, 006 14.7661W	62	70	A4.2122	Caryophyllia smithii and sponges with Pentapora foliacea, Porella compressa and crustose communities on wave-exposed circalittoral rock	CR.MCR.EcCr.CarSp. PenPcom
02/11/2011	13_1	Mosaic of habitats: flat sandy shelly gravel with large boulders/ upstanding reef islands.	DDV	17:03:30	17:26:50	00:23:00	49 58.4284N, 006 15.1618W	49 58.3141N, 006 15.0305W	48	58	A4.2122	Caryophyllia smithii and sponges with Pentapora foliacea, Porella compressa and crustose communities on wave-exposed circalittoral rock	CR.MCR.EcCr.CarSp. PenPcom

02/11/2011	11_1	Mosaic of habitats. Small section of upstanding reef among flat bedrock and cobble.	DDV	11:12:00	11:39:20	00:27:00	49 59.3782N, 006 18.3993W	49 59.2857N, 006 18.3371W	76	76	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
01/11/2011	8_1	Mosaic of cobbles and gravelly sand on partially exposed bedrock	DDV	21:10:00	21:37:20	00:27:00	49 59.9239N, 006 27.5297W	49 59.9260N, 006 27.4178W	92	92	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
01/11/2011	7_1	Partially exposed bedrock overlain with gravelly sands. Faunal turf, Ophiocomina nigra.	DDV	20:19:00	20:25:20	00:06:00	49 59.2578N, 006 27.2400W	49 59.2719N, 006 27.2376W	92	92	A4.2	Moderate energy circalittoral rock	CR.MCR
01/11/2011	7_2	Cobbles on rippled sand. Barnacles and hydroid turf.	DDV	20:25:20	20:36:00	00:11:00	49 59.2719N, 006 27.2376W	49 59.3885N, 006 27.2789W	92	92	A5.14	Circalittoral coarse sediment	SS.SCS.CCS
01/11/2011	6_1	Sand with pebbles and occasional cobble.	DDV	19:25:40	19:32:10	00:07:00	49 59.0674N, 006 27.3298W	49 59.0744N, 006 27.331W	90	90	A5.14	Circalittoral coarse sediment	SS.SCS.CCS

01/11/2011	6_2	Bedrock with faunal turf and Pomatoceros. tubes	DDV	19:32:10	19:39:20	00:07:00	49 59.0744N, 006 27.331W	49 59.0789N, 006 27.3379W	90	90	A4.2	Moderate energy circalittoral rock	CR.MCR
01/11/2011	5_1	Coarse sediment on partially exposed bedrock.	DDV	18:23:10	18:49:40	00:26:00	49 58.5329N, 006 28.0865W	49 58.4932N, 006 28.0222W	90	90	A4.2	Moderate energy circalittoral rock	CR.MCR
12/07/2011	DD2	Concreted cobbles with gravelly sand veneer. Pentapora fascialis (Good).	ROV	16:18:00	16:35:00	00:17:00	49.8852, -6.31817	49.88607, -6.31760	65.3	66.4	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
12/07/2011	DD3	Upstanding reef. Complex bedrock with sand in gullies. Diverse epifauna.	ROV	16:55:00	17:12:00	00:17:00	49.88633, -6.3225	49.88398, -6.32455	32.3	61.0	A4.131	Bryozoan turf and erect sponges on tide-swept circalittoral rock	CR.HCR.XFa.ByErSp
12/07/2011	SE2A	Gravelly, shelly sand and exposed bedrock patches. N.antennina and sponges on rock.	ROV	10:14:00	10:28:00	00:14:00	49.88176, -6.31775	49.88075, -6.32057	59.0	61.6	A5.14/A4.131	Circalittoral coarse sediment/Bryozoan turf and erect sponges on tide-swept circalittoral rock	SS.SCS.CCS/CR.HCR.XFa.ByErSp

12/07/2011	SE6A	Rippled gravelly sand rock outcrop. Rock populated by A.digitatum, E. Esculentus and sponges.	ROV	11:16:22	11:22:58	00:06:30	49.87367, -6.32532	49.87382, -6.32647	57.7	58.9	A5.14/A4.131	Circalittoral coarse sediment/Bryozoan turf and erect sponges on tide-swept circalittoral rock	SS.SCS.CCS/CR.HCR.XFa.ByErSp
13/07/2011	DD1	Compacted cobbles and sand veneer. Ophiocomina numerous but not dense.	ROV	16:55:00	17:12:00	00:17:00	49.99252, -6.31748	49.9923, -6.31132	79.8	80.3	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
13/07/2011	DD2	Compacted cobbles and shelly sand veneer. Ophiocomina nigra numerous but not dense.	ROV	15:06:00	15:22:00	00:16:00	49.99617, -6.32185	49.99452, -6.31325	82.0	82.3	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
13/07/2011	DD3	Compacted cobbles and sandy gravel veneer. Faunal turf and Pentapora fascialis (Good condition).	ROV	15:52:00	16:03:00	00:11:00	49.97622, -6.25355	49.97562, -6.24862	67.4	72.1	A5.14	Circalittoral coarse sediment	SS.SCS.CCS
13/07/2011	DD4	Isolated boulders on sandy gravel. P. fascialis (Good condition) and branching sponges on boulders.	ROV	16:44:00	16:56:00	00:12:00	49.9405, -6.25067	49.93935, -6.25147	41.2	44.5	A5.14/A4.131	Circalittoral coarse sediment/Bryozoan turf and erect sponges on tide-swept circalittoral rock	SS.SCS.CCS/CR.HCR.XFa.ByErSp

13/07/2011	JT	Upstanding reef ledges. P. fascialis (Moderate condition) Echinoderms and branching sponges, Corynactis.	ROV	08:51:00	08:59:00	00:08:00	49.97763, -6.27298	49.97683, -6.27297	14.5	38.2	A4.139/A3.2142	Sponges and anemones on vertical circalittoral bedrock	CR.HCR.XFa.SpAnVt/IR.MIR.KR.Lhyp.Pk
13/07/2011	01	Bioturbated sand and Bedrock reef. Branching biogenic structures (Sand), branching sponges (Rock).	ROV	08:29:00	08:42:00	00:13:00	49.97835, -6.26995	49.97782, -6.27030	44.6	59.0	A4.121/A5.441	Cerianthus lloydii and other burrowing anemones in circalittoral muddy mixed sediment/Phakellia ventilabrum and Axinellid sponges on deep, wave-exposed circalittoral rock	SS.SMx.CMx.ClloMx/CR.HCR.DpSp.PhaAxi
13/07/2011	05	Upstanding reef. Bedrock and boulders with sand at bases. Echinoderms, Corynactis viridis, Alcyonium glomeratum and Eunicella verrucosa.	ROV	09:44:00	10:01:00	00:17:00	49.9711, -6.25072	49.9703, -6.25167	32.5	43.9	A4.132	Corynactis viridis and a mixed turf of crisiids, Bugula, Scrupocellaria, and Cellaria on moderately tide-swept exposed circalittoral rock	CR.HCR.Xfa.CvirCri
13/07/2011	08	Upstanding reef. Bedrock and Boulders, boulders on sand. Echinoderms, epifaunal ANTHOZOA and Eunicella verrucosa.	ROV	10:22:00	10:29:00	00:07:00	49.94883, -6.24100	49.94953, -6.24140	20.1	30.3	A4.131	Bryozoan turf and erect sponges on tide-swept circalittoral rock	CR.HCR.XFa.ByErSp

13/07/2011	N2	Bedrock Pinnacle. Laminaria and foliose red algae, Metridium senile and Alcyonium digitatum.	ROV	00:08:19 (Tape)	00:10:20 (Tape)	00:02:00	49.98122, -6.32610	49.9822, -6.32148	N/A		A3.2142	Laminaria hyperborea park and foliose red seaweeds on moderately exposed lower infralittoral rock	IR.MIR.KR.Lhyp.Pk
13/07/2011	N3	Boulders (on sand). Caryophyllia smithii, A. digitatum and Eunicella verrucosa.	ROV	00:00:09 (Tape)	00:05:00 (Tape)	00:04:30	49.9829, -6.31482	49.98290, -6.31482	N/A		A4.131	Bryozoan turf and erect sponges on tide-swept circalittoral rock	CR.HCR.XFa.ByErSp
12/07/2011	S1	Undulating coarse rippled sand with coarse sediment in furrows with isolated low-lying boulders covered with faunal turf, sponges and anemones.	ROV	11:47:05	12:05:33	00:18:00	49.87182, -6.36145	49.87157, -6.36308	51	62	A4.131	Bryozoan turf and erect sponges on tide-swept circalittoral rock	CR.HCR.XFa.ByErSp
12/07/2011	S4	Upstanding reef with abundant Alcyonium digitatum and Metridium senile. Eunicella verrucosa and Pentapora occasional.	ROV	12:28:28	12:40:52	00:12:00	49.870833, -6.368767	49.87168, -6.36923	26	44	A4.131	Bryozoan turf and erect sponges on tide-swept circalittoral rock	CR.HCR.XFa.ByErSp

7.2 Summary of stills information (DDV only)

Date	Event	Brief Habitat Description	Still Sample Ref	Fix Time	Lat/Long	Biotope (EUNIS code)	Classification (MNCR descriptor)	Biotope Key (MNCRcode)
03/11/2011	Stn 26/N18	Axinellid sponges and short faunal turf on boulder.	26_1_IMG_0407	06:56:20	49 55.2020N, 006 26.0694W	A4.121	*Phakellia ventilabrum* and Axinellid sponges on deep, wave-exposed circalittoral rock	CR.HCR.DpSp.PhaAxi
03/11/2011	Stn 26/N18	Boulder covered with Caryophyllia smithii faunal turf and Axinellid sponges.	26_1_IMG_0424	07:04:20	49 55.2037N, 006 26.1109W	A4.121	*Phakellia ventilabrum* and Axinellid sponges on deep, wave-exposed circalittoral rock	CR.HCR.DpSp.PhaAxi
03/11/2011	Stn 26/N18	Boulder covered with Axinellid sponges.	26_1_IMG_0447	07:14:40	49 55.2153N, 006 26.1804W	A4.121	*Phakellia ventilabrum* and Axinellid sponges on deep, wave-exposed circalittoral rock	CR.HCR.DpSp.PhaAxi
03/11/2011	Stn 25/N14	Partially covered (sand) bedrock and cobbles with Ophiocomina nigra and Cellaria visible.	25_1_IMG_0454	05:18:20	49 59.1255N, 006 19.7612W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr

03/11/2011	Stn 25/N14	Veneer of sand over bedrock with *Ophiocomina nigra* and faunal turf.	25_1_IMG_0463	05:23:00	49 59.1391N, 006 19.8457W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	Stn 25/N14	Partially covered (sand) bedrock with Ophiocomina nigra and faunal turf.	25_1_IMG_0475	05:28:20	49 59.1574N, 006 19.8457W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	Stn 24/N5	Veneer of sand over bedrock. Exposed bedrock covered with Corynactis viridis.	24_1_IMG_0403	04:31:10	49 59.2511N, 006 18.9529W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	Stn 24/N5	Veneer of sand over bedrock.	24_1_IMG_0427	04:41:10	49 59.2962N, 006 19.0147W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	Stn 24/N5	Raised bedrock with Corynactis viridis and faunal turf.	24_1_IMG_0444	04:47:10	49 59.3249N, 006 19.0608W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr

03/11/2011	Stn 22/N17	Sandy gravel veneer over bedrock. Faunal turf and Ophiocomina nigra.	22_1_IMG_0367	02:54:40	49 59.3253N, 006 17.9406W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	Stn 22/N17	Raised bedrock or boulders with Corynactis viridis and faunal turf.	22_1_IMG_0402	03:08:10	49 59.3741N, 006 17.9937W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	Stn 22/N17	Veneer of sand over bedrock. Faunal turf and Ophiocomina nigra.	22_1_IMG_0436	03:19:10	49 59.4344N, 006 18.0565W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	Stn 21/N13	Veneer of sand over bedrock. Faunal turf and Ophiocomina nigra.	21_1_IMG_0308	02:01:30	49 59.5334N, 006 17.0847W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	Stn 21/N13	Veneer of shelly gravelly sand over bedrock. Faunal turf and Ophiocomina nigra.	21_1_IMG_0329	03:07:30	49 59.5494N, 006 17.1057W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr

03/11/2011	Stn 21/N13	Silted bedrock with veneer of sandy gravel. Corynactis viridis, faunal turf and Ophiocomina nigra.	21_1_IMG_0351	03:13:50	49 59.5663N, 006 17.128W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	Stn 20/N12A	Bedrock partially covered by sand/silt. Faunal turf.	20_1_IMG_0370	01:17:40	49 59.9389N, 006 15.9362W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	Stn 20/N12A	Bedrock partially covered by sand. Faunal turf, Ophiocomina nigra and Ciocalypta pencillus.	20_1_IMG_0381	01:21:30	49 59.9488N, 006 15.9222W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
03/11/2011	Stn 20/N12A	Bedrock partially covered by sand. Faunal turf, Ophiocomina nigra and Ciocalypta pencillus.	20_1_IMG_0397	01:26:30	49 59.9627N, 006 15.9088W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	Stn 18/N11	Shelly sandy gravel overlying bedrock. Ophiocomina nigra, Polymastia boletiformis, faunal turf.	18_1_IMG_0308	23:51:20	49 59.5788N, 006 16.1613W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr

02/11/2011	Stn 18/N11	Gravelly sand veneer over bedrock. Faunal turf and Axinellid sponge.	18_1_IMG_0313	23:56:50	49 59.565N, 006 16.1474W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	Stn 18/N11	Pebbly sand with cobbles overlying bedrock. Ophiocomina nigra, fauna turf, Pomatoceros tubes.	18_1_IMG_0321	00:04:20	49 59.5727N, 006 16.1135W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	Stn 17/N10	Boulder on sandy gravel. Encrusted with Cotynactis viridis and faunal turf.	17_1_IMG_0303	21:54:50	49 59.0007N, 006 16.8907W	A4.132/A5.4	Corynactis viridis and a mixed turf of crisiids, Bugula, Scrupocellaria, and Cellaria on moderately tide-swept exposed circalittoral rock/Sublittoral mixed sediment	CR.HCR.Xfa.CvirCri/SS.SMx
02/11/2011	Stn 17/N10	Boulders on sandy gravel with faunal turf. Some Corynactis viridis. Highly silted.	17_1_IMG_0306	21:56:50	49 59.0023N, 006 16.8922W	A4.132/A5.4	Corynactis viridis and a mixed turf of crisiids, Bugula, Scrupocellaria, and Cellaria on moderately tide-swept exposed circalittoral rock/Sublittoral mixed sediment	CR.HCR.Xfa.CvirCri/SS.SMx
02/11/2011	Stn 17/N10	Boulder on sandy gravel. Highly silted. Encrusted with faunal turf. Ophiura sp. present.	17_1_IMG_0310	22:54:30	49 59.0033N, 006 16.8969W	A4.132/A5.4	Corynactis viridis and a mixed turf of crisiids, Bugula, Scrupocellaria, and Cellaria on moderately tide-swept exposed circalittoral rock/Sublittoral mixed sediment	CR.HCR.Xfa.CvirCri/SS.SMx

02/11/2011	Stn 17/N10	Sandy silty gravel. Ebalia sp. present.	17_2_IMG_0314	22:58:10	49 59.0152N, 006 16.8870W	A5.4	Sublittoral mixed sediment	SS.SMx
02/11/2011	Stn 17/N10	Sandy silty gravel with cobble. Pomatoceros tubes present.	17_2_IMG_0318	23:01:40	49 59.0233N, 006 16.8752W	A5.4	Sublittoral mixed sediment	SS.SMx
02/11/2011	Stn 17/N10	Cobbles on gravelly sand. Pentapora fascialis and faunal turf.	17_2_IMG_0320	23:03:30	49 59.0287N, 006 16.8696W	A5.4	Sublittoral mixed sediment	SS.SMx
02/11/2011	Stn 16/N9	Gravelly sand veneer with Ophiocomina nigra and faunal turf.	16_1_IMG_0330	20:44:20	49 59.4133N, 006 15.1165W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	Stn 16/N9	Sand with cobbles on bedrock. Ophiocomina nigra and faunal turf.	16_1_IMG_0334	20:47:50	49 59.4199N, 006 15.118W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr

02/11/2011	Stn 16/N9	Veneer of coarse sand on bedrock with some silt. Ophiocomina nigra and faunal turf.	16_1_IMG_0337	20:51:00	49 59.4294N, 006 15.1056W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	Stn 16/N9	Cobbles and pebbles with sand and silt veneer on bedrock. Faunal turf and Pomatoceros tubes.	16_3_IMG_0348	21:02:40	49 59.4646N, 006 15.1122W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	Stn 16/N9	Veneer of coarse sand and silt over bedrock. Nemertesia and faunal turf.	16_3_IMG_0351	21:05:30	49 59.4735N, 006 15.1168W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	Stn 16/N9	Rippled sand and silt with Nemertesia, faunal turf and Ciocalypta pencillus.	16_3_IMG_0355	21:09:30	49 59.4872N, 006 15.1220W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	Stn 14/N7	Corynactis viridis, Cliona celata, Pentapora fascialis and faunal turf on silted cobbles and boulder.	14_1_IMG_0346	18:08:50	49 58.5084N, 006 15.0016W	A4.2122	Caryophyllia smithii and sponges with Pentapora foliacea, Porella compressa and crustose communities on wave-exposed circalittoral rock	CR.MCR.EcCr.CarSp. PenPcom

02/11/2011	Stn 14/N7	Pentapora and Cliona celata with faunal turf.	14_1_IMG_0361	18:14:40	49 58.4845N, 006 14.9489W	A4.2122	Caryophyllia smithii and sponges with Pentapora foliacea, Porella compressa and crustose communities on wave-exposed circalittoral rock	CR.MCR.EcCr.CarSp.PenPcom
02/11/2011	Stn 14/N7	Boulder on sandy gravel veneer over bedrock, encrusted with Caryophyllia and Alcyonium.	14_1_IMG_0379	18:27:50	49 58.4340N, 006 14.8378W	A4.2122	Caryophyllia smithii and sponges with Pentapora foliacea, Porella compressa and crustose communities on wave-exposed circalittoral rock	CR.MCR.EcCr.CarSp.PenPcom
02/11/2011	Stn 13/N6	Boulder encrusted with Corynactis viridis, Pentapora fascialis. Antedon bifida present.	13_1_IMG_0303	17:03:40	49 58.4283N, 006 15.1615W	A4.2122	Caryophyllia smithii and sponges with Pentapora foliacea, Porella compressa and crustose communities on wave-exposed circalittoral rock	CR.MCR.EcCr.CarSp.PenPcom
02/11/2011	Stn 13/N6	Transition from boulder to sediment. Boulder covered with Pentapora, Corynactis and faunal turf.	13_1_IMG_0322	17:16:30	49 58.3689N, 006 15.0960W	A4.2122	Caryophyllia smithii and sponges with Pentapora foliacea, Porella compressa and crustose communities on wave-exposed circalittoral rock	CR.MCR.EcCr.CarSp.PenPcom
02/11/2011	Stn 13/N6	Boulder covered with Pentapora, Cliona and faunal turf.	13_1_IMG_0335	17:24:50	49 58.3253N, 006 15.0423W	A4.2122	Caryophyllia smithii and sponges with Pentapora foliacea, Porella compressa and crustose communities on wave-exposed circalittoral rock	CR.MCR.EcCr.CarSp.PenPcom

02/11/2011	Stn 11/N4	Faunal turf and Ophiocomina nigra on sandy sediment and angular cobbles.	11_1vlcsnap-2012-02-09-3	11:12:20	49 59.3783N, 006 18.4003W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	Stn 11/N4	Upstanding reef with small colonies of Alcyonium digitatum and encrusting sponge/bryozoans.	11_1_vlcsnap-2012-02-09_12	11:18:20	49 59.3601N, 006 18.3861W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
02/11/2011	Stn 11/N4	Boulder/cobble on bedrock covered in aging Pentapora, Cliona celata and faunal turf.	11_1_vlcsnap-2012-02-09_42	11:35:20	49 59.2997N, 006 18.3475W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
01/11/2011	Stn 8/NW3	Cobbles on slightly gravelly sand (veneer on bedrock).	8_1_IMG_0203	21:14:00	49 59.9255N, 006 27.5266W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
01/11/2011	Stn 8/NW3	Partially scoured bedrock with sand infill. Faunal turf, Pomatoceros and Ophiocomina nigra.	8_1_IMG_0232	21:23:30	49 59.9232N, 006 27.4918W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr

01/11/2011	Stn 8/NW3	Small boulder covered with Caryophyllia and Pomatoceros tubes on gravelly sand with cobbles.	8_1_IMG_0243	21:25:50	49 59.9233N, 006 27.4774W	A4.21	Echinoderms and crustose communities	CR.MCR.EcCr
01/11/2011	Stn 7/NW2B	Gravelly sands possibly overlying bedrock.	7_1_IMG_0158	20:19:50	49 59.2569N, 006 27.2417W	A4.2	Moderate energy circalittoral rock	CR.MCR
01/11/2011	Stn 7/NW2B	Partially sediment covered bedrock with attached faunal turf.	7_1_IMG_0163	20:24:20	49 59.2598N, 006 27.2373W	A4.2	Moderate energy circalittoral rock	CR.MCR
01/11/2011	Stn 7/NW2B	Scoured bedrock with patches of sand, partially covered with faunal turf.	7_1_IMG_0165	20:24:40	49 59.2632N, 006 27.2362W	A4.2	Moderate energy circalittoral rock	CR.MCR
01/11/2011	Stn 7/NW2B	Cobbles embedded in rippled sand, some shell fragments. Alcyonium, Pomatoceros tubes.	7_2_IMG_0167	20:26:30	49 59.2965N, 006 27.2440W	A5.14	Circalittoral coarse sediment	SS.SCS.CCS

01/11/2011	Stn 7/NW2B	Cobbles embedded in slightly gravelly sand. Cobbles covered with faunal turf.	7_2_IMG_0175	20:29:40	49 59.3695N, 006 27.2801W	A5.14	Circalittoral coarse sediment	SS.SCS.CCS
01/11/2011	Stn 7/NW2B	Cobbles embedded in rippled sand. Cobbles covered in faunal turf.	7_2_IMG_0186	20:34:40	49 59.3838N, 006 27.2799W	A5.14	Circalittoral coarse sediment	SS.SCS.CCS
01/11/2011	Stn 6/NW2	Gravelly pebbly sand with Ophiocomina nigra.	6_1_IMG_0150	19:30:10	49 59.0665N, 006 27.3281W	A5.14	Circalittoral coarse sediment	SS.SCS.CCS
01/11/2011	Stn 6/NW2	Rippled gravelly shelly sand with Cellaria and Ophiocomina nigra.	6_1_IMG_0151	19:30:30	49 59.0675N, 006 27.3287W	A5.14	Circalittoral coarse sediment	SS.SCS.CCS
01/11/2011	Stn 6/NW2	Rippled sand with cobble and pebble embedded. Branching sponge.	6_1_IMG_0153	19:31:40	49 59.0719N, 006 27.3301W	A5.14	Circalittoral coarse sediment	SS.SCS.CCS

01/11/2011	Stn 6/NW2	Scoured bedrock with pebbles in hollows. No faunal visible.	6_2_IMG_0154	19:32:20	49 59.0744N, 006 27.3315W	A4.2	Moderate energy circalittoral rock	CR.MCR
01/11/2011	Stn 5/NW1	Faunal turf on cobbles and pebbles with sand (veneer on bedrock).	5_1_IMG_109	18:37:30	49 58.5239N, 006 28.0656W	A4.2	Moderate energy circalittoral rock	CR.MCR
01/11/2011	Stn 5/NW1	Cobbles and pebbles on gravelly sand (veneer on bedrock). Ophiocomina nigra and faunal turf.	5_1_IMG_0113	18:38:20	49 58.2510N, 006 28.0605W	A4.2	Moderate energy circalittoral rock	CR.MCR
01/11/2011	Stn 5/NW1	Cellaria sp. and other faunal turf on bedrock with veneer of sand.	5_1_IMG_0134	18:46:00	49 58.5014N, 006 28.0357W	A4.2	Moderate energy circalittoral rock	CR.MCR

7.3 Species list

Alcyonidium diaphanum
Alcyonium digitatum
Alcyonium glomeratum
Antedon
Antedon bifida
Aspitrigla cuculus
Asterias rubens
Aureliania heterocera
Axinella dissimilis
Axinella infundibuliformis
Branching biogenic structures
Callionymus
Calliostoma
Cancer pagurus
Caryophyllia smithii
Cellaria
Cereus
Cerianthus
Ciocalypta penicillus
Cirripedia
Cliona celata
Corynactis viridis
Decapoda
Diazona violacea
Diphasia
Ebalia
Echinus esculentus
Eunicella verrucosa
Eunicella verrucosa
Galathea
Galatheidae
Goneplax rhomboides
Halichondria panicea
Haliclona
Henricia
Henricia
Holothuria forskali
Hyas
Inachus
Iophonopsis nigricans
Laminaria
Lanice conchilega
Luidia ciliaris
Luidia sarsi
Lytocarpia myriophyllum
Marthasterias glacialis
Metridium senile
Mollusca
Munida rugosa
Necora puber
Nemertesia
Nemertesia
Nemertesia antennina
Ophiocomina nigra
Ophiothrix fragilis
Pachymatisma
Pachymatisma johnstonia
Paguridae
Pagurus
Palaemon
Palinurus elephas
Pentapora fascialis
Polymastia
Polymastia boletiformis
Pomatoceros tubes
Porella compressa
Raspailia hispida
Raspailia ramosa
Rhodophyta
Sabella
Sagartia elegans
Salmacina dysteri
Serpulidae
Sertulariidae
Spirorbidae
Stelligera stuposa
Suberites carnosus
Suberites ficus
Tethya
Triglidae
Tubularia indivisa
U. anemone
U. bryozoan_encrusting
U. faunal turf
U. hydroid
U. red algae_foliose
U. sponge_arborescent
U. sponge_columnar
U. sponge_encrusting
U. sponge_globular
U. sponge_massive
U. sponge_papillate
U. sponge_pedunculate
Urticina felina
Valvatida

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