

**LUNDY
EUROPEAN MARINE SITE
SUBLITTORAL MONITORING
REPORT
2003/4**

Tom Mercer, Christine Howson and Francis Bunker



AQUATIC SURVEY & MONITORING LTD

**LUNDY EUROPEAN MARINE SITE
SUBLITTORAL MONITORING**

**ENGLISH NATURE
CONTRACT NO. FST20-46-16**

Client

English Nature
Northminster House
PETERBOROUGH
PE1 1UA

Nominated Officer

Simon Brockington
Tel. 01733 455119

Contractor

Aquatic Survey & Monitoring Ltd.
Rowangate
5 Whitfield Brow
Bollihope
Frosterley
Co. Durham
DL13 2SZ

Tom Mercer
Tel. 01388 528 015

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End products and data storage

All of the data have been stored in the following formats:

- Excel spreadsheets;
- Marine Recorder;
- MapInfo GIS;
- Original raw data sheets.

Other end products:

- Animal voucher specimens – these are lodged with the Marine Invertebrate section of the National Museum of Scotland;
- Algal specimens – these are lodged with the Royal Botanic Gardens Edinburgh;
- 35 mm transparencies – English Nature holds a CD. C.M. Howson has the original transparencies which are available for loan;
- Hand-held video tapes –
- Drop-down video-tapes – Mini DV digital (some drops only) and VHS.

Synopsis

Aquatic Survey and Monitoring Limited (ASML) was commissioned to assess the interest feature – **Reefs (subtidal)**, within the Lundy SAC, by surveying several sub-features of Lundy’s reefs, identified as ecologically important components. The components, outlined in the regulation 33 package include; **kelp forest communities, subtidal bedrock and stable boulder communities** and ***Eunicella (Pink Sea Fan)* characterised reef**.

The range of biotopes present were surveyed by ‘drop-down video’ to establish a baseline, from which in the future, an assessment of the target ‘*No decrease in the distribution, extent and range of reef biotopes from a baseline*’ will be made. Procedural Guideline no. 3-5 (Davies *et al* 2001) was used to achieve this. This involved stratified random video drops within 6 permanent 2km wide transects, spread around the island with delineated depth bands at 0-10m, 10-20m, 20-30m, 30-40m & 40m+.

Other targeted biotopes were also surveyed by quantitative diving techniques, to establish a baseline against which an assessment of the target, ‘*Species composition: no significant deviation from baseline*’ will also be made. Procedural Guideline no. 3-7 was used to achieve this. The diving surveys within these biotopes focused on the species composition within belt transects. This was achieved using multiple random quadrats, a site-specific recording form and abundance records of the species present.

Much of the drop-down video work was carried out from the survey vessel *Jessica Hettie*, operated by Clive Pearson. This is a coded MCA workboat that operates in the Lundy area out of Clovelly. The diving work was carried out from both the Joint Nature Conservancy Council (JNCC) RIB ‘*Aplysia*’ and the MCA coded RIB ‘*Domino*’, supplied by West Wales Diving School.

Video records were successfully made at 171 sites within the 6 video transects. Thirty reef biotopes were identified, many dominating large areas of seabed and others occurring as small patches within a dominant primary biotope. This extended the recorded list of reef biotopes by 8 or 36% within the cSAC.

Points of interest noted from the video transect results were:

- a deepwater mussel bed (40+m) seen in The Rattles transect, populated by abundant large crabs (*Maia squinado* and *Cancer pagurus*) feeding voraciously. This was unique within the cSAC and was not seen in any other transect.
- the observation of a red-band fish in its burrow at site IA25 within the Inner Anchorage transect, possibly extends the area of known red-band fish habitation.
- the presence of ‘fields’ of *Cereus pedunculatus* (IMX.An) in both the Inner Anchorage and Knoll Pins transects are fine examples of an uncommon biotope.
- frequent records of the sponge *Ciocalypa penicillus* in the Urt.Cio biotope. recorded in the Northern Points, St James’s Stone and Halftide Rock transects,

at the sediment / reef interface are also good examples of an uncommon biotope.

- the sheer variety of the reef biotopes recorded in the St James's Stone transect; 20 biotopes / entities in 25 drops is an impressive count and as many of these drops were filmed in strong currents, there are quite probably more to be recorded if benign survey conditions can be targetted more accurately.

Nine sites were studied by diving, three to assess the target; *algal species composition: no significant deviation from baseline*, within kelp forests and six sites were studied to assess the subtidal bedrock and stable boulder communities - MCR.ErSPbolSH, MCR.ErSEun, FaV and ScAs.ByH biotopes, in relation to; *species composition: no significant deviation from baseline*. Data obtained from the diving transects appeared to be statistically robust, which vindicated the practice of using a familiarisation dive, followed by specimen work-up and the construction of a site specific recording form.

Comprehensive species lists have been produced for all the sites and when compared to existing data from nearby sites, where possible, all sites studied have added to the state of knowledge. The species complements always exceeded those found in the nature conservation agencies' *Recorder* database, as at August 2003. All biotopes are relocatable by the depth and positional information provided in this report and the surveys are therefore repeatable.

At two kelp forest sites, Rat Island and Gannet's Bay, the forest structure was investigated and ratios of *Laminaria hyperborea* : *L. ochroleuca* of 18:1 and 17:1 were calculated.

A brief survey of the seafans north of Quarry Bay also revealed density assessments and condition index values that concur with previous studies carried out by Keith Hiscock and Robert Irving respectively. Sponge identification was a key part of this survey at all sites and as a result a new species (currently under investigation) was discovered at Gannet's Pinnacle (c.f. *Chaetodoryx* sp).

1. Introduction

Lundy is a small rocky island in the Bristol Channel, off the Devon coast, north of Hartland Point. The location of Lundy is shown on Figure 1 below.

Figure 1. Lundy Island.



The slate and granite cliffs rise steeply to a gently undulating plateau 140m above sea level. The land of the island is leased from the National Trust to the Landmark Trust who farm the land and manage the properties for tourism and all the habitats for

wildlife. The intertidal and subtidal however, are England's only Marine Nature Reserve (MNR) and they are administered by English Nature (EN), the UK government's advisor on nature conservation. Lundy has also been designated as a candidate Special Area of Conservation (cSAC) under the European Union's Habitats Directive (1994) and as such, is the subject of a Regulation 33 package, a document designed to help relevant and competent authorities, who have responsibilities to implement the Habitats Directive to:

- understand the international importance of the site, the underlying physical processes and the ecological requirements of the habitats and species involved;
- develop a management scheme to ensure that the ecological requirements of the site's interest features are met; and
- set the standards against which the condition of the site's interest features can be determined and compliance monitoring undertaken to establish whether they are in favourable condition.

The regulation 33 package contains conservation objectives. These are the starting points from which management schemes and monitoring programmes are to be developed, in order that the UK government can report on the condition of the site within a 6 yearly reporting cycle.

This *Aquatic Survey and Monitoring Limited (ASML)* project was commissioned to assess the interest feature – **Reefs (subtidal)**, within the cSAC, by surveying several sub-features of Lundy's reefs, identified as ecologically important components. These components, outlined in the regulation 33 package, include; **kelp forest communities, subtidal bedrock and stable boulder communities** and ***Eunicella (Pink Sea Fan) characterised reef***, all to be surveyed by 'drop-down video' in order to establish a baseline, from which in the future, an assessment of the target; '*No decrease in the distribution, extent and range of biotopes from a baseline*' will be made. Some biotopes and other structural aspects of these same components were also to be surveyed by quantitative diving techniques, to establish a baseline against which an assessment of the target, '*Species composition: no significant deviation from baseline*' will also be made.

This project forms part of a larger programme of work by *ASML*, commissioned by EN to monitor specific features of all the sublittoral marine cSACs in England, designated for their sublittoral reefs. The title of this programme was 'Biological Survey using Divers and Video' (BSDV), contract No. **FST20-46-16**. The whole project was designed by EN to utilise standard methods selected from the Procedural Guidelines in the Marine Monitoring Handbook (Davies *et al.*, 2001) and to study, where appropriate, similar aspects of the 9 EN sites.

The Lundy project took the form of 4 trips to the island, over a period of 15 months between June 2003 and September 2004. Table 1 below shows the timetable and personnel involvement in the *ASML* survey activities.

Table 1. Programme of activities and personnel involvement in the fieldwork

Date	Activity	Personnel
9 th – 13 th June 2003	Drop-down video	Ian Sotheran (Envision), Ian Reach (EN), Laura Heape (EN), Tom Mercer (ASML)
30 th August – 13 th September 2003	Scientific diving	Jenny Hill (JNCC), Jen Jones (WWDS ¹), Christine Howson, Francis Bunker and Tom Mercer (all ASML).
5 th – 9 th June 2004	Drop-down video	Laura Heape & Chris Davis (EN), Christine Howson & Tom Mercer (ASML)
28 th August - 11 th September 2004	Scientific diving & drop-down video	Jenny Hill (JNCC), Jen Jones (WWDS ²), Christine Howson, Francis Bunker and Tom Mercer (all ASML).

2. Objectives

This project was designed to enable the condition of the Lundy cSAC (Figure 1) to be assessed against the attributes of the features listed in Table 2 below. The objectives for this subtidal fieldwork programme were to establish a methodology for sampling particular subtidal features of the site, so that the programme could be repeated in the future, producing multiple, robust data sets that will enable EN to make comparisons between monitoring cycles.

The project required both scientific diving surveys and the use of remote drop-down video techniques to carry out the objectives and to establish a baseline of information, within the target biotopes and features, against which the site condition will be assessed in the future and which can also be used in a comparison with extant data sets such as those collected by the Marine Nature Conservation Review (MNCR).

Table 2. Features of Lundy cSAC selected by EN for site condition monitoring

Feature	Sub-feature	Attribute	Methods and strategy
Kelp forest communities & subtidal bedrock and stable boulder communities	Kelp forest communities & subtidal bedrock and stable boulder communities and <i>Eunicella</i> -characterised reef.	No decrease in distribution, extent and range of biotopes from baseline.	Drop-down video (Procedural Guideline no. 3-5)(Davies <i>et al</i> 2001). Stratified random video drops within permanent 2km wide transects, spread around the island with delineated depth bands (0-10m, 10-20m, 20-30m, 30-40m & 40m+).

¹ West Wales Diving School – employed as a Nitrox technician and diver.

² West Wales Diving School – employed as a Nitrox technician, coxswain, supplier of MCA coded RIB and diver.

Feature	Sub-feature	Attribute	Methods and strategy
Kelp forest communities	Kelp forest communities	Algal species composition: No significant deviation from baseline.	Diver survey of the biotope, targeting algal species composition. Stratified belt transects with random quadrats; placed in the biotope with adequate coverage of the site. (Procedural Guideline no. 3-7). Site selection based on previous survey data and local knowledge.
Subtidal bedrock and stable boulder communities.	MCR.ErSPbolSH biotope.	Species composition: No significant deviation from baseline.	Diver survey of the biotope, targeting species composition. Stratified belt transects with random quadrats; placed in the biotope with adequate coverage of the site. (Procedural Guideline no. 3-7). Site selection based on previous survey data and local knowledge.
Subtidal bedrock and stable boulder communities.	MCR.ErSEun biotope.	Species composition: No significant deviation from baseline.	Diver survey of the biotope, targeting species composition. Stratified belt transects with random quadrats; placed in the biotope with adequate coverage of the site. (Procedural Guideline no. 3-7). Site selection based on previous survey data and local knowledge.
Subtidal bedrock and stable boulder communities.	FaV; ScAs.ByH biotope.	Species composition: No significant deviation from baseline.	Diver survey of the biotope, targeting species composition. Stratified belt transects with random quadrats; placed in the biotope with adequate coverage of the site. (Procedural Guideline no. 3-7). Site selection based on previous survey data and local knowledge.
Subtidal bedrock and stable boulder communities.	MCR.ErSEun biotope.	Average density of sea fans, proportion of damaged or epiphytised branches: No significant deviation from baseline.	Random drops of 'Drop-down video' within the biotope or timed flights of an ROV. Sampling methods to be developed in association with English Nature.

3. Methods

Prior to the survey, the methodologies for the work were discussed in detail with English Nature and were planned, where possible to build on those used during previous studies in condition monitoring of cSACs elsewhere. Outlines of the methodologies used are presented in this section and further details are provided in the Appendices.

3.1 Assessment of biotope distribution and diversity by drop-down video survey.

Feature: Kelp forest and subtidal bedrock and stable boulder communities.

Target: No decrease in distribution extent and range of biotopes from baseline.

3.1.1 Drop-down video equipment

In June 2003 Envision (formerly *Seamap* of Newcastle University) provided the drop-down video equipment and an operator, Ian Sotheran, for the field survey. The camera used was a Sony VX1000 digital video camera, a 3CCD camera using Mini DV format tapes. This was deployed in a *Sea-Technics* housing and mounted in an aluminium sledge frame. A generator on the survey vessel powered the lights and the camera and both were controlled by a deck unit, via an umbilical. The system could record on the surface in the deck unit and also had the ability to record in the camera on the seabed simultaneously.

In 2004, both the June and September surveys were conducted with another system designed by *Sea-Technics* for *ASML*. This drop-down video system was also based on a 3CCD Sony DRV 950 digital video camera in a marine grade Aluminium housing rated to 130m. The main difference between the two systems is one of deployment technique; as the ASML system is not a 'sledge' system and is 'drifted' above the seabed **not** dragged along it. This mode of operation is deemed by the author to be far more appropriate to the biotopes and seabed topography found around Lundy e.g. the erect sponge communities, *Eunicella verrucosa* and *Pentapora foliacea* populations could be damaged by regular video sledge deployments, due to their fragility, whereas a 'drifted' system is benign and can more easily avoid rugged seabed topography. Further details of the equipment are provided in [Appendix 1](#).

3.1.2 Pre-survey plan

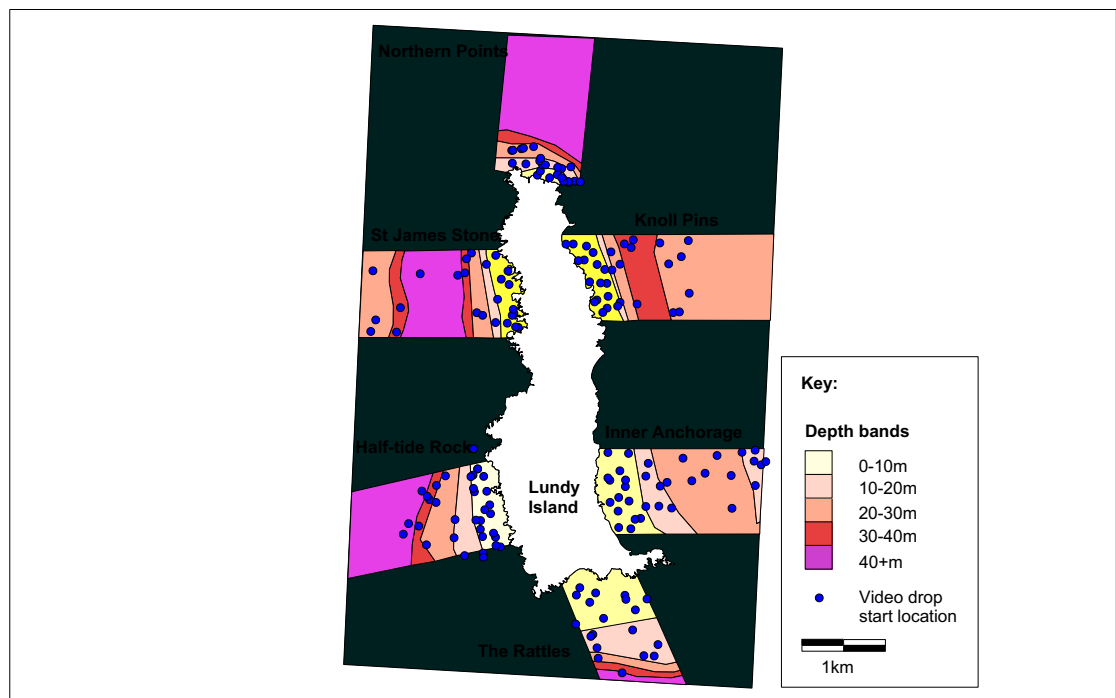
The project specification required the biotope complement and the distribution of biotopes across the site to be assessed using a drop-down video. Six block transects throughout the SAC were selected by EN.

The 6 block transects were each divided into the depth bands 0–10m, 10–20m, 20–30m, 30–40m and 40+m. Given the difficulty assessing the heterogeneity of the areas prior to the survey and hence the number of samples needed to achieve adequate coverage, the maximum number of tows to be carried out in each depth

band was set following an assessment of the provisional results of the Flamborough Head video survey performed by ASML in September 2001 (Howson *et al.* 2003). This maximum number was provisionally set at 15. However where no reef was discovered within a depth band, then fewer drops were undertaken.

The location and form of the sampling blocks and the location of the ‘start positions’ of the video transects are shown on figure 2 below.

Figure 2 Location of video transects, depth bands and drop-down video deployment locations within Lundy cSAC.



The series of random positions within each depth band were generated for each transect prior to the survey. [Appendix 2](#) shows the detail of each video transect location. The video deployment positions shown were worked in sequence (east to west or north-south) within each depth band to maintain randomness. As required in Procedural Guideline 3-5 (Davies *et al.*, 2001), video tows of 100 m length were attempted where possible, at the pre-determined positions.

3.1.3 Field survey logistics

In June 2003 the video work was carried out from the survey vessel *Jessica Hettie*, operated by Clive Pearson (for contact details see Appendix 2). This is a coded MCA workboat that operates in the Lundy area out of Clovelly. In June 2004 the video work was carried out from the Joint Nature Conservancy Council (JNCC) RIB ‘*Aplysia*’ and in September 2004 the remainder of the survey was carried out from both the ‘*Jessica Hettie*’ and the MCA coded RIB ‘*Domino*’, supplied by West Wales Diving School.

If for any reason a station could not be sampled effectively, for example due to the strength of the tide or poor visibility at the seabed, the video transect was abandoned and the gear dropped at the next station in the geographical sequence. It was intended that each tow should be approximately 100 m in length and generally the camera was allowed to drift along the seabed for between 2 and 5 minutes to achieve this. The environmental conditions prevailing during the survey determined to a large extent the exact duration and coverage of each drop. In hostile conditions the camera was only kept on the seabed until it was judged that there was enough footage to identify the biotopes present. If the seabed substrata were mixed, the tows were generally longer within the safe limits of the operating conditions. The operating procedure adopted during this survey is presented in [Appendix 1](#).

3.2 Diving surveys to assess selected features within Kelp forest, subtidal bedrock & stable boulder and subtidal vertical & overhanging circalittoral communities.

- **Feature:** Kelp forest communities.
Target: Algal species composition: no significant deviation from baseline.

- **Feature:** Subtidal bedrock and stable boulder communities - MCR.ErSPbolSH, MCR.ErSEun, FaV and ScAs.ByH biotopes.
Target: Species composition: no significant deviation from baseline

- **Feature:** MCR.ErSEun biotope.
Target: Average density of sea fans, proportion of damaged or epiphytised branches: No significant deviation from baseline.

3.2.1 Pre-survey plan

These features were assessed using scientific diving methodologies. The diving survey was planned around methods set out in **Procedural Guideline 3-7, (*in situ* quantitative survey of subtidal epibiota using quadrat sampling techniques)**, with the aim of establishing several monitoring sites, within the required biotopes. Sites around the island were identified for study prior to the field survey. The selection process was based on the results of an examination of existing information held in the MNCR database and a meeting with Dr Keith Hiscock held in Plymouth on 12th August 2003.

Prior to the commencement of the field survey, the latter target was dropped from the list of EN requirements under this contract (E. Murray pers comm.). The reason being that this target was now being tackled by other groups, given that concern about die-back, disease and epiphytisation of *Eunicella verrucosa* had now reached higher levels than when this contract was originally drawn up. However, due to a hiatus in boat availability, caused by engine, electrical and hydraulic problems with the Lundy RIB during the 2003 survey, an opportunity arose at short notice to dive from the *Jessica Hettie* on the Quarry Bay seafans. During these dives several brief studies were accomplished and

it is hoped that the results of these may add to the knowledge base for the respective attributes.

3.2.2 Diving safety and logistics

Figure 3 below shows the locations of the diving activities carried out under this contract during 2003 and 2004. The diving surveys took place during 31st August – 12th September 2003 and 29th August – 10th September 2004. All of the diving was carried out in accordance with the Approved Code of Practice for scientific diving projects (Health and Safety Commission 1998) and the team dived under the JNCC Diving Rules (Holt 1998) adapted by *ASML* in 2001. During any dive, the divers remained in contact with each other underwater in conditions of poor visibility by using a buddy line. One of each pair always carried a Surface Marker Buoy (SMB) and the other diver always had a delayed SMB for use in case of separation. Diving was planned for slack water at all times as many sites around the island are exposed to very strong currents.

The divers were all qualified according to the relevant 1997 HSE regulations and used air and nitrox with standard SCUBA equipment. Breathing oxygen was transported to the island with the field team on the *Jessica Hettie* in 2003 and aboard the *Oldenburg* in 2004. Jen Jones of West Wales Diving School accompanied the survey on both occasions and acted as the Nitrox Technician. Nitrox was blended each day at the Lundy dive store and the mixes were tailored to the diving planned for the next day.

Nitrox was used to increase the safety of the diving, given that the divers were constantly diving near to the ‘no stop times’ at depths approaching 30m. No decompression diving was planned or undertaken during either of the surveys.

During the 2003 survey the dive team planned to use the Lundy RIB for the duration, but after the first day it developed electrical and hydraulic faults and had to be abandoned. The *Jessica Hettie* was then hired for several dives, whilst the JNCC RIB *Aplysia* was brought from Peterborough. *Aplysia* was then used from 4th September for the remainder of the survey. In 2004, Jen Jones from West Wales Diving School was contracted to provide the RIB ‘*Domino*’ for the duration of the survey.

Originally the diving survey was planned to be completed in 2003 the diving survey in that year was for the most part restricted to the east coast due to the strong westerly winds encountered on the island. Hence due to the lack of coverage on the west coast *ASML* were instructed by EN to undertake a second survey in 2004 in order to obtain a greater geographical spread in terms of dive sites and therefore monitoring data.

3.2.3 Methodological rationale

The approach to the quantitative monitoring adopted for this project was one of stratified random sampling in which the target biotope acts as the stratified element of the sampling programme, and once located, is sampled using quadrats positioned randomly along a transect. These methods and biotope-

specific variations are described in detail in [Appendix 3](#). This detailed quantitative work was supported by semi-quantitative Phase II surveys of the target biotopes, which provided a broader contextual description to complement the smaller scale quadrat studies. Each transect was also either videoed using hand-held digital video or photographed with a 35 mm camera to provide a permanent visual record of the biotope appearance. In some cases there was a combination of both video and photography, depending upon the logistics of personnel and underwater conditions on the day.

Following the data analysis, the results are discussed in terms of the characterising species. The species composition of the various biotopes selected are presented in Appendix 3. In order to provide an assessment of whether the species composition showed any significant deviation from earlier data, the results were also compared with data collected during MNCR and other historical 'Phase II' surveys. The results of these comparisons are also described in Section 5.

Figure 3. Location of diving activities undertaken for the Lundy cSAC monitoring for both the 2003 and 2004 surveys.

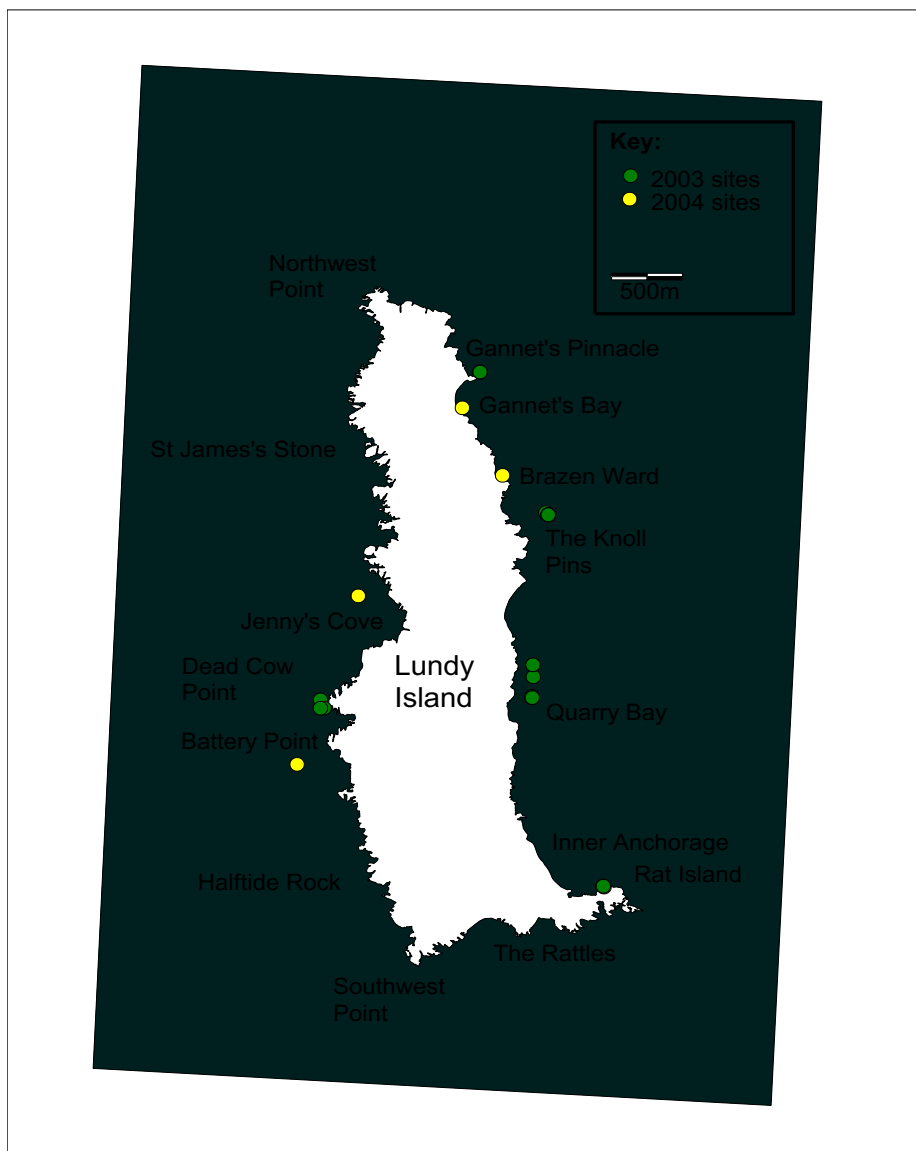


Table 3 Characteristics of the transect locations and additional diving sites.

Site name	Site position		Site description
	Start	Finish	
Dead Cow Point	SS12643 – 45230		Dense Kelp forest on granite reef ledge with an understorey of foliose red algae and an encrusting faunal turf. (Plates 1&2)
Rat Island	SS14610 – 43860		Dense, silty kelp forest on rugged slate reef with an understorey of foliose red algae and an encrusting faunal turf including <i>Aiptasia mutabilis</i> anemones.
N. of Quarry Bay	SS14116 – 45246	SS14120 – 45488	220m transect along the lower infralittoral boulder slope north of Quarry Bay. Dense foliose red and brown algae, erect axinellid sponges and seafans. (Plate 3).
N. of Quarry Bay	SS14120 – 45488		Silty boulder slope north of Quarry Bay. Dense foliose red and brown algae, erect axinellid sponges and seafans. (Plates 4&5)
Knoll Pins (Cliff)	SS 14227 – 46591		A turf of hydroids, bryozoans, sponges and anemones on vertical and near vertical circalittoral granite bedrock reef. (Plate 6)
Knoll Pins (Horizontal)	SS 14227 – 46591		A turf of hydroids, bryozoans and sponges on horizontal circa littoral granite bedrock reef with a veneer or shell gravel. (Plate 7)
Gannet's Pinnacle	SS13753 – 47641		A vertical cliff north facing sublittoral cliff in the infralittoral, encrusted with anemones, sponge crusts and bryozoans.
Gannets Bay	51.19509 °N 04.66879 °W		A shallow bedrock and boulder reef with a silty, mixed kelp forest and a foliose red algal understorey beneath.
Jenny's Cove	51.18243 °N 04.67841 °W		A deep gully in the granite with a sandy floor. The near vertical gully walls covered in encrusting sponges, bryozoans and ascidians, as well as occasional foliose red algae. (Plates 8&9)
Battery Point	51.17116 °N 04.68385 °W	51.17119 °N 04.68456 °W	Horizontal and near horizontal faces of silty, large granite boulders and bedrock. Colonised by erect and cushion sponges, byozoans, hydroids and foliose algae. (Plates 10&11)

3.3 Average density of sea fans, proportion of damaged or epiphytised branches; assessed in part by diving.

Due to the problems which arose with the Lundy RIB in August/September 2003, the opportunity arose to dive on the seafan bed north of Quarry Bay from the Jessica Hettie, even though this had been removed from the work programme prior to the field survey. Two waves of diving were undertaken, on the 3rd September 2003, in which, 2 pairs of divers counted all seafans in a series of 10m x 2m contiguous quadrats along a single depth contour. Each

pair repeatedly layed out a 10m long tape and then the individual divers searched a 2m wide strip, counting all seafans, noting adults (>10cm), juveniles (<10cm) and degree of epiphytisation. In total 880m² of seabed were surveyed.

In tandem with this transect, 1 dive was undertaken to photograph the north of Quarry Bay seafans. This dive commenced at the edge of the reef at the north end of the bay (see Table 3 above) and on arriving at the seabed, the divers then photographed all the seafans encountered along the depth contour until the film was exhausted. Each seafan was photographed against a strung 50cm x 50cm quadrat to allow the size of the seafans to be assessed.

Plate 1. Dead Cow Point: Lhyp.Ft

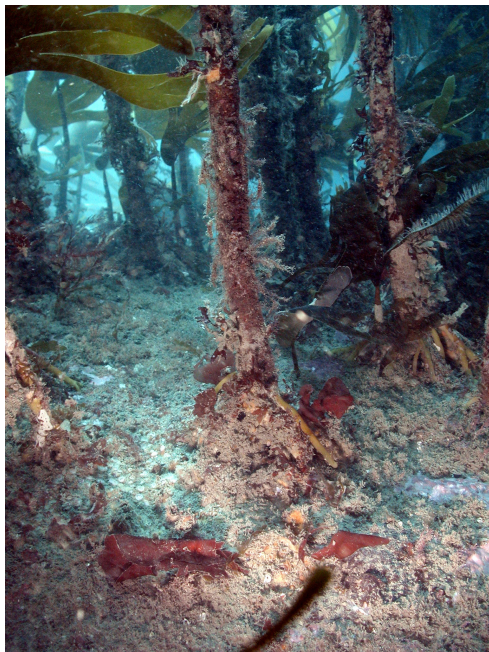


Plate 2. Dead Cow Point: Lhyp.Ft



Plate 3. North of Quarry Bay: Seafan health work.

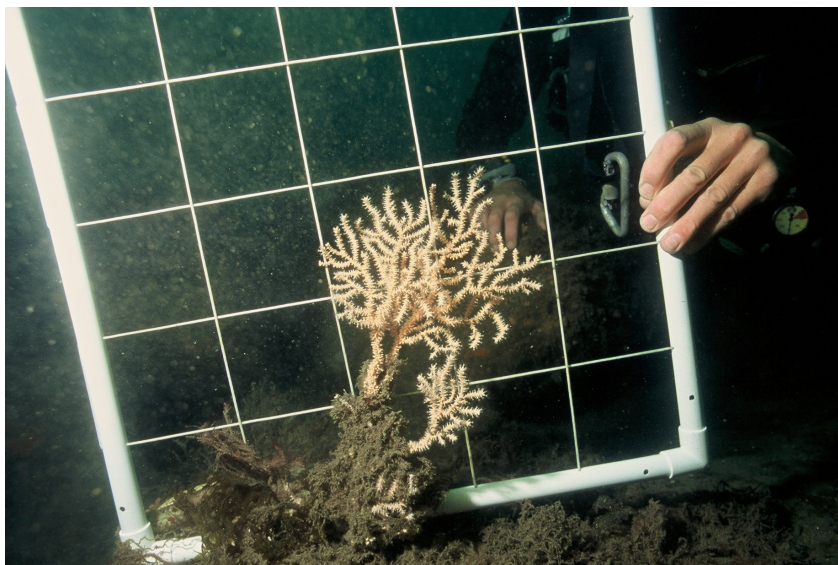


Plate 4. North of Quarry Bay: ErSEun transect

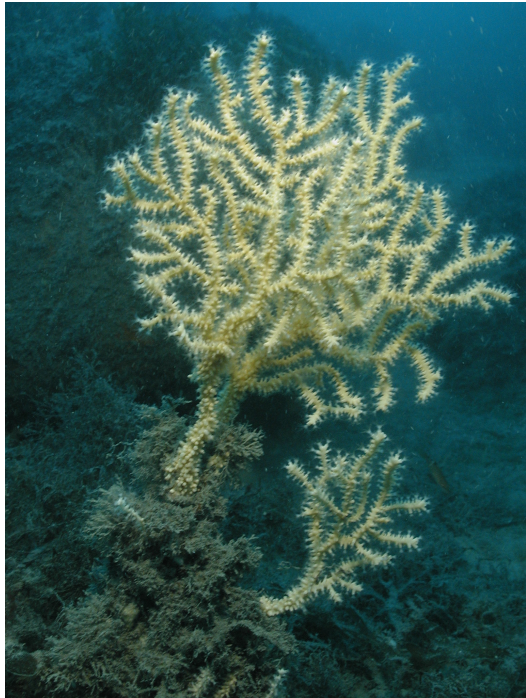


Plate 5. North of Quarry Bay: ErSEun transect

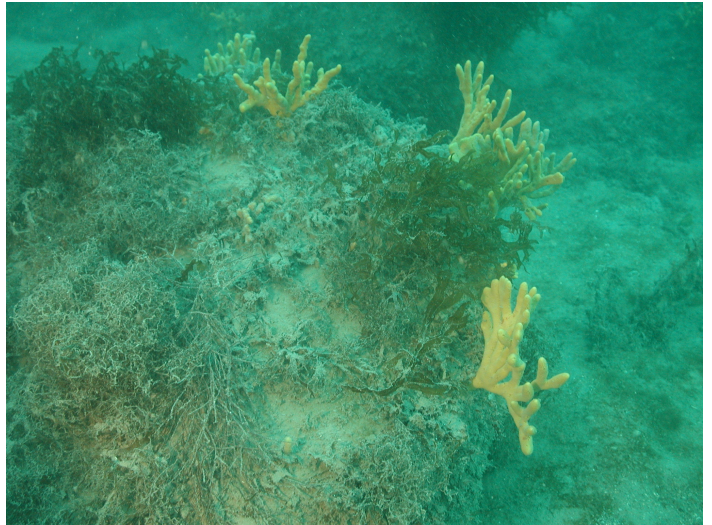


Plate 6. Knoll Pins: Vertical reef

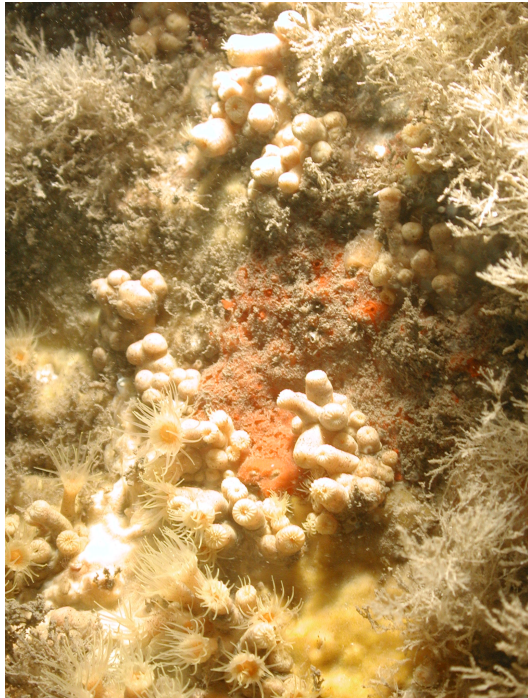


Plate 7. Knoll Pins: Horizontal Reef.



Plate 8 Jenny's Cove: Gully wall.

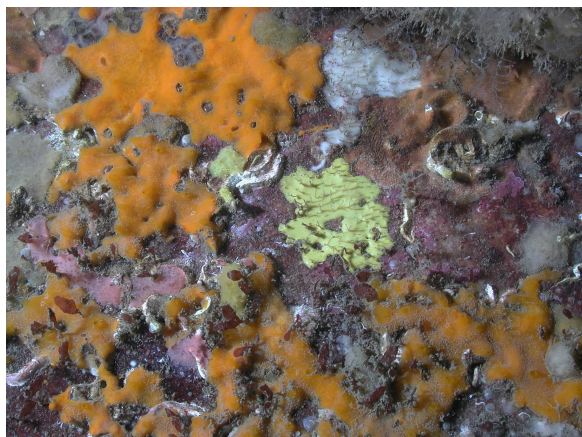


Plate 9. Jenny's Cove: Gully wall.

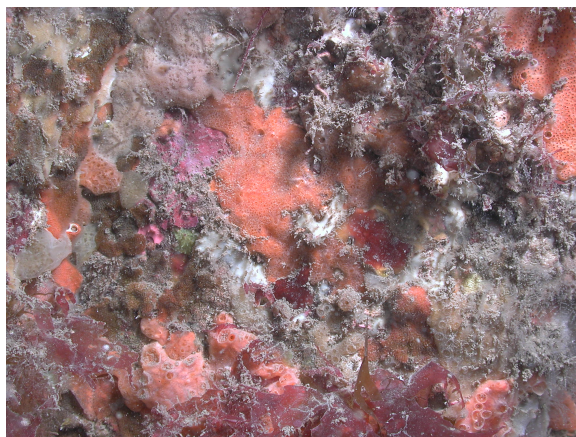


Plate 10: Battery Point: Sponge & bryozoan turf



Plate 11. Battery Point:



3.4 Photography and video

The majority of the biotopes were videoed with a hand-held digital video and lights (Sony VX1000 3CCD). 35 mm macro photographs using a housed Nikon F50 with 60 mm and 20 mm lens were taken of a representative range of species and habitats at several of the sites. A Nikon coolpix 3200 in an Ikelite housing was also used on occasions. This latter photographic setup was especially useful for species familiarisation in each of the new biotopes, in tandem with the collection and identification of specimens.

3.5 Data handling and analysis

3.5.1 Video data analysis

An initial assessment of the biotopes found on each tow, based on the species visible and the seabed type, was made during the course of the fieldwork. Following the field survey, the videotapes were viewed more thoroughly and biotopes assigned to each tow. A second worker reviewed approximately 10% of the tows to ensure accuracy and consistency of biotope identification. The sites selected for review included examples of each biotope identified and a number of sites where there was a query over the classification. The results and comments from both workers were taken into account to make a final decision on biotope allocation.

In addition to this work, the results of a broad scale survey of the area carried out in 1996 (Sotheran & Walton, 1997) were reviewed for comparison.

Analysis of the quadrat data collected by the divers (see Section 4) enabled better recognition of a number of the biotopes present in the area. Where appropriate, the biotope descriptions compiled from the divers' data were used to assist in classifying the video drops. No statistical analysis of the video results was deemed relevant.

3.5.2 Quadrat data handling and analysis

The methods used for data analysis, including the prior treatment of the data, are described in detail in [Appendix 3](#) and only an outline summary is included here. The comparison with earlier data is discussed in Section 4

Following the field work, all the specimens collected, were identified and added to the species data sets as 0.25 (present) unless there was additional abundance information available on the waterproof field recording sheet. All the Phase II and quadrat data were entered into Excel spreadsheets and Marine Recorder. The data collected were analysed separately on a site by site basis, with the exception of the kelp sites which were pooled for interest sake

- Kelp – sites 1,2 & 8;

The quadrat data were analysed using the PRIMER 5 statistical package to address the following questions:

- Which species characterised each biotope sampled in 2003/4?
- Did the quadrats collected from one site by different divers comprise a coherent data set?

Cluster analysis and ordination were the major tools used to provide a visual assessment of the similarity of and differences between the various sites and to check for outlying quadrats. The species responsible for the similarities and differences between the resultant clusters were identified and this information was used to assist in describing the biotopes.

3.6 Comparison with historical data

Many sublittoral descriptive surveys have been carried out within the cSAC since 1968, though a plethora of natural history studies go back as far as 1925 and beyond Table 4 lists some of the studies that produced data relevant to this survey. The biotope and species data collected during these surveys were assessed and compared, where possible with the results from these ASML surveys in an attempt to determine whether the following monitoring targets for the kelp forest and subtidal bedrock & stable boulder and subtidal vertical & overhanging circalittoral communities had been achieved to date:

- No decrease in distribution and diversity of biotopes from baseline.
- Algal species composition (kelp forest): No significant deviation from baseline.
- MCR.ErSPbolSH, MCR.ErSEun, FaV and ScAs.ByH biotopes; species composition: No significant deviation from baseline.
- MCR.ErSEun biotope: average density of sea fans, proportion of damaged or epiphytised branches: No significant deviation from baseline.

Table 4 Surveys and information used for the comparison of biotope and species data.

Year of survey	Survey title	Organisation	Survey type	Reference
1981	<i>Southwest Britain Sublittoral Survey. Final Report. Field Studies Council, Oil Pollution Research Unit, Pembroke. Nature Conservancy Council, CSD Report No. 326</i>	OPRU	Diving	Hiscock, K. 1981a.
1981	<i>Southwest Britain Sublittoral Survey. Field surveys of sublittoral habitats and species around Lundy, 16th to 29th July 1978 & 7th to 13th August 1979.</i>	OPRU	Diving	Hiscock, K. 1981b.
1984	<i>Lundy Marine Nature Reserve. Report of the 1983 Lundy Working Party.</i>	UCS	Diving	Hiscock, K. 1984a.
1997	Broad scale biological mapping of Lundy MNR with particular reference to reefs, EN report	BioMar	Remote video & <i>Roxann</i>	Sotheran, I & Walton. R (1997).

3.7 Other end products:

- Animal voucher specimens – these are lodged with the Marine Invertebrate section of the National Museum of Scotland, Chambers Street, Edinburgh;
- Pressed and preserved algal specimens – these are lodged with the Royal Botanic Gardens Edinburgh;
- 35 mm transparencies – English Nature holds a CD. C.M. Howson has the original transparencies which are available for loan;
- Hand-held videotapes, Digital and VHS format. These are held by the English Nature Devon Team;
- Drop-down videotapes, digital and VHS format. These are held by the English Nature Devon Team .

All of the above are available for reference or loan upon request to English Nature

4. Results

4.1 Video survey

Video drops were successfully made at 171 sites in the 6 sampling transects outlined in Figure 2. The figures in [Appendix 2](#) (Figure A2.1 - A2.6) present the individual transects in more detail.

Assessment of biotope distribution and diversity by drop-down video survey.

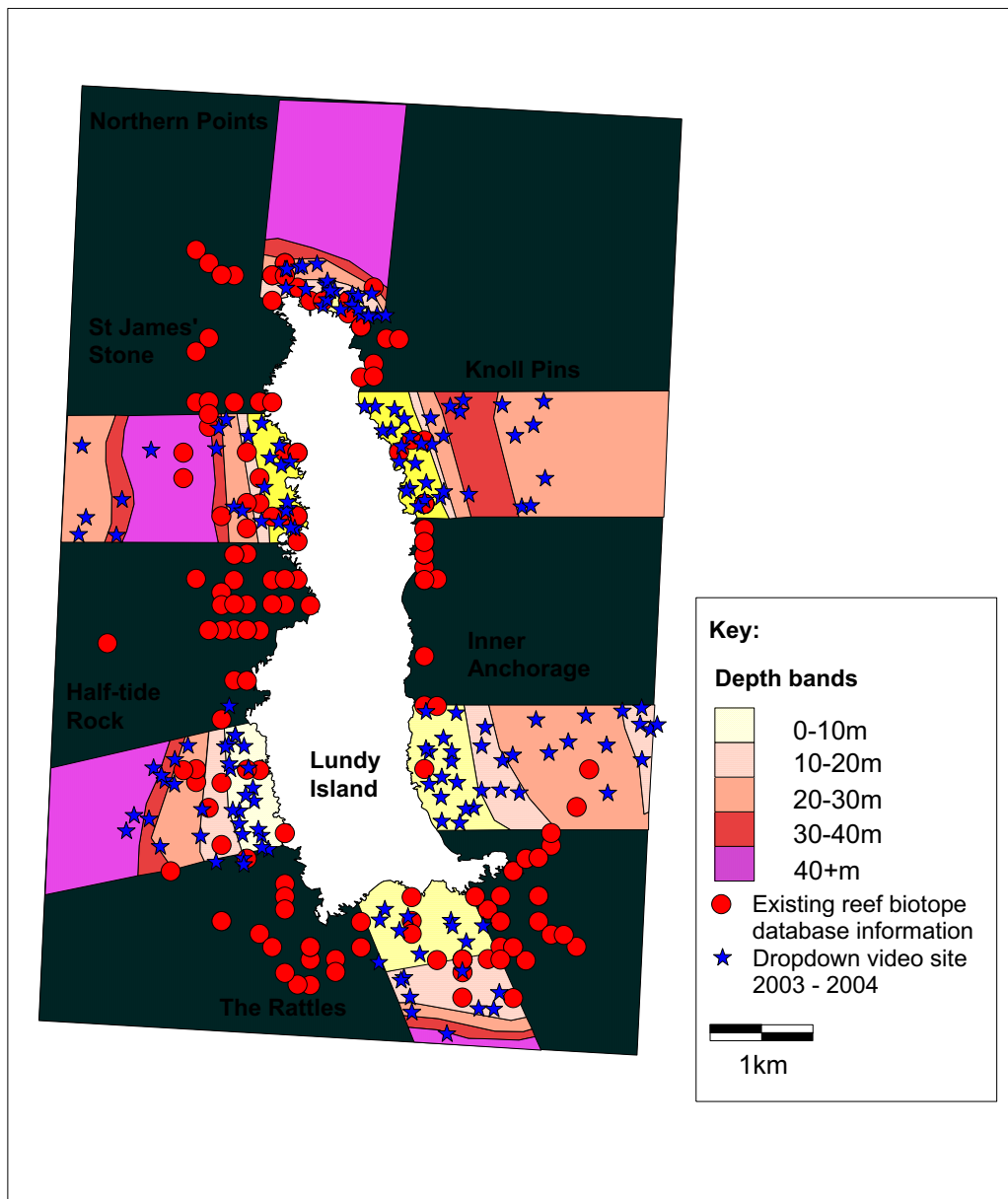
Feature: Kelp forest and subtidal bedrock and stable boulder communities.

Target: No decrease in distribution extent and range of biotopes from baseline.

37 discrete biotopes or higher-level substrate entities were recorded during the ‘drop-down’ surveys, of these, 30 were reef biotopes, many dominating large areas of seabed and others occurring as small patches within a dominant primary biotope. Mixtures of biotopes often occurred as a mosaic particularly where the substratum was heterogeneous. [Appendix 2](#) presents the detail of the video data matrices and an interpretation of the footage collected.

Figure 4 shows both the locations of the video drops within the transect areas and the distribution of the existing reef biotope records, from the Recorder database, within the cSAC as at 2003. Table 5 below lists the biotopes and higher level sediment codes recorded by dropdown video (this survey), as well as the biotopes, lifeforms and higher level sediment codes previously recorded by diving surveys and entered into the JNCC’s *Recorder* database as at August 2003.

Figure 4. Locations around Lundy with recorded biotope information.



The above figure gives an impression of the considerable amount of work that has been carried out on Lundy, but only the results of a few of the many surveys undertaken are represented above (1977, 1978-79, 1980 and 1983), as these are the surveys whose results had been entered into the *Recorder* database in 2003.

4.1.1 The Rattles: All video drops were all obtained in 2004 when some very calm weather was encountered during both June and September's surveys. The Rattles is exposed to the south and west and very strong tidal streams run across it during most states of the tide. Consequently sea conditions are frequently unacceptable for any video deployments. However 19 drops were achieved resulting in the following 15 biotopes / entities recorded:

- **Kelp:** LhypR.LoCh?, LhypFt, HalXK.
- **Foliose algal:** FoSwCC.

- **Hydroid / bryozoan / sponge:** ErSPbolSH, ErSEun, Flu.HbyS, AlcC, AlcMas.
- **Mussel bed:** MytHAs.
- **Scoured / grazed and encrusting:** CCMob, Oph, PomByC.
- **Infralittoral sediment:** IGS.
- **Circalittoral sediment:** CGS.

In the two shallow depth bands a dense kelp forest dominates, possibly with *Laminaria ochroleuca* present. It grows over a level reef, which is punctuated with frequent shallow gullies. These gullies are occasionally sandy floored but mainly paved with scoured cobbles and boulders. Steep gully sides are colonised by red algae amongst the kelp plants and on the fringes of the sediment areas *Halidrys siliquosa* is frequently present. From the infralittoral / circalittoral border and deeper into the circalittoral, large *Cliona celata* and *Pentapora* colonies dominate the reef fauna. Much of the deeper depth bands are dominated by gravel waves with little obvious life, however, at the west end of the transect, a dense mussel bed was recorded at 40m+ with abundant, large *Maia* and *Cancer* seen feeding voraciously on the mussels. [Figure A2.7](#) in Appendix 2 shows the transect and the dominant lifeforms recorded on the video.

4.1.2 Inner Anchorage: Figure 4 shows that little information had been archived in Recorder from within this transect area, prior to the ASML surveys, probably due to the predominance of sediment substrata in the vicinity. All video drops were obtained in June 2003 when strong westerly winds were encountered during the survey and all the video work was restricted to the east coast. Of all the video transects around Lundy the Inner Anchorage is probably the most protected from both the prevailing winds and waves, though strong southeasterly currents do flow across the site during the ebb tide. 35 video drops were achieved resulting in the following 10 biotopes / entities recorded:

- **Kelp:** HalXK, LhypLsac.Ft, XKScrR.
- **Foliose algal:** FoR, FoR.Dic.
- **Hydroid / bryozoan / sponge:** ErSPbolSH, SNemAdia.
- **Mussel bed:** None
- **Scoured / grazed and encrusting:** None.
- **Infralittoral sediment:** IGS, IMX.An.
- **Circalittoral sediment:** CMX.

The 3 kelp biotopes recorded reflect the sheltered nature of this transect, with the presence of *Laminaria saccharina* and the predominance of sediment adjacent to the reef outcrops that exist inshore. Most notable were the *Halidrys* forests along the edge of the reef and the 'fields' of the anemone *Cereus pedunculatus* found in the shallow sediment sites adjacent to the reef. Also worthy of note was the capturing on film of a red band fish out of its burrow during the day at IA25. This sighting was made in an area to the south of the last recorded location of the main population. [Figure A2.8](#) in Appendix 2 shows the transect and the dominant lifeforms recorded on the video.

4.1.3 Knoll Pins: All video drops were again obtained in June 2003 when strong westerly winds were encountered during the survey and all the video work was restricted to the east coast. Again the Knoll Pins video transect is protected from the prevailing wind, waves and tidal streams by the island itself. 34 video drops were achieved resulting in the following 11 biotopes / categories being recorded:

- **Kelp:** LsacX, HalXK, LhypLsac, LhypR.Loch.
- **Foliose algal:** FoR.
- **Hydroid / bryozoan / sponge:** ErSPbolSH, SnemAdia.
- **Mussel bed:** None
- **Scoured / grazed and encrusting:** None
- **Infralittoral sediment:** IMX.An, IMS, IMX.
- **Circalittoral sediment:** CMX.

The list above being almost identical to the Inner Anchorage site, reflects the similar physical and hydrographical nature of the 2 sites, dominated by mixed sediments with occasional patches of small boulders and low relief reef, with bryozoan, hydroid and sponge biotopes appearing. The presence of more *Laminaria saccharina* in the shallows, highlights the influence of sediment within this transect. Of particular interest was the observation of an octopus at KP20 and the presence of *Aipasia mutabilis* on the inshore reef at KP25, in the red algal zone below the kelp forest. Figure A2.9 in Appendix 2 shows the transect and the dominant lifeforms and entities recorded by the drop-down video.

4.1.4 Northern Points: Several drops were obtained in June 2003 on the eastern side of this transect, but the strong westerly winds prevented deployment beyond the lee of the island. Further deployments were obtained in 2004, but limited time prevented the deeper depth bands from being investigated. 25 drops were recorded, many of which were close in to the cliffs and frequently along the sediment reef interface, due to the strong currents and steep nature of the reef in the inshore section of this transect. The following 13 biotopes / categories were recorded:

- **Kelp:** Lhyp.TPk, HalXK.
- **Foliose algal:** FoR.Dic.
- **Hydroid / bryozoan / sponge:** Flu.HbyS, CorCri, ErSEun, SnemAdia, TubS, Urt.Cio, AlcMas.
- **Mussel bed:** None.
- **Scoured / grazed and encrusting:** Oph, PomByC.
- **Infralittoral sediment:** None.
- **Circalittoral sediment:** CGS.

Tideswept steep rugged reef dominates the areas close inshore at the Northern Points. The reef frequently descends onto sand in current-sheltered pockets, or scoured cobble and boulder fields in areas exposed to the strong east / west tidal flows. The reef itself was frequently colonised by *Flustra*, *Cellaria* / crisiidae turf and both *Cliona* and axinellid sponge colonies, as well as steep

rock faces with 'sheets' of *Corynactis* or urchin grazed patches. Where the rock graded gently into the sediment, frequent colonies of the sponge *Ciocalyptra penicillus* were seen, where the sand partially buried the rock surface. In the east of the transect *Ophiocomina* brittlestar beds were recorded, as well as the barren aftermath of recently deserted beds. Figure A2.10 in [Appendix 2](#) shows the transect and the dominant lifeforms / entities recorded on the video.

4.1.5 St James's Stone: All video work on the west coast was carried out in 2004 during the calm weather encountered. This transect is very exposed to severe wave action and strong tidal currents, hence the difficulty encountered in performing the survey in this vicinity. However, 25 video drops were achieved and the following 20 biotopes / categories recorded:

- **Kelp:** HalXK, Lhyp.TPk, LhypGz.Ft, LhypR.Loch?, XKScrR.
- **Foliose algal:** FoR, FoR.Dic, FoSwCC.
- **Hydroid / bryozoan / sponge:** Flu.HbyS, CorCri, ErSEun, ErSPbolSH, ScAsByH, SNemAdia, Urt.Cio, AlcMas
- **Mussel bed:** None
- **Scoured / grazed and encrusting:** CC.BalPom, CCParCar.
- **Infralittoral sediment:** IGS.
- **Circalittoral sediment:** CGS.

The granite reef is very rugged with sudden cliffs and deep, sheer-sided gullies and correspondingly a great diversity of conditions were encountered. This is highlighted by the diverse biotope list above. Tide swept kelp biotopes dominated the shallow depth bands with swards of red algae on the reef just below, as well as on the gully sides. The steeper faces encountered were occasionally covered with *Corynactis* and crisiid turf, or were scoured and grazed and on the remainder of the reef, hydroids, bryozoans, sponges and ascidians covered the rock surface. Coarse silty sand waves dominated the deeper depth bands with no reef encountered in the offshore areas. Figure A2.11 in Appendix 2 shows the transect and the dominant lifeforms recorded on the video takes.

4.1.6 Halftide Rock: Again this transect was only surveyed in 2004 due to the weather encountered in 2003. Exposed to the full force of the southwesterly winds and strong tidal currents the transect will always be difficult to survey in anything except in calm weather. However, 35 video drops were achieved and the following 16 biotopes / categories were recorded:

- **Kelp:** LhypR.Loch?, LhypR.Ft, LhypR.Pk, HalXK.
- **Foliose algal:** FoR, FoR.Dic.
- **Hydroid / bryozoan / sponge:** SCAs.ByH, ErSPbolSH, AlcMas, ErSEun, Urt.Cio, Flu.HbyS, CorCri.
- **Mussel bed:** None
- **Scoured / grazed and encrusting:** PomByC.
- **Infralittoral sediment:** IGS.
- **Circalittoral sediment:** CGS.

This transect is perhaps slightly less rugged than the St James’s Stone, but shelves steeply into the circalittoral and so less kelp forest was surveyed. The steep gully walls that were encountered were encrusted with sponges, crisiids and ascidians as well as small foliose red algae. At the circalittoral fringe cushion sponges such as *Cliona* and *Polymastia* were dominant and the seafan, *Eunicella verrucosa* was recorded infrequently. Deeper into the circalittoral, branching axinellids and *Pentapora foliacea* were abundant and adjacent to the sand / gravel boundary the sponge *Ciocalypa* was again often recorded at the rock / sediment interface. On gully floors, occasional pockets of scoured cobbles and boulders were also observed. Figure A2.12 in Appendix 2 shows the transect and the dominant lifeforms / entities recorded by the drop-down video.

Table 5. Biotopes previously recorded from within the cSAC and those recorded from the transects during the 2003-4 survey. (Biotope codes after Connor *et al.*, 1997).

Biotopes, lifeforms and higher sediment codes recorded in Lundy cSAC from the JNCC Recorder database (2003)			Biotopes and higher sediment codes recorded in the Lundy cSAC video transects by drop-down video equipment (2003-4)			
Ala.Ldig	XKScrR	XFa	LhypR.Loch	HalXK	TubS	IGS
Ala.Myt	HalXK	Urt	LhypFt	FoR	ErSEun	IGS Mob
Lhyp	SedK	IMS	Lhyp.TPk	FoR.Dic	ErSPbolSH	IMS
Lhyp.Ft	KfaR	IMX	LhypGz.Ft	FoSwCC	Urt.Cio	IMX
LhypGz.Pk	FoR	IGS	LhypLsac	CorCri	MytHAs	IMX.An
LhypR	CorCri	CGS	LhypLsac.Ft	Flu.HByS	Oph	CGS
LhypR.Ft	ByH	CMS	LhypR.Ft	SCAs.ByH	CCParCar	CMX
LhypR.Pk	Flu.SerHyd	CMU	LhypR.Pk	SNemAdia	PomByC	
Lhyp.TPk	ErSEun	CMX	LsacX	AlcMas	CC.BalPom	
Sac	ScupHyd		XKScrR	AlcC	CCMob	

Key:	Kelp biotope	Foliose algal biotope	Bryozoan, hydroid, sponge biotope	Mussel bed biotope	Scoured encrusting biotope	Infralittoral sediment	Circalittoral sediment
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4.2 Diving surveys to assess selected features within Kelp forest, subtidal bedrock & stable boulder and subtidal vertical & overhanging circalittoral communities.

- **Feature:** Kelp forest communities.
Target: Algal species composition: no significant deviation from baseline.

- **Feature:** Subtidal bedrock and stable boulder communities - MCR.ErSPbolSH, MCR.ErSEun, FaV and SCAs.ByH biotopes.
Target: Species composition: no significant deviation from baseline

A target of 12 quadrats per transect was deemed to be a minimum requirement, based on the results of previous monitoring trials in Loch Maddy (Western Isles) (Howson and Davidson, 1999) and Plymouth (Moore, 2000) and subsequent surveys under this

contract at Flamborough (Howson *et al.*, 2003) and the Fleet (Bunker *et al.*, 2004). This target was exceeded in all the transects studied, as shown below in table 6:

Table 6. Quantitative work achieved at each survey site.

Transect Site	N° of quadrats
Dead Cow Point	15 (0.25m ²)
Rat Island	14 (0.25m ²)
North Quarry Bay	14 (0.25m ²)
Knoll Pins (vertical)	19 (^0.1m ²)
Knoll Pins (horizontal)	13 (0.25m ²)
Gannet's Pinnacle (vertical)	34 (^0.1m ²)
Gannet's Bay	22 (0.25m ²)
Jenny's cove (vertical)	30 (^0.1m ²)
Battery Point	27 (0.25m ²)

The complete quadrat/species abundance results tables are presented in [Appendix 3](#). PRIMER 5 data manipulation and statistical analysis output are also presented in Appendix 3. These statistical analyses were used to address the questions posed in section 3.5.2. As a result Bray-Curtis similarity dendrograms and MDS ordination plots for all 9 transects studied were generated and are also presented in [Appendix 3](#). Species area curves produced by Primer for all 9 sites studied, imply that sufficient quadrats were recorded, to have adequately sampled the biotope in each case.

4.2.1 Transect quadrat data: degree of similarity

PRIMER 5-generated Bray-Curtis similarity matrices (Appendix 3) were produced for all sites studied, this was carried out on all data from each site and then again for 'core-data' quadrats once 'outliers' had been removed where necessary. The results indicated 5 transects where the studied quadrats shared species and abundance similarity levels of 50% and over and 4 transects where quadrat species and abundance similarity levels were 45% and over. A summary of the results is shown in Table 7.

Table 7 Inter-quadrat Bray-Curtis similarity levels within the diver transects.

Transect Site	Degree of similarity of all the quadrats	Degree of similarity of the quadrats with outliers removed
Rat Island – Kelp	All quadrats 43% similar	50%
Gannet's Bay – Kelp	All quadrats 36% similar	45%
Dead Cow Point – Kelp	All quadrats 52% similar	52% - no outliers
North Quarry Bay	All quadrats 42% similar	45%
Knoll Pins (horizontal)	All quadrats 54% similar	54% - no outliers
Knoll Pins (vertical)	All quadrats 42% similar	50%
Gannet's Pinnacle (vertical)	All quadrats 40% similar	48%
Jenny's cove (vertical)	All quadrats 42% similar	51%
Battery Point	All quadrats 38% similar	48%

4.2.2 Characterising species

Further analysis of the data, using the SIMPER program within PRIMER, produced lists of species that were responsible for the similarity within the quadrats and therefore some of the specific characteristics of the biotope at that location. A summary of the characteristic species for each transect is given in Table 8 below.

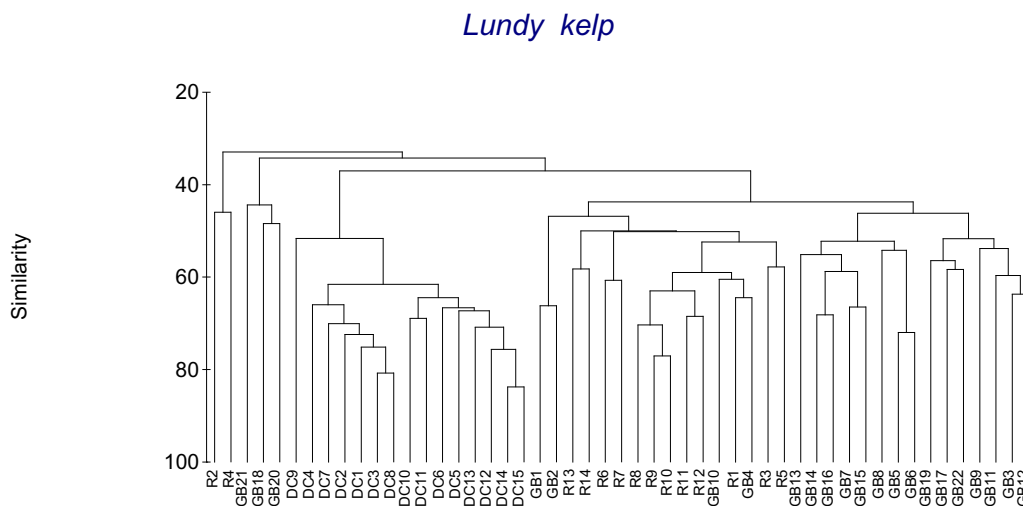
Table 8 Species whose presence and abundance caused 90% of the similarity within the quadrats.

Transect site and biotope	Species contributing to the dendrogram clusters.
Rat Island – LhypR.Ft	Enc. Corallines, <i>Heterosiphonia plumosa</i> , <i>Cryptopleura ramosa</i> , <i>Laminaria hyperborea</i> , <i>Meredithia microphylla</i> , <i>Rhodymenia pseudopalmata</i> , Sporelings red, <i>Polyneura bonniemaisonii</i> , <i>Halopteris filicina</i> , Enc. Rhodophyta, <i>Kallymenia reniformis</i> , <i>Callophyllis laciniata</i> , <i>L. hypborea</i> . (Medium), <i>Phyllophora pseudoceranooides</i> , <i>Rhodothamniella sp.</i>
Gannet's Bay - LhypR.Ft	Enc. Coralline algae, <i>Halopteris filicina</i> , <i>L. hyperborea</i> (medium), Sporelings red, <i>Delesseria sanguinea</i> , <i>Heterosiphonia plumosa</i> , <i>Callophyllis laciniata</i> , , <i>Polyneura bonnemaisonia</i> , <i>Laminaria hyperborea</i> , <i>Rhodymenia pseudopalmata</i> .
Dead Cow Point LhypT.Ft	<i>Delesseria sanguinea</i> , <i>Laminaria hyperborea</i> , <i>L. hyperborea</i> (medium), Enc. Corallines, <i>Cryptopleura ramosa</i> , <i>Schottera niccaensis</i> , <i>Dictyota dichotoma</i> .
North Quarry Bay - ErSEun	<i>Dictyota dichotoma</i> , <i>Dictyopteris membranacea</i> , <i>Phyllophora crispa</i> , <i>Axinella dissimilis</i> , <i>Polysiphonia elongata</i> , <i>Calliblepharis ciliata</i> , <i>Drachiella heterocarpa</i> , <i>Caryophyllia smithii</i> , <i>Axinella dissimilis</i> , <i>Rhodomela confervoides</i> , <i>Antithamnionella ternifolia</i> , Red sporelings, <i>Heterosiphonia plumosa</i> , <i>Crisia eburnea</i> , <i>Anomiidae</i> , <i>Verruca stroemia</i> , <i>Pomatoceros lamarcki</i> .
Knoll Pins (horizontal) – ErSPbolSH?	<i>Cellaria fistulosa</i> , <i>Crisiidae</i> , <i>Cellaria sinuosa</i> , <i>Epizoanthus couchii</i> , <i>Cliona celata</i> , <i>Nemertesia antennina</i> , <i>Stelligera stuposa</i> , <i>Hydrallmania falcata</i> , <i>Raspailia ramosa</i> , <i>Pentapora foliacea</i> , <i>Antennella secundaria</i> .
Knoll Pins (vertical) – FaV (Leptopsammia)	<i>Cellaria fistulosa</i> , <i>Crisiidae</i> , <i>Hymedesmiidae</i> , <i>Nolella stipitata</i> , <i>Halicnemis patera</i> , <i>Caryophyllia smithii</i> , <i>Scrupocellaria reptans</i> .
Gannet's Pinnacle (vertical) - CorCri	<i>Crisiidae</i> , <i>Corynactis viridis</i> , <i>Eurypon spp.</i> , <i>Cellaria fistulosa</i> , <i>Hymedesmiidae sp.</i> , <i>Nolella stipitata</i> , <i>Parazoanthus axinellae</i> , <i>Alcyonium glomeratum</i> , <i>Dysidea fragilis</i> , <i>Caryophyllia smithii</i> .
Jenny's cove (vertical) - ScAs.ByH	<i>Crisiidae indet.</i> , Bryozoan turf total, <i>Scrupocellaria reptans</i> , <i>Erythroglossum laciniatum</i> , <i>Dysidea fragilis</i> , <i>Dictyopteris membranacea</i> , <i>Dictyota dichotoma</i> , <i>Schottera necaeensis</i> , <i>Rhodymenia holmesii</i> , Encrusting orange bryozoa.

Battery Point – (upward facing) ErSPbolSH	<i>Dictyopteris membranacea</i> , <i>Rhodymenia holmesii</i> , <i>Drachiella heterocarpa</i> , <i>Crisiidae</i> , <i>Scrupocellaria sp.</i> , <i>Phyllophora crispa</i> , <i>Dictyota dichotoma</i> , <i>Polymastia</i> <i>boletiformis</i> , <i>Axinella dissimilis</i> , <i>Caryophyllia smithii</i> , Enc. Coralline algae, <i>Epizooanthus couchii</i> , <i>Nemertesia</i> <i>antenna</i> .
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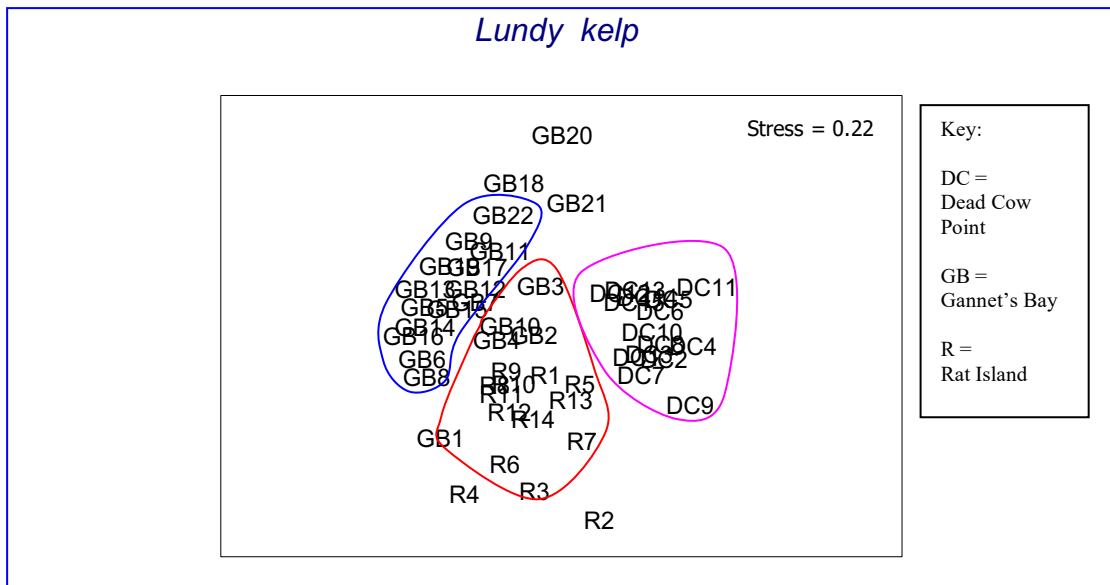
With the exception of the 3 kelp sites, no inter-site comparison of the quadrat data is warranted, as each site was chosen to represent a separate biotope or independent set of hydrographic, or geographical conditions. However the 3 kelp sites were run through the classification and ordination tools in PRIMER 5 together for interest, as a combined data set. The Bray-Curtis similarity dendrogram and the MDS plot produced following these tests, are presented below.

Figure 5 A Bray-Curtis similarity dendrogram for the 3 kelp sites combined.



The Dead Cow Point site (DC_) clearly separates off from the other 2 sites, even though there is a basic core similarity of 38% between all 3 sites, with the exception of 5 outlying quadrats. This is reinforced by the MDS plot shown in figure 6. Both the other 2 sites are also clearly distinguishable as separate entities within the dendrogram and even though they both represent ‘wavesheltered’ kelp forest on Lundy’s east coast, their differing hydrographic regimes result in 2, clearly distinguishable entities.

Figure 6 An MDS plot for the 3 Lundy Kelp sites studied

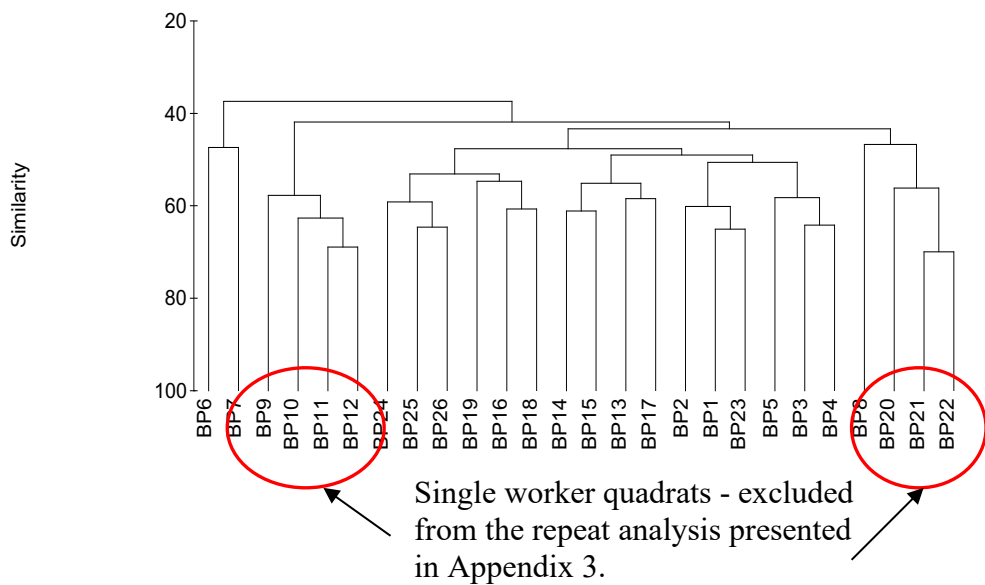


4.2.3 Worker variability

As each transect data set returned overall quadrat similarities of >45% it is highly unlikely that worker variability was an issue within this survey. All workers were competently recording the ‘core species’ at each site using the methodologies defined in this report. Scrutiny of the Bray-Curtis similarity dendrograms did however occasionally reveal a degree of clustering with low overall similarities, that appeared to be associated with individual workers, and although this does not constitute proof of recorder bias, where it occurred, then that worker’s data was excluded from the analysis. An example of this is presented in figure 7.

Figure 7. Bray-Curtis similarity dendrogram for Battery Point - all quadrats included.

Lundy: Battery Point - Horizontal



4.2.4 Comparison with previous data.

Although much work has been carried out around Lundy Island over the last 30 years, little of the data that has been generated has been entered onto the Agencies' Recorder database. Also, given the very specific nature of the task ASML were charged with, it seemed unlikely from the outset that these present and past data sets would be directly comparable. However, past data was found for the chosen ASML sites in all cases. Where these data were found to exist, the 2 or more data sets were compared at the 'species presence' level. All past 'Recorder data' tends to exist in abundance scale form within the data base and is not directly comparable to the ASML percentage cover data.

Table 9 A comparison of number of species recorded between past and present surveys for the sites studied by ASML.

Transect Site	Past data – species complement	ASML survey - species complement	% of 'Past data' species also recorded by ASML survey
Rat Island – Kelp algae	22	55	64%
Gannets' Bays – Kelp algae	28	61	64%
Dead Cow Point – Kelp algae	18	24	44%
North Quarry Bay	46 & 45	88	9%
Knoll Pins (horizontal)	36	60	44%
Knoll Pins (vertical)	36	40	50%
Gannet's Pinnacle (vertical)	18, 31 & 65	67	42%
Jenny's cove (vertical)	40	96	17.5%
Battery Point	47 & 32	62	32%

At all ASML sites the species complement recorded exceeded the 'past data' species complement level, even though ASML generally only worked in one or two 10m transects at each site. Where previously recorded species were considerably different to the ASML list, then an examination of the database records tended to show that the data had targetted different biotopes and the dissimilarity was therefore to be expected. The Knoll Pins, Gannet's Pinnacle, Jenny's Cove and Battery Point sites were only compared faunally as the ASM transects were generally carried out in the circalittoral or circalittoral fringe and so the algal records were not at all comparable.

4.2.5 Kelp forest structure.

The kelp forest structure was further investigated in 2004 at the 2 east coast sites of Rat Island and Gannet's Bay. A survey of the kelp species that create the forest was undertaken in multiple random quadrats in the vicinity of the transects. The results are presented in Appendix 3 and summarising data is presented in tables 10 and 11.

Table 10. Kelp forest structure at Rat Island – 33 x1m² quadrats

	Laminaria hyperborea	L. digitata	L. ochroleuca	Juvenile Laminaria spp.	Saccorhiza polyschides.
No. of plants recorded	295	6	17	26	41
Density - Plants / m ²	8.9	0.2	0.5	0.8	1.2

Table 11. Kelp forest structure at Gannet's Bay - 21 x 1m² quadrats

	Laminaria hyperborea	L. digitata	L. ochroleuca	Juvenile Laminaria spp.	Saccorhiza polyschides.
No. of plants recorded	352	0	22	66	31
Density - Plants / m ²	16.8	0.0	1.0	3.1	1.5

Both sites can be seen to have very similar species compositions and ratios. The most important ratio from a monitoring perspective, possibly being the *Laminaria hyperborea* : *L. ochroleuca* ratio of 18:1 and 17:1 respectively.

4.2.6 Sea fan density and epiphytisation on the North Quarry Bay boulder slope.

Although this work was removed from the work programme at the time of mobilising for the 2003 surveys, the failure of the Lundy RIB during the diving survey presented an opportunity to collect data from the North Quarry Bay seafan beds.

- **Feature:** MCR.ErSEun biotope.

Target: Average density of sea fans, proportion of damaged or epiphytised branches: No significant deviation from baseline.

Figure 7 Location of ‘Seafan population assesement’ dive sites.



As described in section 3, two dives were undertaken on the boulder slope at the 12.5 – 13.5m bCD depth contour and each diver counted and assessed all seafans encountered within a series of contiguous, 10m x 2m, quadrats. The data collected during this survey is presented in full in Appendix 3.

Table 12. Summary data from the seafan survey.

Attribute	Statistic
Area of seabed surveyed	880m ²
Total no. seafans recorded	117
Average density per 10m ²	1.33
% Unepiphytised	32%
50% epiphytised	16%
100% epiphytised	52%
Condition index (approx)	2.93

4.2.7 Comparison with previous data.

During an MCS working party in 1995 a figure for the density/abundance of seafans off Lundy’s east coast was obtained by volunteer divers who laid out a series of 10 m x 10 m quadrats on the sea bed at three sites, within the depth band of 13-15 m BCD (Irving 1995). The number of sea fans within each 10 m

x 10m quadrat was then counted and their densities per **10 m²** calculated: The Quarries 7.7 per 10 m² (i.e. 77 fans counted within the quadrat) Gull Rock 10.5 per 10 m², NNW of Gannets' Rock ~3.0 per 10 m². It is interesting to note that Hiscock (1975b) also records the average abundance of *Eunicella* at any one site around the island to be about 1 per 10 m².

This ASML survey recorded an average seafan density of 1.33 per 10 m² in the vicinity of The Quarries. This value being closer to the value recorded by Hiscock 1975, than to the MCS Working Party figure. However, it must be said that these results are very site specific and do not represent 3 values from the same location at 3 points in time, but from 3 separate locations at 3 points in time.

The condition of Lundy's sea fans has been of concern for a number of years now. Irving (1995) initiated a study of the condition of sea fans by using a simple scoring system (1 = pristine or <5% cover by weed or epizoic organisms; 2 = <20% cover; 3 = 20-50% cover; 4 = 50-80% cover; and 5 = >80% cover). This study was continued on each of the group's annual visits until 2001. A total of 406 sea fans were examined to determine their condition between 1997 and 2001, yielding an **average condition score of 2.9 for Lundy sea fans during this period**. The data show a general improvement in the overall condition of fans at all sites from 1997 to 1999, but then a decline from 1999 to 2001. This pattern was consistent at all sites around the island where sea fans were counted (Irving & Northen 2004).

Although the ASML survey recorded the 'degree of fouling' in a slightly different manner in 2003, a simple extrapolation of the ASML data returns a Condition Index of 2.93, which concurs with the MCS Working Party value given above.

4.2.8 Photographic monitoring of the seafans North of Quarry Bay.

On a dedicated photographic dive at the edge of the reef on the north side of Quarry Bay, all the seafans encountered were photographed. The Dive started at 11m bCD and continued northwards from NGR SS14116 – 45246, photographing each seafan encountered at that depth, until the film was finished. 32 seafans were photographed and these are presented in Appendix 3. The photographs have not been analysed in this report, but represent a resource should alternative studies require them.

5. Discussion

5.1 Distribution, extent and range of biotopes monitored by drop down video within 6 delineated transects.

Monitoring within the 6 video transects on a regular basis will always prove to be a difficult task due to Lundy's unique geographical location, testing hydrographic conditions and unforgiving seabed topography. The 171 video drops made during this survey within the transects therefore represent a considerable undertaking.

Inspection of figure 4 and the interpretive figures A2.7 – A2.12 in Appendix 2 indicate how much effort was involved in this study. The knowledge base for the Target: 'No decrease in the distribution, extent and range of biotopes from baseline' has now been considerably expanded, particularly within the Inner Anchorage, Knoll Pins and St James's Stone transects where data was obtained out to the boundary of the cSAC. On paper a list of 30 reef biotopes identified is relatively impressive and compares very favourably with the existing database information of only 22. However this must be tempered by the fact that so much of the existing Lundy information is inaccessible as a resource-base for this target, by not being in biotope form, or for the large part not being in the Recorder Database. So it is highly likely that 22 recorded reef biotopes is probably well below the true state of knowledge of the existing situation. Similarly Lundy's spectacular west coast seabed topography combined with its 'aggressive' hydrographic regime tends to accentuate the weaknesses of the dropdown methodology, in that both vertical cliff and tideswept biotopes are inevitably under recorded as biological detail is very difficult to obtain in these conditions without putting equipment, people and boats at risk. The technology is also not yet advanced enough to give adequate rapid focussing when the video equipment is moving in strong tidal streams and hence the ability to accurately identify biotopes is consequently reduced when pictures are blurred.

The results of this survey, when combined with the new bathymetry work (*HydroSurveys*, 2005), will form a baseline for the cSAC future monitoring. Indeed it may be possible to reduce transect length and sampling effort in the future, in the sedimentary areas and then further efforts could be made to cover unknown ground in the Northern Points, Halftide Rock and the Knoll Pins transects. Also an increase in slack-water targetting of the tideswept, north, west and south coast reef areas, will undoubtedly allow further biotopes to be elucidated. An example of where this strategy would increase the knowledge base, would be in targetting the kelp forests to pin-point the *Laminaria ochroleuca* distribution, a feat only possible by drop-down video in slack water conditions.

A drawback highlighted by this project, was the inaccuracy of the bathymetry information initially supplied, as its use in the project planning stages prior to the field survey resulted in the poor targetting of the 'depth bands' in the field. Table 12 shows the actual coverage of the survey in relation to the the depth bands, measured *in situ* and the theoretical coverage identified in the project planning stages.

Table 12. Number of video drops undertaken per depth band within the transects

Depth Band	0-10m	10-20m	20-30m	30-40m	40+m
Transect	Actual No. of drops / Planned No. of drops				
The Rattles	9 / 10	2 / 7	4 / 1	3 / 0	1 / 1
Inner Anchorage	10 / 15	15 / 6	9 / 7	- / 6	- / -
Knoll Pins	6 / 17	10 / 2	12 / 9	6 / 4	-
Northern Points	3 / 8	3 / 9	8 / 7	10 / 0	1 / 0
St James's Stone	6 / 12	9 / 2	6 / 6	2 / 4	3 / 1
Halftide Rock	11 / 18	14 / 5	6 / 4	5 / 4	- / 3

Table 12 highlights the poor quality of the existing knowledge e.g. in The Rattles transect; 7 drops were planned in the 10-20m depth band, whereas the reality of the situation shown in Table 12 was that only 2 drops were surveyed in this depth band and there are many other examples where this error occurred.

The new hydrographic information soon to be available for Lundy, should rectify this knowledge gap and will enable much more accurate targetting of the bands in future.

Other points of interest noted from the video transect results are outlined below:

- The deepwater mussel bed (40+m) seen in The Rattles transect, populated by abundant large crabs (*Maia* and *Cancer*) feeding voraciously was unique within the cSAC and not seen in any other transect.
- The observation of a red-band fish in its burrow at IA25 within the Inner Anchorage transect, possibly extends the area of known red-band fish habitation.
- The presence of fields of *Cereus pedunculatus* (IMX.An) in both the Inner Anchorage and Knoll Pins transects are fine examples of an uncommon biotope.
- The frequent records of *Ciocalypa penicillus* (Urt.Cio) recorded at the Northern Points, St James's Stone and Halftide Rock at the sediment / reef interface are also good examples of an uncommon biotope.
- The sheer variety of the reef biotopes recorded in the St James's Stone transect; 20 biotopes / entities in 25 drops is impressive and as many of these drops were filmed in strong currents, there are quite probably more to be recorded, if benign survey conditions can be targetted more accurately.

The results of the video survey creates a list of biotopes from within 6 delineated transects around Lundy and this list can be monitored against in the future. The list currently extends the knowledge base of the range of biotopes entered in the *Recorder* database by approximately 36%. However the methodology has obvious limitations and has limited value when attempting to answer the questions of distribution and extent of biotopes throughout the whole of the SAC, being constrained by the boundaries of the transects.

5.2 Kelp forest algal community - species composition: No significant deviation from baseline.

The algal species composition results for the kelp forest sites studied at Rat Island, Gannet's Bay and Dead Cow Point ([Appendix 3](#)) provide good baseline data from which to monitor in the future. When past species presence data is compared with the ASML data (Table 9) then there is an overlap of approximately 50% of the previously recorded species.

All three ASML transects were run along gently sloping bedrock. Each recorded significantly more species of algae in the kelp forest than had been previously recorded at these locations and this was in spite of the fact that kelp stipe algae are ignored in the BSDV contract methodology and this community of algae are present in the 'previous data records'.

In the cases of Rat Island and Gannet's Bay, then the increased number of species recorded was over 100% more than had been recorded on previous surveys in the database and for Dead Cow Point, 33% more species were recorded.

This simple fact would appear to be a vindication of the stratified random quadrat technique, which coupled with a 'specimen collection training dive' with post dive work-up and the production of a site specific checklist / waterproof recording form for each transect, appears to pay dividends in terms of the quality of data collected.

The species area curves for the 3 kelp sites appear to indicate that enough quadrats were sampled at all sites. However in order to be sure of a successful result in future, 15-20 x 0.25m² should be the requested target.

Of interest amongst the records were the species *Carpomitra costata* and *Laminaria ochroleuca* which were both recorded in the Rat Island transect and are species near their northern limit on Lundy. Similarly *Grateloupia dichotoma* was recorded in Gannet's Bay, a species also approaching its northern limit .

In 2004 the poor weather encountered during the diving survey, enforced further east coast work for several days and so the 'kelp forest structure' dives were carried out at the Rat Island Gannet's Bay sites. Both these east coast kelp forests returned similar values for the ratio of *Laminaria hyperborea* : *L. ochroleuca* of 18:1 and 17:1 respectively even though the forest was twice as dense in Gannet's Bay. Whether this is a stable ratio will be of interest in future monitoring events.

5.3 Subtidal bedrock and stable boulder communities (MCR.ErSPbolSH biotope): Species composition: No significant deviation from baseline.

The *ErSPbolSH* biotope studied at Battery Point was conducted without deployment of the transect line, as the method was deemed inappropriate for the rugged seabed topography. Quadrats were dropped at random onto upward facing surfaces of large boulders and bedrock outcrops. 62 faunal species were recorded comparing well with the 47 species found in the database and many of these may have been recorded from other shallower biotopes. Algae were ignored in this comparison as there could be no control over the depths at which the species list comparisons are made and by

including all fauna, then inevitably some of the database faunal records will have arisen from alternative biotopes.

The biotope was dominated by a hydroid / bryozoan turf of *Nemertesia antennina*, *Crisiidae* and *Scrupocellaria spp.*, with both erect and cushion sponges present, these typically being *Polymastia boletiformis* and *Axinella dissimilis*. The rock surface was frequently colonised by the anthozoans, *Caryophyllia smithii* and *Epizooanthus couchii*. Several foliose red algal species were also frequently recorded, the dominant species being *Dictyopteris membranacea*, *Rhodymenia holmesii*, *Drachiella heterocarpa*, *Phyllophora crispa* and *Dictyota dichotoma*. Occasional records of *Pentapora* and *Eunicella* indicate how close this biotope is to the MCR.ErSEun - seafan biotope.

With the pool of analysis quadrats reduced to remove possible 'recorder sampling bias' in this biotope 13 quadrats analysed at Battery Point was barely an adequate number (see species area curve – Appendix 3) and a target of 15-20 x 0.25m² quadrats should be adopted for this biotope in future.

5.4 Subtidal bedrock and stable boulder communities (MCR.ErSEun biotope): Species composition: No significant deviation from baseline.

The results of the quadrats surveyed at The Knoll Pins (horizontal bedrock reef) transect represent a good example of this biotope. The 60 faunal species recorded within the 13 quadrats showed the greatest degree of similarity of all the transects studied (54%).

A similar biotope to the previous MCR.ErSPbolSH, the MCR.ErSEun biotope was dominated by a bryozoan turf (*Cellaria fistulosa*, *Cellaria sinuosa* and *crisiidae*), with branching sponges (*Raspailia ramosa*, *Stelligera stuposa*), cushion sponges (*Cliona celata*) and large erect hydroids (*Nemertesia antennina*, *Hydrallmania falcata*), Ross corals and *Epizooanthus couchii*, with the occasional *Eunicella verrucosa* (pink seafan) as well.

The results compare well with the historical database entries for the Knoll Pins (36 faunal species and 44% similarity with previously recorded species lists) and the transecting area is also easily located, hence future monitoring surveys will find this a very rewarding study site. Again in order to allow for some poor data, a target of 15-20 x 0.25m² quadrats should be adopted for this biotope in the future.

Another similar, shallower biotope was also surveyed at North Quarry Bay at the base of the large jumbled boulder slope. This community was dominated by both sponges and pink seafans but was also colonised by considerable foliose algal growth (e.g *Dictyota dichotoma*, *Dictyopteris membranacea*, *Phyllophora crispa*, *Polysiphonia elongata*, *Calliblepharis ciliata*, *Drachiella heterocarpa*, *Antithamnionella ternifolia*, *Rhodomela confervoides* and *Heterosiphonia plumosa* were the dominant species) including *Carpomitra costata*. This particular community appears to lie between the MCR.ErSPbolSH and MCR.ErSEun biotopes with abundant erect and cushion sponges (e.g *Axinella dissimilis*, *Stelligera rigida*, *Stelligera stuposa*, *Polymastia boletiformis*, *Polymastia mamillaris*, *Pseudosuberites sulphureus*) with *Caryophyllia smithii* frequently present on the sides of the boulders and a *Crisia eburnea* and *Crisidia cornuta* turf lying beneath the algal sward.

The quadrats were deployed in a similar fashion to Battery Point, with no transect line as it would have been inappropriate to the chaos. The quadrats subsequently analysed for this biotope returned a respectable Bray-Curtis percentage similarity score of 45%, with 88 species being recorded overall. Historically data appears to be lacking in the JNCC database for this community as a comparison with Recorder data returned on a 9% overlap of species and examination of the data appeared to show that the Recorder data was drawn from different biotopes.

The species area curve for the data appears to indicate that 12 quadrats is just adequate as a sample size and perhaps future monitoring events should aim to analyse at least 15 quadrats, providing the data is of a good quality.

5.5 Subtidal bedrock and stable boulder communities (FaV biotope): Species composition: No significant deviation from baseline.

The Knoll Pins (Vertical) transect possibly represents an example of this biotope group – Faunal turf on deep vertical rock. A patchy crissiid / *Scrupocellaria reptans* / *Cellaria* spp. turf with sponge crusts (*Hymedesmiida* and *Halicnemia patera*) and patches of anthozoan species, typically *Caryophyllia smithii*, *Corynactis viridis*, *Leptopsammia pruvoti* and *Epizooanthus couchii*.

This biotope is again easily locatable on the outer face of the outer knoll Pin and with outliers removed, returned a creditable quadrat Bray-Curtis similarity measure of 48%. When compared with the historical database records, a 50% species similarity is also a good agreement and so these records appear to form another acceptable baseline from which to monitor in the future. However, as with the Battery Point site the species area curve indicates that the 19 x 0.1m² quadrats is probably only just enough in terms of the number of samples obtained and in future perhaps 20-25 x 0.1m² quadrats should be the target for repeat analyses.

5.6 Subtidal bedrock and stable boulder communities (CorCri biotope): Species composition: No significant deviation from baseline.

The Gannet's Pinnacle transect was undertaken in 2003 when the weather had ruled out work on the west coast. It was selected as another fine example of a vertical rock biotope dominated by fauna and in particular large patches of encrusting sponges (*Eurypon* spp, *Hymedesmiidae* sp³, *Dysidea fragilis*) and sheets of anemones (*Corynactis viridis*, *Parazoanthus axinellae*, *Caryophyllia smithii*, *Alcyonium glomeratum*), with patches of bryozoan turf (*Crisiidae* and *Cellaria fistulosa*).

Another well known dive site, this transect was run very carefully along the spectacular north wall of Gannet's Pinnacle, making a very good monitoring location, being completely sheltered from the northerly flowing currents of an ebbing tide. 34 x 0.1m² quadrats were hung carefully with 'bungees' from crevices in the rockface, which resulted in samples with an overall Bray-Curtis similarity of 48% and a species list of 67 fauna. The Species area curve indicates an adequately sampled biotope and an acceptable Bray-Curtis similarity measure of 42% with the historical data records. A target of 30 x 0.1m² quadrats should be stipulated as a minimum requirement for

³ These records include a new species currently under investigation -.

future monitoring events and extreme care should be taken at this site as much of the fauna is of a very delicate nature, in particular the *Leptopsammia pruvoti* and the *Alcyonium glomeratum* colonies.

**5.7 Subtidal bedrock and stable boulder communities (SCAs.ByH biotope):
Species composition: No significant deviation from baseline.**

The Jenny's cove transect, undertaken in 2004 was dominated by sponge crust species e.g. *Pseudosuberites sulphureus*, *Stelligera rigida*, *Haliclona viscosa*, *Aplysilla sulphurea*, *Hemimycale columella*, *Phorbas fictitius* and *Dysidea fragilis*, were all species commonly recorded within a total of at least 31 sponge species⁴. The steeply sloping and vertical gully side along which this transect was layed was also covered with a bryozoan turf dominated by *Scrupocellaria reptans* and *crisiidae indet.* A sparse sward of foliose red and brown algae dominated by *Erythrogloussum laciniatum*, *Dictyopteris membranacea*, *Dictyota dichotoma*, *Schottera necaeensis* and *Rhodymenia holmesii*, also characterised the biotope where the slope of the gully side lessened slightly.

30 x 0.1m² quadrats were surveyed and 96 species were recorded with a 51% Bray-curtis similarity. The data compares relatively poorly with the database records from Jenny's Cove (17.5% Bray-Curtis similarity) but this is perhaps not surprising given the unique amount of effort expended on the sponge community in 2004. Also the 'old' Jenny's Cove data appears to include shallow water algae and is possibly not from the same biotope and will therefore not be directly comparable.

The species area curve appears to indicate that 25 x 0.1m² quadrats adequately sampled the biotope and therefore this value should remain the target number of samples in future surveys of this biotope.

5.8 Seafan density and condition in the Quarries area

As described in 4.2.6-4.2.7 the ASML work on the seafans north of Quarry Bay returned an average density of 1.33 seafans per 10 m² in The Quarries area. This figure concurs with Dr Hiscock's 1975 work and is somewhat lower than the Lundy Working Party 1995 figure of 7.7. The specimens surveyed possessed a 'condition index' of 2.93 which concurs closely with the MCS Lundy Working Party's 1995 figures of 2.9. These values are interesting as they possibly appear to indicate a relatively static situation, when much recent publicity has indicated that the situation with regard to seafan density and fouling is a deteriorating one. However these were only very limited studies and far more work is required to obtain an accurate picture for the whole of the SAC.

⁴ Small amounts of each sponge specimen were collected, bagged and labelled *in situ* and identifications were confirmed in the laboratory and later confirmed by Dr Bernard Picton of the Ulster Museum.

6. References

- Bunker, FStPD, Mercer, TM, Howson, CM. (2003). Chesil and the Fleet cSAC Fleet Lagoon and Tidal Rapids Survey 15th – 22nd July 2002. A report to English Nature from Aquatic Survey and Monitoring Ltd.
- Connor, D.W., M.J. Dalkin, T.O. Hill, R.H.F. Holt & W.G. Sanderson. 1997. *Marine Nature Conservation Review: marine biotope classification for Britain and Ireland. Volume 2. Sublittoral biotopes. Version 97.06*. Peterborough, Joint Nature Conservation Committee.
- Davies, J. *et al.* (eds). 2001. *Marine Monitoring Handbook*. UK Marine SACs Project. Peterborough, Joint Nature Conservation Committee.
- Health and Safety Commission. 1998. *Scientific and Archaeological Diving Projects: The Diving at Work regulations 1997. Approved Code of Practice and Guidance – L107*. The Stationery Office.
- Hiscock, K. 1975b. The marine fauna of Lundy. Coelenterata. *Annual Report of the Lundy Field Society*, 25, 20-32
- Hiscock, K. 1981a. *South-West Britain Sublittoral Survey. Final Report*. Field Studies Council, Oil Pollution Research Unit, Pembroke. Nature Conservancy Council, CSD Report No. 326
- Hiscock, K. 1981b. *South-west Britain Sublittoral Survey. Field surveys of sublittoral habitats and species around Lundy, 16th to 29th July, 1978 & 7th to 13th August 1979*. Field Studies Council, Oil Pollution Research Unit, Pembroke. Nature Conservancy Council, Huntingdon (unpublished report)
- Hiscock, K. 1984a. *Lundy Marine Nature Reserve. Report of the 1983 Lundy Working Party*. Underwater Conservation Society. World Wildlife Fund / Lundy Field Society
- Holt, R.H.F. 1998. Joint Nature Conservation Committee, English Nature, Scottish Natural Heritage, Countryside Council for Wales: Diving Rules. *Peterborough, Joint Nature Conservation Committee*.
- Howson, C., Mercer, T and Bunker, F. 2003. Flamborough Head Sublittoral Monitoring 2002. A report to English Nature by Aquatic Survey and Monitoring Ltd.
- Howson, C.M. & Davison, A. 1999. Trials of monitoring techniques using divers and ROV in Loch Maddy cSAC, North Uist. UK Marine SACs Project. *Scottish Natural Heritage Research Report*.

Irving, R.A. 1995. *Report of the Marine Conservation Society Working Party to the Lundy Marine Nature Reserve, 3-10 June 1995*. Unpublished report to English Nature (Exeter). Marine Conservation Society

Irving, R.A. & Northen, K.O. 2004. *Report of the MCS Working Parties to Lundy, 1997-2001*. Unpublished report to English Nature (Exeter).

Moore, J. 2000. Development of a monitoring programme and methods in Plymouth Sound cSAC: application of diver techniques – 1999. A report to English Nature from Cordah Ltd.

Sotheran, I. & Walton, R. 1997. *Broad scale biological mapping of Lundy MNR with particular reference to reefs*. English Nature (English Nature Research Report, 231).

Appendix 1. Drop-down video

1. Drop-down Video deployment protocol and equipment

1.1 Sampling procedure

A set of random deployment positions was generated within each depth band prior to the survey. These provided sample stations which were sampled in 'east-west' or 'north-south' sequence to ensure that the positions remained random. If for some reason a station could not be sampled effectively, for example due to the strength of the tide or poor visibility at the seabed, the video was dropped at the next station in the sequence. It was intended that each tow should be approximately 100 m in length and the camera was allowed to drift along above the seabed for between 2 and 5 minutes to achieve this. However the environmental conditions prevailing during the survey determined to a large extent the duration of each drop, as weather and sea conditions were poor, there was generally low underwater visibility and, in some parts of the site, the terrain was very rugged with deep rock gullies which threatened to snag the camera system. In these situations, the camera was kept near the seabed until it was judged that there was enough footage to enable the biotope to be identified. If the seabed was mixed, the tows were generally longer within the safe limits of the operating conditions. The intention to move to the next depth band or transect once no new biotopes had been discovered in the last 3 drops was carried out at the Inner Anchorage and Knoll Pins, St James's Stone and Halftide Rock but at the other 2 transects, Northern Points and The Rattles, time and or tidal conditions prevented this from happening and the sampling was cut short.

1.2 Data analysis

Whilst the video tows were underway, notes were made on the species visible and the seabed type by one of the biologists observing the viewing screen. This enabled an initial assessment of the biotopes present. Subsequent laboratory analysis of the tapes involved reviewing each tow more thoroughly to identify as many species as possible and to produce a more detailed description of the seabed. In a number of cases, the low level of information retrievable from the tapes meant that the site could fit into any one of several biotopes. In these cases, the nearest fit from the data compiled in the area summary (Brazier et al. 1998) was used. If this was not possible, then the biotope was assigned to a higher level in the classification. This happened with the sandy sites where very few animals were seen and the sites were classified as CGS (Circalittoral gravels and sands). Mosaics of biotopes were recorded at several sites where there was no clear spatial division between the biotopes present.

Approximately 20 % of the video tows were reviewed by a second ASML biologist by way of quality control. This was carried out to ensure accuracy and consistency of biotope identification. The sites selected for review, included examples of each biotope identified and a number of sites where there was a query over the classification.

1.3 ASML Drop-down video equipment

The ASML drop-down video system was modelled on the SNH equipment. It is based on a 3CCD Sony DRV 950 digital video camera in an aluminium housing rated to 130 m. There is an 110 m multi-core umbilical that allows the system (camera and lights) to be controlled from the surface. The digital video footage is recorded in the camera and simultaneously relayed to the surface via the umbilical where it is viewed and also recorded on a Sony mini digital VCR (GV-D1000E). The surface control box provides the remote control facilities over the camera, the surface video recorder and the lights. The lights are powered by an independent surface 110v system and so do not rely on battery power. It is possible to toggle between the camera and recorder and also to record on either. Hence an instant back up can be obtained during the filming.

Appendix 2 Details of the deployment and results of the Drop-down video survey

1. Deployment positions

The following figures show the details of the drop-down video transects around the Island of Lundy.

Figure A2.1 Video drop locations within the Inner Anchorage fixed transect.

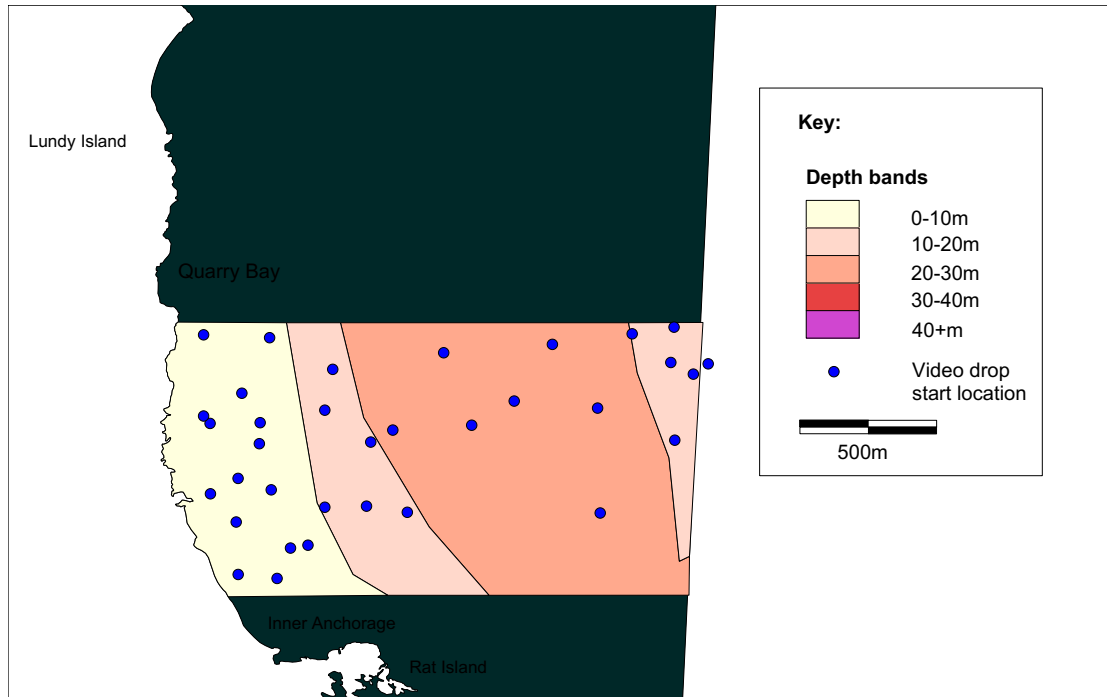


Figure A2.2 Video drop locations within the Knoll Pins fixed transect.

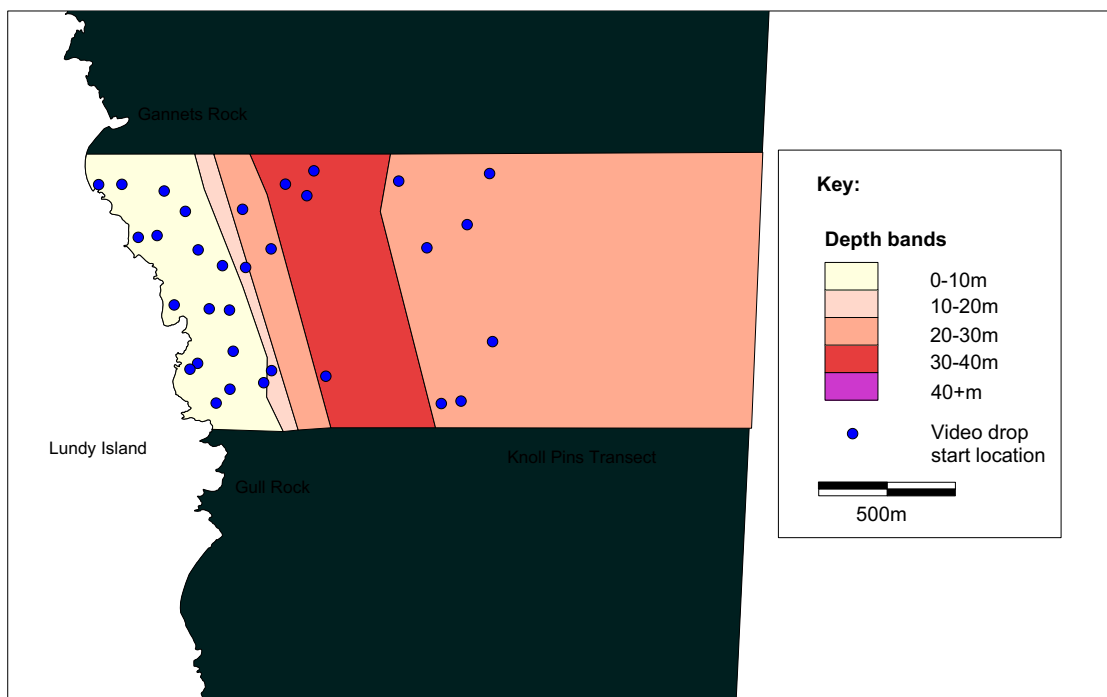


Figure A2.3 Video drop locations within the Northern Points fixed transect.

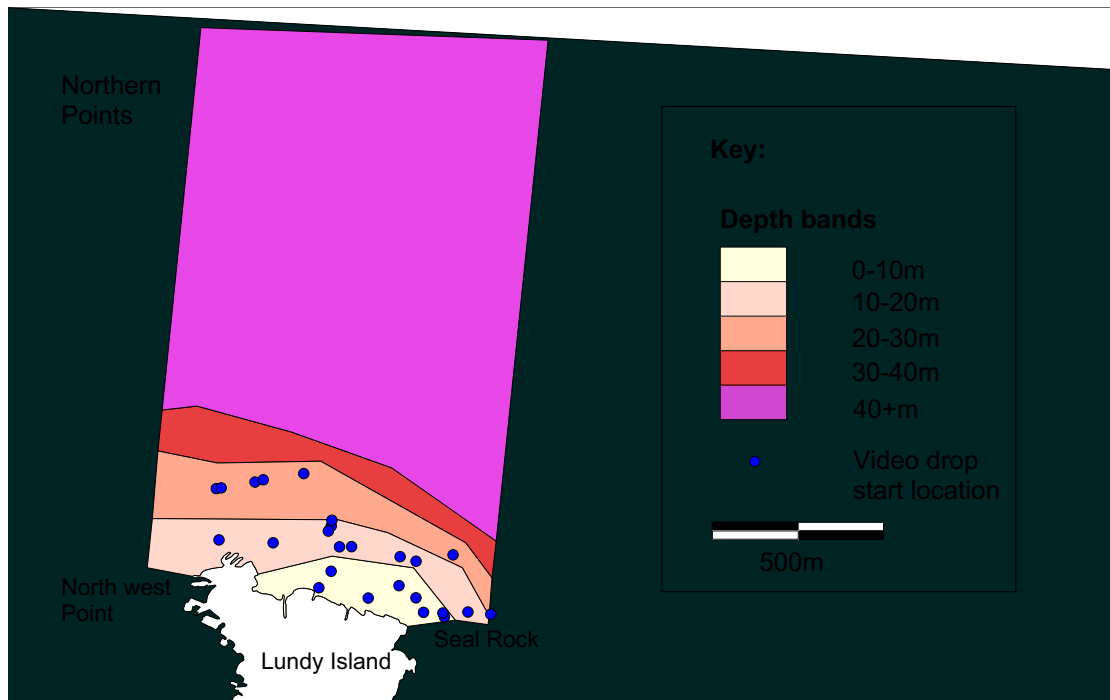


Figure A2.4 Video drop locations within the St James's Stone fixed transect.

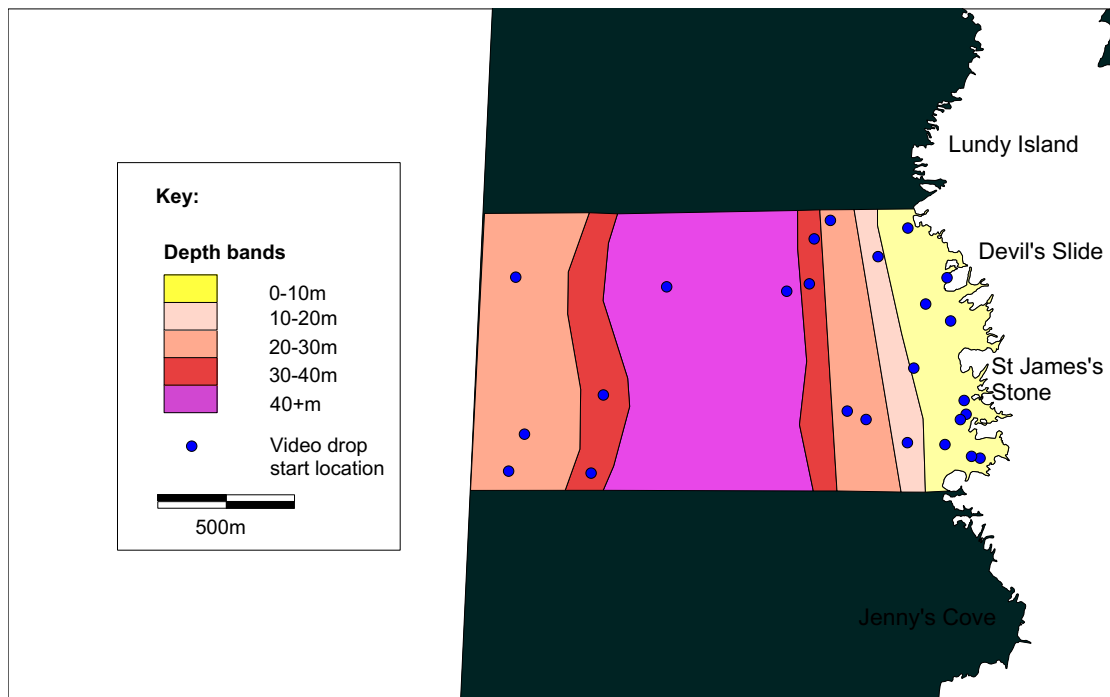


Figure A2.5 Video drop locations within the Halftide Rock fixed transect.

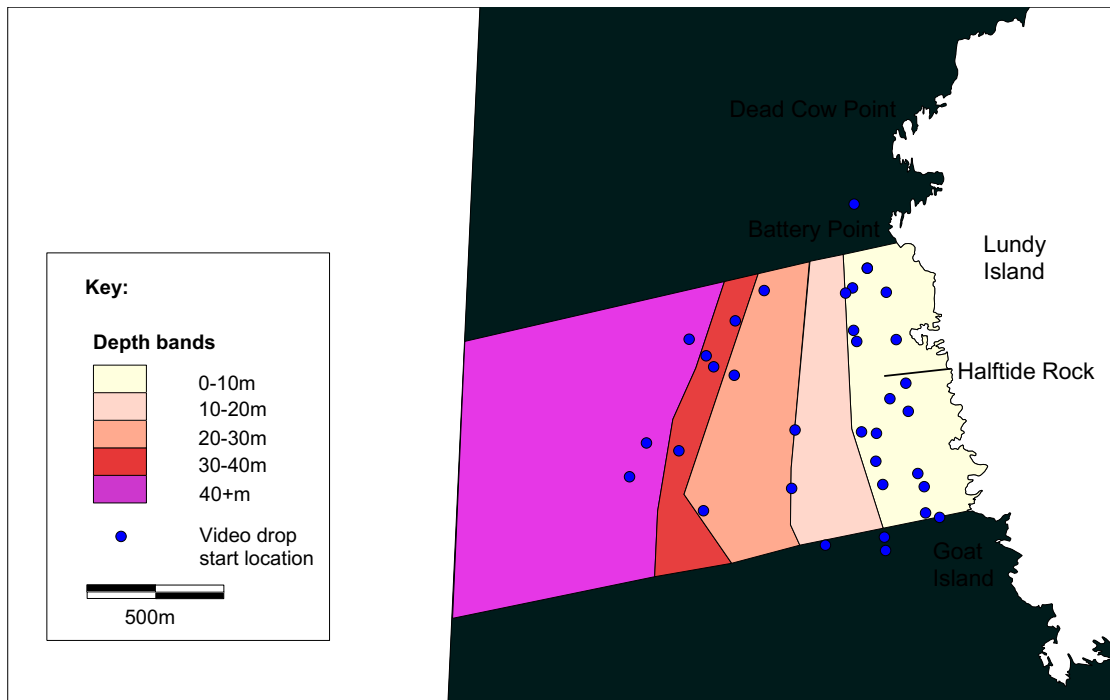
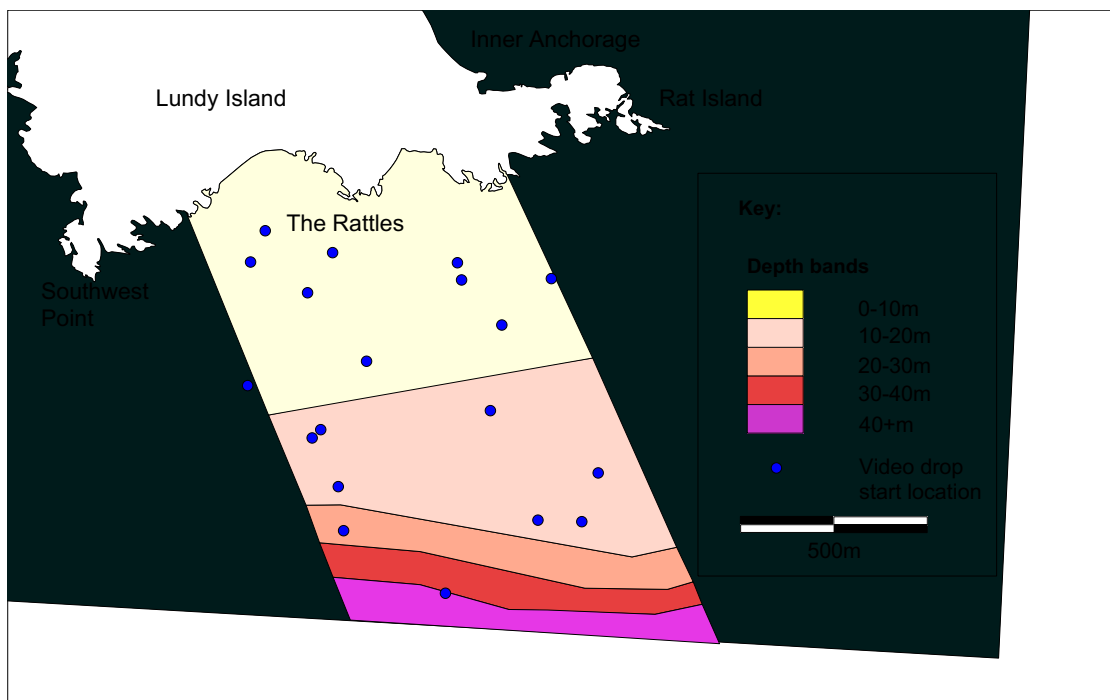


Figure A2.6 Video drop locations within The Rattles fixed transect.



2. Drop-down video results

2.1 The Rattles

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
Rat1	6-Jun-04	Drop Video	12:20	6.8m	0-10m	51.15946	-4.66445	Kelp forest with both <i>L hyperborea</i> and <i>L. ochroleuca</i> plants on bedrock and an understorey of foliose red algae. Shallow gullies of scoured rounded boulders with coralline crusts and <i>Pomatoceros</i> and some with foliose algae.	LhypR.Loch	CCMob, FoSwCC
Rat2	6-Jun-04	Drop Video	12:28	4.6m	0-10m	51.15899	-4.66182	Kelp forest with both <i>L hyperborea</i> and <i>L. ochroleuca</i> plants on bedrock and an understorey of foliose red algae. Shallow gullies of scoured rounded boulders with coralline crusts and <i>Pomatoceros</i> and some with foliose algae.	LhypR.Loch	CCMob, FoSwCC
Rat3	6-Jun-04	Drop Video	12:39	4.5m	0-10m	51.15869	-4.66498	Kelp forest with both <i>L hyperborea</i> and <i>L. ochroleuca</i> plants on bedrock and an understorey of foliose red algae. Shallow gullies of scoured rounded boulders with coralline crusts and <i>Pomatoceros</i> and some with foliose algae.	LhypR.Loch	CCMob, FoSwCC
Rat4	6-Jun-04	Drop Video	12:47	7m	0-10m	51.15638	-4.66035	Kelp forest with an understorey of foliose red algae. Vertical and steeply sloping faces with erect sponges, bryozoans and foliose red algae. <i>Axinella</i> , <i>Echinus</i> , <i>Schottera</i> .	LhypFt	ErSPbolSH?
Rat5	6-Jun-04	Drop Video	12:54	7.2m	0-10m	51.15799	-4.66273	Kelp forest with an understorey of foliose red algae. Clean sand in the gullies.	LhypFt	IGS

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
Rat6	6-Jun-04	Drop Video	13:24	13.6m	10-20m	51.15568	-4.66492	Hydroid / bryozoan turf with abundant Holothuria, Echinus, Cliona, Pentapora, Marthasterias, Nemertesia and Asterias	ErSEun?	
Rat7	6-Jun-04	Drop Video	13:31	23.6m	20-30m	51.15467	-4.66203	Clean gravel waves	CGS	
Rat8	6-Jun-04	Drop Video	13:44	24.7m	20-30m	51.15446	-4.66235	Clean gravel waves	CGS	
Rat9	7-Jun-04	Drop Video	09:49	2m	0-10m	51.15885	-4.65697	Kelp forest with red algal understorey	LhypFt	
Rat10	7-Jun-04	Drop Video	10:00	4m	0-10m	51.15855	-4.65331	Kelp forest with red algal understorey and gullies with mobile boulders and cobbles.	LhypFt	CCMob
Rat11	7-Jun-04	Drop Video	10:05	4.6m	0-10m	51.15738	-4.65516	Kelp forest with red algal understorey and gullies with clean sand. Plus areas of Halidrys and red algae	LhypFt	IGS, HalXK
Rat12	7-Jun-04	Drop Video	10:14	2.5m	0-10m	51.15844	-4.65678	Kelp forest with red algal understorey.	LhypFt	
Rat13	5-Sep-04	Drop Video	16:47	37.3m	30-40m	51.15386	-4.65122	Ophiocomina brittlestars on slatey cobbles and boulders with Pomatoceros, Halecium and bryozoan crusts, Hyas and Asterias.	Oph	
Rat14	5-Sep-04	Drop Video	16:59	27.2m	20-30m	51.15266	-4.65349	Flustra patches in a Cellaria / hydroid turf. Pentapora and Cliona, Parazoanthus? Axinellid sponges, Alcyonium. Then onto a cobble bed with Pomatoceros, hydroids and crustose bryozoans.	ErSEun	Flu.HByS, PomByC

Rat15	5-Sep-04	Drop Video	17:07	37.5m	30-40m	51.15266	-4.65179	Flustra, Pentapora, Pomatoceros, Balanus crenatus, erect hydroids and bryozoans, Urticina on cobbles, gravel and assorted boulders. On to smaller scoured mobile cobbles and then coarse clean sand.	Flu.HByS	PomByC, CGS
Rat16	9-Sep-04	Drop Video	16.37	28.1m	20-30m	51.15330	-4.66127	Rugged reef with Cellaria and hydroid encrustations. Alcyonium, Echinus, Pentapora, Marthasterias, Asterias, Cliona, Caryophyllia, crustose sponges. Areas of cobbles and gravel with Pomatoceros	PomByC, AlcMas,	
Rat17	9-Sep-04	Drop Video	16.45	35.6m	30-40m	51.15223	-4.66100	Flustra patches in a Cellaria / hydroid turf. Nemertesia, Marthasterias, Asterias, Pentapora and Cliona, Axinellid sponges, Alcyonium.	ErSEun	Flu.HByS,
Rat18	9-Sep-04	Drop Video	16.53	41.9m	40-50m	51.15080	-4.65697	Low rugged reef with dense Mytilus edulis beds, in places over growing Pentapora! Marthasterias Asterias, Pentapora, Munida. Abundant large Maia and Cancer feeding on the mussels.	Flu.HByS, MytHAs	
Rat19	9-Sep-04	Drop Video	17.04	18m	10-20m	51.15528	-4.65548	Rugged reef with erect axinellid sponges, Pentapora, hydroids and bryozoans. Sparse foliose red algae and massive cushion sponges (Cliona). Alcyonium on the verticals and onto clean coarse sand	ErSPboISH, CGS, AlcC	AlcMas

2.2 Inner Anchorage

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
IA1	10:06:03	Drop Video	16:55	1.9m	0-10m	51.16585	-4.65840	Clean coarse rippled sand	IGS Mob	
IA2	10:06:03	Drop Video	17:04	6.17m	0-10m	51.16577	-4.65638	Arenicola casts on coarse silty sand.	IGS	
IA3	10:06:03	Drop Video	17:12	9.7m	0-10m	51.16688	-4.65485	Coarse sand, shells and cobbles. Gurnards, Enteromorpha, Desmarestia aculeata, abundant Cereus and foliose red algae.	Mosaic of IMX.An & XKScrR	
IA4	10:06:03	Drop Video	17:17	10.3m	10-20m	51.16863	-4.65685	Coarse sand, shells and cobbles. Enteromorpha, Desmarestia aculeata, abundant Cereus, Hyas? and foliose red algae.	Mosaic of IMX.An & XKScrR	
IA5	10:06:03	Drop Video	17:27	5.0m	0-10m	51.16755	-4.65860	Silty mixed sand with faunal depressions.	IGS	
IA6	11:06:03	Drop Video	09:00	4.0m	0-10m	51.16843	-4.65998	Mixed L hyp, L sacc forest with foliose red algae understory	LhypLsac.Ft	
IA7	11:06:03	Drop Video	09:05	6.8m	0-10m	51.17072	-4.66013	Foliose red algae and dense Dictyota + occ. Halidrys.	FoR.Dic	
IA8	11:06:03	Drop Video	09:12	11.3m	10-20m	51.17012	-4.65755	Silty mixed sand with faunal depressions. Cobbles with algae and Cereus.	IMX.An	
IA9	11:06:03	Drop Video	09:17	12.3m	10-20m	51.17080	-4.65755	Silty mixed sand with faunal depressions and burrows.	IGS	
IA10	11:06:03	Drop Video	09:22	14.2m	10-20m	51.17357	-4.65722	Silty mixed sand with faunal depressions, burrows and diatom mats.	IGS	
IA11	11:06:03	Drop Video	09:27	12.m	10-20m	51.17173	-4.65855	Silty mixed sand with faunal depressions, burrows and diatom mats.	IGS	
IA12	11:06:03	Drop Video	09:33	21m	20-30m	51.17262	-4.65390	Silty mixed sand and shell gravel with faunal depressions and burrows (Dragonets)	CMX	

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
IA13	11:06:03	Drop Video	09:38	18m	10-20m	51.17128	-4.65423	Silty mixed sand and shell gravel with faunal depressions and burrows (Galatheids)	CMX	
IA14	11:06:03	Drop Video	09:44	18m	10-20m	51.17030	-4.65180	Silty mixed sand and shell gravel with faunal depressions and burrows (Galatheids). Areas on silty cobbles and small boulders colonised by Pomatoceros, hydroids and Pentapora	CMX	ErSPboISH
IA15	11:06:03	Drop Video	09:52	11.8m	10-20m	51.16813	-4.65405	Mosaic of foliose red algae and dense Desmarestia sp. Nemertesia antennina and other hydroids on small boulders and cobbles, in a plain of mixed sediment containing abundant Cereus.	IMX.An	FoR.Dic
A16	11:06:03	Drop Video	10:01	14.8	10-20m	51.16822	-4.65190	Mosaic of foliose red algae and Desmarestia sp. Nemertesia spp and other hydroids, bryozoans and cushion sponges on boulders and cobbles, in a plain of mixed sediment containing abundant Cereus.	IMX.An	SNemAdia?
IA17	11:06:03	Drop Video	10:11	20.0m	10-20m	51.16807	-4.64978	Cobbles, boulders and mixed sediments. Dominated by Pentapora, hydroids and bryozoans with some foliose red algae, erect sponges and cushion sponges..	ErSPboISH	CMX
IA18	11:06:03	Drop Video	10:26	12.4m	10-20m	51.17438	-4.63635	Clean coarse rippled sand and gravel with red algal clumps	IGS	
IA19	11:06:03	Drop Video	10:32	13.4m	10-20m	51.17323	-4.63645	Clean coarse rippled sand and gravel with red algal clumps	IGS	

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
IA20	11:06:03	Drop Video	10:39	13m	10-20m	51.17072	-4.63610	Clean coarse rippled sand and gravel with red algal clumps	IGS	
IA21	11:06:03	Drop Video	10:47	11m	10-20m	51.17288	-4.63527	Clean coarse rippled sand and gravel and large sand waves.	IGS	
IA23	11:06:03	Drop Video	10:55	16m	10-20m	51.17412	-4.63850	Clean coarse rippled sand and gravel with sparse red algal clumps. Abundant sand eels	IGS	
IA24	11:06:03	Drop Video	11:04	23m	20-30m	51.17323	-4.63452	Silty mixed sediment with faunal burrows.	CMX	
IA25	11:06:03	Drop Video	11:12	24m	20-30m	51.17328	-4.64820	Silty mixed sediment with faunal burrows. Red band fish seen? Then on to silty cobbles and boulders in mixed sediment. Hydroids seen.	CMX	SNemAdia?
IA26	11:06:03	Drop Video	11:20	24m	20-30m	51.17097	-4.64662	Hydroid and bryozoan turf growing on cobbles and boulders with mixed sediment between. Pentapora, Nemertesia and Stelligera sp. dominate the rock surface. Mixed sediment at the end	ErSPboISH?	CMX
IA27	11:06:03	Drop Video	11:31	21m	20-30m	51.17072	-4.65068	Silty mixed sediment with faunal burrows.	CMX	
IA28	11:06:03	Drop Video	11:36	25m	20-30m	51.17180	-4.64447	Silty mixed sediment with faunal burrows. Pagurids, Buccinum, and Asterias seen.	CMX	
IA29	11:06:03	Drop Video	11:46	21m	20-30m	51.17368	-4.64260	Silty mixed sediment with faunal burrows.	CMX	
IA30	11:06:03	Drop Video	11:51	21m	20-30m	51.17167	-4.64015	Silty mixed sediment with shell debris and faunal burrows.	CMX	
IA31	11:06:03	Drop Video	13:01	21m	20-30m	51.16827	-4.63982	Cobbles and shell debris colonised by hydroids and bryozoans, in a silty mixed sediment matrix with shell debris and faunal burrows.	SNemAdia?	CMX

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
IA32	12:06:03	Drop Video	14:30	5m	0-10m	51.17358	-4.66063	Reef with Halidrys park and occasional L. hyperborea plants. Dense growths of filamentous and foliose red, green and brown algae.	HalXK	
IA33	12:06:03	Drop Video	14:40	5m	0-10m	51.17095	-4.66048	Reef with Halidrys park and occasional L. hyperborea plants. Echinus and dense growths of filamentous and foliose red, green and brown algae. Calibletharis, Polyides/ Furcellaria, Brogniartella	HalXK	
IA34	12:06:03	Drop Video	14:45	7.5m	0-10m	51.16897	-4.65858	Reef and silty-gravel and sand. Foliose red algae.	FoR	IGS
IA35	12:06:03	Drop Video	14:51	7m	0-10m	51.16677	-4.65575	Reef and silty-gravel and sand. Foliose red algae.	FoR	IGS
IA32	12:06:03	Drop Video	14:30	5m	0-10m	51.17358	-4.66063	Reef with Halidrys park and occasional L. hyperborea plants. Dense growths of filamentous and foliose red, green and brown algae.	HalXK	

2.3 Knoll Pins

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
KP1	11:06:03	Drop Video	13:17	21.4m	20-30m	51.19550	-4.65330	Mixed sediment with shell debris. Debris colonised by faunal tufts of hydroids and bryozoans	CMX	SNemAdia
KP2	11:06:03	Drop Video	13:24	20.8m	20-30m	51.19337	-4.65172	Mixed sediment with shell debris. Debris colonised by faunal tufts of hydroids and bryozoans	CMX	SNemAdia
KP3	11:06:03	Drop Video	13:32	18m	10-20m	51.18833	-4.65068	Mixed sediment with shell debris. Debris colonised by faunal tufts of hydroids and bryozoans. Possible <i>Pecten</i> records	CMX	SNemAdia
KP4	11:06:03	Drop Video	13:41	18m	10-20m	51.18843	-4.64967	Mixed sediment with shell debris. Debris colonised by faunal tufts of hydroids and bryozoans. Possible <i>Pecten</i> records	CMX	
KP5	11:06:03	Drop Video	13:48	36m	30-40m	51.19315	-4.65977	Mixed sediment with sparse shell debris and occasional hydroids	CMX	
KP6	11:06:03	Drop Video	13:59	22m	20-30m	51.19040	-4.64815	Mixed sediment with sparse shell debris and occasional hydroids	CMX	
KP7	11:06:03	Drop Video	14:07	21m	20-30m	51.19417	-4.64968	Mixed sediment with shell debris and hydroids. Predominantly <i>Hydrallmania falcata</i> and <i>Nemertesia ramosa</i> , with <i>Pomatoceros sp.</i> on the shells.	CMX	SNemAdia
KP8	11:06:03	Drop Video	14:14	20m	20-30m	51.19585	-4.64862	Mixed sediment with shell debris and hydroids. Predominantly <i>Hydrallmania falcata</i> , <i>Nemertesia antennina</i> and <i>Nemertesia ramosa</i> , with <i>Pomatoceros sp.</i> on the shells.	Mosaic of CMX and SNemAdia	
KP9	11:06:03	Drop Video	14:28	35m	30-40m	51.19440	-4.66132	Mixed sediment with little obvious epifaunal life.	CMX	

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
KP10	11:06:03	Drop Video	14:40	33m	30-40m	51.19252	-4.66105	Mixed sediment with little obvious epifaunal life.	CMX	
KP11	11:06:03	Drop Video	14:50	19m-21m	10-20m & 20-30m	51.19303	-4.66353	Mixed sediment with boulder outcrops. <i>Munida rugosa</i> , <i>Nemertesia</i> spp. <i>Cellaria fistulosa</i> , <i>Pentapora</i> , <i>Anemonia</i> . Generally hydroid and bryozoan turf with <i>Pomatoceros</i> on the hard substrate.	CMX	ErSPboISH?
KP12	11:06:03	Drop Video	15:20	25m	20-0m	51.19112	-4.66180	Abort no lights		
KP14	12:06:03	Drop Video	08:18	33-30m	30-40m	51.18920	-4.65952	Silty shell gravel. <i>Sagartia</i> ?	CMX	
KP15	12:06:03	Drop Video	08:31	30-26m	20-30m	51.18880	-4.65990	Silty shell gravel with <i>Lanice</i> anemones and burrows.	CMX	
KP16	12:06:03	Drop Video	08:42	14m	10-20m	51.18855	-4.66163	Silty pebbles and gravel, foliose red algae, <i>Lanice</i> , <i>Pomatoceros</i> , <i>Peachia</i> / <i>Cerianthus</i> ?	Mosaic of IMX.An & IMX.LsacX?	
KP17	12:06:03	Drop Video	08:49	9m	0-10m	51.18808	-4.66232	Foliose red and brown algae on shallow reef. <i>Dictyota</i> , <i>Calibletharis</i> , <i>Desmarestia</i> , <i>Broggiartella</i> ,	FoR	
KP18	12:06:03	Drop Video	08:55	17m	10-20m	51.18978	-4.66153	Silty sand and gravel.	CMX	
KP19	12:06:03	Drop Video	09:01	11m	10-20m	51.18935	-4.66335	Foliose red and brown algae on shallow reef. <i>Dictyota</i> , <i>Calibletharis</i> , <i>Desmarestia</i> , <i>Broggiartella</i> . On to muddy sand with diatomaceous mats and deep faunal burrows with Dragonets.	FoR / IMX	

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
KP20	12:06:03	Drop Video	09:11	29.5m	20-30m	51.19255	-4.66225	Mixed sediment with boulder outcrops. <i>Munida rugosa</i> , <i>Nemertesia</i> spp. Axinellid sponges. Generally sponge, hydroid and bryozoan turf with <i>Pomatoceros</i> on the hard substrate. Octopus noted	CMX	ErSPboISH?
KP21	12:06:03	Drop Video	09:22	21.6	20-30m	51.19427	-4.66427	Mixed sediment, muddy shell gravel with shell debris and small hydroids and <i>Pomatoceros</i> sp. on the pebbles and the shells. <i>Cerianthus lloydii</i> ?	CMX	
KP22	12:06:03	Drop Video	09:29	18.6m	10-20m	51.19490	-4.66540	Muddy sand with shell debris and with diatomaceous mats and deep faunal burrows with Dragonets.	IMX	
KP23	12:06:03	Drop Video	09:36	10.7m	10-20m	51.19507	-4.66760	Muddy sand with diatomaceous mats and deep faunal burrows.	IMS	
KP24	12:06:03	Drop Video	09:44	7.7m	0-10m	51.19345	-4.66568	Foliose red and brown algae, Dictyota, Dictyopteris, Calibletharis, Desmarestia spp. Heterosiphonia, Coralline crusts, Echinus. Rugged reef of gullies and ridges. Ballan wrasse	FoR	
KP25	12:06:03	Drop Video	09:51	11.7m	10-20m	51.19230	-4.56448	Foliose red and brown algae, Dictyota, Dictyopteris, Calibletharis, Desmarestia spp. Phyllophora crista, Brogniatella, Coralline crusts, Rugged reef of gullies and ridges. <i>Aiptasia mutabilis</i> , Cuckoo wrasse	FoR	
KP26	12:06:03	Drop Video	10:00	16.5m	10-20m	51.19113	-4.66285	Muddy sand with shell debris and with diatomaceous mats and deep faunal burrows with Dragonets.	IMX	

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
KP27	12:06:03	Drop Video	10:13	31.6	30-40m	51.18908	-4.65670	Mud and shell debris / gravel with occasional hydroids etc. on cobbles and stones. Dragonets.	CMX	
KP28	12:06:03	Drop Video	10:26	27.5	20-30m	51.19492	-4.65802	Mud and shell debris / gravel with frequent hydroids etc. on cobbles and stones. Dragonets.	CMX	Barely enough but SNemAdia?
KP29	12:06:03	Drop Video	10:34	33.5m	30-40m	51.19527	-4.65915	Mud and shell debris / gravel with frequent hydroids etc. on cobbles and stones. Faunal burrows. Dragonets.	CMX	SNemAdia
KP30	12:06:03	Drop Video	10:39	23.3m	20-30m	51.19573	-4.65770	Mud and shell debris / gravel with frequent hydroids etc. on cobbles and stones. Faunal burrows. Dragonets.	CMX	SNemAdia
KP31	12:06:03	Drop Video	13:24	1.5m	0-10m	51.19503	-4.66880	Bedrock reef, with mixed kelp forest. Chorda, Halidrys, Desmarestia	LhypLsac	
KP32	12:06:03	Drop Video	14:01	3m	0-10m	51.19337	-4.66665	Kelp on reef. Possibly L. ochroleuca present.	LhypR.Loch	
KP33	12:06:03	Drop Video	14:06	2.5m	0-10m	51.19122	-4.66467	Bedrock reef, with mixed kelp forest. Saccorhiza polyschides, Halidrys, Desmarestia and foliose understorey	LhypLsac	
KP34	12:06:03	Drop Video	14:15	0-4m	0-10m	51.18915	-4.66373	Kelp on reef. L. ochroleuca present. Then on to Halidrys, Taonia and filamentous and foliose red algae. Echinus	LhypR.Loch	HalXK?

2.4 Northern Points.

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
NP1	12:06:03	Drop Video	10:51	39.2m	30-40m	51.20158	-4.66775	Cobbles and small boulders with Pomatoceros and hydroids. Marthasterias, Echinus and Pentapora.	Oph after the brittlestars have gone!	
NP2	12:06:03	Drop Video	11:01	38m	30-40m	51.20153	-4.66878	Cobbles and small boulders with Pomatoceros and hydroids. Marthasterias, Echinus and Pentapora.	Oph after the brittlestars have gone!	
NP3	12:06:03	Drop Video	11:10	38m	30-40m	51.20153	-4.66958	Cobbles and small boulders with Pomatoceros and dense hydroids. Hydrallmania, Pecten, Maia, Sertularella, Cliona. Also dense brittlestar bed.	Oph and Flu.HByS?	
NP4	12:06:03	Drop Video	11:18	39.9m	30-40m	51.20285	-4.66997	Cobbles and small boulders with Pomatoceros and hydroids.	Oph after the brittlestars have gone!	
NP5	12:06:03	Drop Video	11:25	26m	20-30m	51.20220	-4.67063	Coarse sand then onto reef of bed rock and boulders Cellaria, Cliona, Nemertesia antenninia, Alcyonium, Echinus, pollack and sand eels	AlcMas	CGS
NP6	12:06:03	Drop Video	11:32	33m	30-40m	51.20190	-4.66992	Massive rounded granite boulders forming a reef. Cellaria, sparse sponges, Bugula, Echinus Corynactis, erect hydroids, pollack and wrasse	SNemAdia?	
NP7	12:06:03	Drop Video	11:41	40.5m	40+m	51.20305	-4.66845	Cobbles and small boulders with Pomatoceros and hydroids. Marthasterias - a recovering brittlestar bed?. Patches of hydroid and bryozoan turf	Oph after the brittlestars have gone!	SNemAdia?

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
NP8	07:06:04	Drop Video	14.04	27	20-30m	51.20143	-4.66871	Grazed rounded granite boulders with Echinus.	Never in Focus (ErSEun)?	
NP9	07:06:04	Drop Video	14.12	5.2	0-10m	51.20185	-4.67189	Halidrys forest on patchily grazed bedrock with foliose red algal and coralline crust patches beneath.	HalXK	
NP10	07:06:04	Drop Video	14.19	5.2	0-10m	51.20207	-4.67394	Halidrys forest/ park on patchily grazed bedrock with foliose red algal and coralline crust patches beneath. Occasional axinellids and sandy foliose algal turf.	HalXK	FoR.Dic
NP11	07:06:04	Drop Video	14.25	12.5	10-20m	51.20251	-4.67346	Grazed rounded granite boulders and bedrock reef with Echinus and a hydroid bryozoan turf. Clean coarse sand	ErSEun / CGS	
NP12	07:06:04	Drop Video	14.31	12.5	10-20m	51.20319	-4.67590	Grazed rounded granite boulders and bedrock reef with Echinus, Asterias plus dense foliose red algal growth and a hydroid bryozoan turf with occasional axinellids. Clean coarse sand in between	ErSEun / CGS	
NP13	07:06:04	Drop Video	14.39	7.8	0-10m	51.20322	-4.67814	Kelp park with a hydroid bryozoan turf and foliose red algal understorey. On to a turf of hydroids such as Tubularia and bryozoans with occasional branching sponges, Echinus and Asterias.	Lhyp.TPk / ErSEun? / TubS?	
NP14	07:06:04	Drop Video	14.47	24.8	20-30m	51.20454	-4.67832	Grazed rounded granite boulders and bedrock reef with Cliona, Echinus, Asterias and a hydroid bryozoan turf. Clean coarse sand in between.	AlcMas / CGS	CorCri
NP15	07:06:04	Drop Video	14.57	31	30-40m	51.20368	-4.67352	Boulders, cobbles and gravel with hydroids, Pomatceros and Pentapora on the larger stable boulders	PomByC	

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
NP16	07:06:04	Drop Video	15.12	33.2	30-40m	51.20295	-4.67063	Bedrock and large boulders with Echinus grazed hydroid / bryozoan turf.	Flu.HByS?	
NP17	07:06:04	Drop Video	15.16	38	30-40m	51.20155	-4.66680	Massive rounded granite boulders forming a reef. Cellaria, sparse sponges, Pentapora, Nemertesia, Echinus Caryophyllia, erect hydroids, pollack and wrasse	SNemAdia?	
NP18	9-Sep-04	Drop Video	15.20	18.8m	10-20m	51.20457	-4.67812	Foliose red and brown algae, Dictyopteris, Echinus, Pentapora. Patches of Flustra. Sand between boulders. Corynactis and Cellaria / crisiid turf on verticals	For.Dic, Flu.HByS, CorCri	CGS
NP19	9-Sep-04	Drop Video	15.28	21.9m	20-30m	51.20475	-4.67673	Reef with Corynactis and Cellaria / crisiid turf on verticals with Echinus. Low reef with Flustra surrounded by cobbles with crusts and Pomatoceros.	CorCri, PomByC, Flu.HByS	
NP20	9-Sep-04	Drop Video	15.34	21.4m	20-30m	51.20482	-4.67640	Cobbles and pebbles with Pomatoceros, on to reef with Cellaria, Flustra, hydroid turf with Cliona	PomByC, Flu.HByS	
NP21	9-Sep-04	Drop Video	15.44	27m	20-30m	51.20315	-4.67315	Silty gravel and cobbles with Pomatoceros. On to sand waves 30cm high.	PomByC, CGS	
NP22	9-Sep-04	Drop Video	15.52	26m	20-30m	51.20355	-4.67363	Grazed rounded granite boulders and bedrock reef with Cliona, axinellids and Pentapora, Echinus, Asterias and a grazed hydroid bryozoan turf. Clean coarse sand in between. Near the sand frequent Ciocalyptra sponge colonies. Areas of cobbles adjacent to the reef.	ErSEun, CGS, PomByC	Urt.Cio

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
NP23	9-Sep-04	Drop Video	15.59	29.7m	20-30m	51.20317	-4.67265	Cobbles and gravel with Pomatoceros and onto rugged Cellaria and Flustra encrusted reef. Echinus, Pentapora, Corynactis (on verticals) Marthasterias, Caryophyllia,	PomByC, Flu.HByS, CorCri,	
NP24	9-Sep-04	Drop Video	16.06	34.2m	30-40m	51.20383	-4.67350	Rugged reef with Cellaria and Flustra encrustations. Echinus, Pentapora, Marthasterias, Caryophyllia, crustose sponges. Areas of cobbles and gravel with Pomatoceros	PomByC, Flu.HByS,	
NP25	9-Sep-04	Drop Video	16.14	36.3m	30-40m	51.20502	-4.67473	Cobbles and gravel with Pomatoceros and bryozoan crusts and onto rugged Cellaria and Flustra encrusted boulders. Echinus, Pentapora, Corynactis (on verticals) Marthasterias, Caryophyllia,	PomByC, Flu.HByS,	

2.5 St James' Stone.

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
StJS1	7-Jun-04	Drop Video	12:00	7.2m	0-10m	51.19359	-4.68033	Kelp forest / park with possibly L. ochroleuca hydroid/ bryozoan/ red & brown algae understorey. Echinus, Asterias, Marthasterias, Nemertesia with Tubularia in the sward.	LhypR.Loch	FoSwCC,

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
StJS2	7-Jun-04	Drop Video	12:09	5.5m	0-10m	51.19203	-4.67821	Pinnacles and gullies with L hyperborea forest and red algal sward, some massive sponge growths, probably Cliona and coralline crust patches.	LhypR.Loch	FoSwCC,
StJS3	7-Jun-04	Drop Video	12:18	11.7m	10-20m	51.18762	-4.67697	Bedrock ridges and gullies with red algal sward and down onto a hydroid and bryozoan turf. Polymastia boletiformis, asteroids. Clean coarse sandy gullies.	FoR, ErSPboISH	IGS
StJS4	7-Jun-04	Drop Video	12:26	8m	0-10m	51.18622	-4.67617	Kelp forest / park with possibly L. ochroleuca hydroid/ bryozoan/ red & brown algae understorey. Echinus, Asterias, Marthasterias, Nemertesia with	LhypR.Loch	
StJS5	7-Jun-04	Drop Video	12:35	14m	10-20m	51.18744	-4.67726	Large rounded boulders with sandy gullies. Hydroid/ bryozoan/ red & brown algal turf. Echinus, Asterias, Marthasterias, Pachymatisma	ErSEun?	CC.BalPom
StJS6	7-Jun-04	Drop Video	12:46	9-11.5m	0-10 and 10-20m	51.19140	-4.68647	Kelp forest on bedrock. Then on to clean sand and on to a Halidrys park with Anemonia, Sacchoriza polychides, all with an understorey of hydroids and bryozoans.	LhypR.Loch?, HalXK	IGS
StJS7	7-Jun-04	Drop Video	12:56	11.9m	10-20m	51.19063	-4.67795	Kelp park with a sward of hydroids and bryozoans and foliose red algae. Patches of Halidrys and gullies of coarse clean sand.	LhypR.Loch?, FoR.Dic, HalXK	IGS
StJS8	7-Jun-04	Drop Video	13:07	12.1m	10-20m	51.18662	-4.67801	A sward of hydroids and bryozoans and foliose red algae. Nemertesia spp. Cliona, Asterias and Marthasterias. Occasional branching sponges	ErSPboISH	

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
StJS9	7-Jun-04	Drop Video	13:27	17.5m	10-20m	51.18906	-4.67976	Clean, coarse sand waves. Reef with Flustra biotope around the sides and a sward of hydroids and bryozoans and foliose red algae on the top.	IGS, Flu.HByS, ErSPboISH	
StJS10	8-Jun-04	Drop Video	13:04	6.7m	0-10m	51.18626	-4.67661	Kelp park with a sward of hydroids and bryozoans and foliose red algae beneath. L. sacharina and Saccorhiza polyschides present. Followed by a park of Laminaria hyperborea	XKScrR	
StJS11	9-Sep-04	Drop Video	11:53	3.4m	0-10m	51.18807	-4.67710	Kelp Forest possibly with L. ochroleuca, an understory of foliose red and brown algae and grazed areas. Red algae, hydroids, bryozoans, polyclinids on the vertical faces.	LhypR.Loch?	LhypGz.Ft, FoSwCC
StJS12	9-Sep-04	Drop Video	11:59	11.9m	10-20m	51.18663	-4.67995	Dictyota, Dictyopteris, red algae and hydroid / bryozoan turf on the reef tops with sparse sponge crusts. Bryozoan / hydroid turf on vertical walls with some Alcyonium. On to deeper circalittoral hydroid turf with Axinellids, Pentapora and massive sponge crusts	FoR.Dic, SCAsByH, ErSPboISH	
StJS13	9-Sep-04	Drop Video	12:09	27.8m	20-30m	51.18758	-4.68312	Flustra, Alcyonium, Echinus, Asterias and cushion sponges on a silty grazed reef. Marthasterias, Holothuria, Pentapora, axinellids and Caryophyllia. Silty gravel patches with Ciocalypa, Polymastia and Haliclona around the edges.	ErSEun?	CGS, Urt.Cio

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
StJS14	9-Sep-04	Drop Video	12:19	10.1m	10-20m	51.19115	-4.67927	Clean, coarse sand / gravel bed with a mixed kelp and foliose red algae zone around the edge. Vertical walls of foliose red algae, coralline crusts, hydroids and bryozoans. Up into a kelp foreset with an algae / hydroid / bryozoan understory. Foliose red algae, dictyopteris, hydroids and bryozoans below kelp.	IGS, XKScrR, FoSwCC, LhypR.Loch, FoR.Dic	
StJS15	9-Sep-04	Drop Video	12:25	10.5m	10-20m	51.19263	-4.68182	Vertical walls of foliose red algae, coralline crusts, hydroids and bryozoans. Dictyopteris and foliose red algae on bedrock reef. Gully walls of hydroids and bryozoans. Echinus, Asterias. Kelp forest on the top of the reef..	FoSwCC, For.Dic, SCAs.ByH	LhypR.Loch
StJS16	9-Sep-04	Drop Video	12:32	20.7m	20-30m	51.19375	-4.68435	Cellaria turf with patches of Flustra. Pentapora, and axinellid sponges as well as massive growths of Cliona. Vertical walls of Corynactis, Caryophyllia and bryozoans and up onto a diffuse sward of foliose algae with sparse Alcyonium, abundant Caryophyllia and Pentapora and Cliona.	CorCri, ErSEun, AlcMas or CCParCar?	
StJS17	9-Sep-04	Drop Video	12:41	26.9m	20-30m	51.19313	-4.68515	Rugged bedrock reef with Pentapora, Echinus, Flustra and Alcyonium, Caryophyllia, Eunicella, Asterias, Marthasterias, axinellids, Luidia and Holothuria. Patches of coarse sand / gravel.	Flu.HByS, CorCri	CGS

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
StJS18	9-Sep-04	Drop Video	12:49	28.75m	20-30m	51.19167	-4.68532	Rugged bedrock reef with Flustra, Pentapora, Echinus and Alcyonium. Caryophyllia dominating some of the walls, Asterias, Marthasterias, axinellids, Luidia and Holothuria. Patches of coarse sand / gravel.	Flu.HByS, CCParCar? Or CorCri	CGS
StJS19	9-Sep-04	Drop Video	12:57	43.75m	40-50m	51.19140	-4.69268	Low reef with a silty sparse Cellaria turf with Abietinaria, Nemertesia, and crustose bryozoans, Pentapora, Alcyonidium, Alcyonium, Cliona and Actinothoe. Abundant Munida, Cancer and patches of Hydrallmania. Patches of silty gravel.	CGS, AlcMas	
StJS20	9-Sep-04	Drop Video	13:10	27.7m	20-30m	51.19153	-4.70050	Silty sand waves.	CGS	
StJS21	9-Sep-04	Drop Video	13:18	43.7m	40-50m	51.18782	-4.69575	Silty sand waves.	CGS	
StJS22	9-Sep-04	Drop Video	13:29	33.6m	30-40m	51.18645	-4.69975	Silty sand waves.	CGS	
StJS23	9-Sep-04	Drop Video	13:41	40.6m	40-50m	51.18527	-4.69623	Silty sand waves.	CGS	
StJS24	9-Sep-04	Drop Video	13:50	31.6m	30-40m	51.18523	-4.70050	Silty sand waves.	CGS	
StJS25	9-Sep-04	Drop Video	14:01	20.1m	20-30m	51.18733	-4.68213	Rugged bedrock reef with hydroid bryozoan turf, abundant large Pentapora colonies, Echinus, patches of Flustra and Alcyonium, Caryophyllia, Asterias, Marthasterias, axinellid sponges and frequent Polymastia boletiformis. Eunicella on the steeper slopes.	ErSPbolSH, ErsEun	

2.6 Half Tide Rock

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
HTR1	5-Jun-04	Drop Video	15.41	6m	0-10m	51.17140	-4.68202	Kelp forest on reef with possible <i>L. ochroleuca</i> present. <i>Delesseria</i> , <i>Dilsea</i> , <i>Dictyopteris</i> ,	(LhypR.Loch) LhypR.Ft,	
HTR2	5-Jun-04	Drop Video	15.48	6m	0-10m	51.17140	-4.68202	Kelp forest on reef with possible <i>L. ochroleuca</i> present. <i>Delesseria</i> , <i>Dilsea</i> , <i>Dictyopteris</i> .	(LhypR.Loch) LhypR.Ft,	
HTR3	5-Jun-04	Drop Video	15.56	9.5m	0-10m	51.16771	-4.67981	Kelp park. <i>Cliona</i> , coralline crusts, <i>Marthasterias</i> , <i>Nemertesia</i> , <i>Schottera</i> ,	LhypR.Pk	
HTR4	5-Jun-04	Drop Video	16.05	5.5m	0-10m	51.16438	-4.67866	Kelp forest on reef with <i>Delesseria</i> , <i>Dilsea</i> , <i>Dictyopteris</i> , coralline crusts, <i>Marthasterias</i> , <i>Schottera</i> ,	(LhypR.Loch) LhypR.Ft,	
HTR5	5-Jun-04	Drop Video	16.16	7.9m	0-10m	51.16340	-4.67781	Kelp park. <i>Cliona</i> , coralline crusts, <i>Marthasterias</i> , <i>Nemertesia</i> , <i>Schottera</i> , and foliose red algae	LhypR.Pk	
HTR6	6-Jun-04	Drop Video	10.44	13.4m	10-20m	51.17346	-4.68281	Silty boulders and bedrock, with <i>Pentapora</i> , foliose red algae, hydroids, bryozoans and cushion sponges. Into clean coarse sand and gravel	ErSPboISH?	IGS
HTR7	6-Jun-04	Drop Video	10.58	5.9m	0-10m	51.17064	-4.68099	Kelp forest / park with hydroid/ bryozoan/ red & brown algae understorey. <i>Echinus</i> ,	LhypR.Ft	FoR, SCAs.ByH?
HTR8	6-Jun-04	Drop Video	11.06	4m	0-10m	51.16480	-4.67902	Kelp forest / park with hydroid/ bryozoan/ red algae understorey. <i>Echinus</i> ,	LhypR.Ft	
HTR9	6-Jun-04	Drop Video	11.39	4.1m	0-10m	51.16912	-4.68039	Kelp forest / park with hydroid/ bryozoan/ red & brown algae understorey. <i>Echinus</i> ,	LhypR.Ft	FoR.Dic
HTR10	6-Jun-04	Drop Video	11.48	8.4m	0-10m	51.16680	-4.67963	Kelp forest / park with hydroid/ bryozoan/ red & brown algae understorey. <i>Echinus</i> , <i>Dictyopteris</i> . Sandy floored gullies.	LhypR.Ft	FoR.Dic, IGS

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
HTR11	6-Jun-04	Drop Video	12	8.8m	0-10m	51.16353	-4.67855	Broken Halidrys sward, with patches of L. hyperborea and red algae. Cushion sponges and hydroids such as Polymastia and Nemertesia present.	HalXK, LhypR.Ft	FoR, ErSPboISH?
HTR12	7-Jun-04	Drop Video	10.54	16.4m	10-20m	51.16901	-4.68242	Broken bedrock and massive granite boulders. Hydroid / bryozoan turf with Holothuria, Echinus, Cliona, Pentapora, Marthasterias, Nemertesia foliose red algae and Asterias.	ErSEun? Or AlcMas	
HTR13	7-Jun-04	Drop Video	11.03	16.4m	10-20m	51.16605	-4.68123	Broken bedrock and massive granite boulders. Hydroid / bryozoan turf with foliose red algae, Echinus, Cliona, Pentapora, Marthasterias, Nemertesia and Asterias	ErSEun? Or AlcMas	
HTR14	7-Jun-04	Drop Video	11.11	17.8m	10-20m	51.16515	-4.68121	Broken bedrock and massive granite boulders. Hydroid / bryozoan turf with Echinus, Cliona, Pentapora, Marthasterias, Nemertesia, foliose red algae and Asterias.	ErSEun? Or AlcMas	
HTR15	7-Jun-04	Drop Video	11.19	13.8m	10-20m	51.16269	-4.68062	Broken bedrock and massive granite boulders. Hydroid / bryozoan turf with Eunicella, large axinellids, Echinus, Cliona, abundant Pentapora, Marthasterias, abundant Nemertesia, foliose red algae and Asterias.	ErSEun	
HTR16	7-Jun-04	Drop Video	15.44	15m	10-20m	51.17074	-4.68274	Bryozoan / hydroid turf, with red algae, coralline crusts, massive sponges, Echinus and Nemertesia. Occasional sandy patches.	ErSEun? Or AlcMas	CGS
HTR17	7-Jun-04	Drop Video	15.54	15m	10-20m	51.16936	-4.68261	Bryozoan / hydroid turf, with red algae, coralline crusts, massive sponges, Echinus and Nemertesia. Occasional sandy patches.	ErSEun? Or AlcMas	CGS

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
HTR18	7-Jun-04	Drop Video	16.02	13m	10-20m	51.16719	-4.68060	Bryozoan / hydroid turf, with red algae, sparse old Halidrys plants, coralline crusts, massive sponges, Echinus, Eunicella and Nemertesia. Occasional sandy patches.	ErSEun	CGS
HTR19	7-Jun-04	Drop Video	16.08	11m	10-20m	51.16440	-4.68081	Broken Halidrys sward, with patches of L. hyperborea and red algae. Echinus, Asterias, cushion sponges and hydroids such as Polymastia and Nemertesia present.	HalXK, LhypR.Pk	FoR, ErSPboISH?
HTR20	7-Jun-04	Drop Video	16.15	18.9m	10-20m	51.16226	-4.68054	Broken bedrock and rounded granite boulders. Hydroid / bryozoan turf with Echinus, Cliona, abundant Pentapora, Marthasterias, abundant Nemertesia, foliose red algae and Asterias.	ErSEun? Or AlcMas	CGS
HTR21	8-Jun-04	Drop Video	13.08	23.2m	20-30	51.17055	-4.68730	Silty boulders and bedrock, with Asterias, Echinus and branching axinellids, Cliona, Pentapora, Holothuria, Caryophyllia and Nemertesia.	ErSEun	
HTR22	8-Jun-04	Drop Video	13.15	24.6m	20-30	51.16953	-4.68873	Silty boulders and bedrock, with Asterias, Echinus, Alcyonium Cliona, Abietinaria, Caryophyllia and Nemertesia.	AlcMas	
HTR23	8-Jun-04	Drop Video	13.23	31.4m	30-40	51.16888	-4.69108	Silty bedrock with cushion sponges, Cliona, Ciocalypta, Polymastia, Haliclona and branching axinellids, hydroids and bryozoans. Sagartia in the silt cover.	ErSEun	Urt.Cio
HTR24	8-Jun-04	Drop Video	13.31	32.1m	30-40	51.16802	-4.68977	Silty bedrock with cushion and branching sponges, Cliona, Ciocalypta and branching axinellids, hydroids and bryozoans. Tubularia, Caryophyllia, Marthasterias, Halecium and Nemertesia.	ErSEun	Urt.Cio

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
HTR25	8-Jun-04	Drop Video	13.44	28.5m	20-30	51.16777	-4.68868	Silty bedrock with cushion and branching sponges, Cliona, Ciocalyptra and branching axinellids, hydroids and encrusting bryozoans (particularly on the verticals with Alcyonium). Pentapora, Caryophyllia, Marthasterias, Asterias, Halecium, Tubularia and Nemertesia.	ErSEun	Urt.Cio
HTR26	8-Jun-04	Drop Video	13.58	29.2m	20-30	51.16525	-4.69140	Silty bedrock with cushion and branching sponges, Cliona, Ciocalyptra and branching axinellids, hydroids and encrusting bryozoans (particularly on the verticals with Alcyonium). Pentapora, Caryophyllia, Marthasterias, Asterias, Halecium, Tubularia and Nemertesia.	ErSEun	Urt.Cio
HTR27	8-Jun-04	Drop Video	14.01	31.7m	30-40	51.16435	-4.69390	Silty bedrock with cushion and branching sponges, Cliona, Ciocalyptra and branching axinellids, hydroids and encrusting bryozoans (particularly on the verticals with Alcyonium). Pentapora, Caryophyllia, Marthasterias, Asterias, Halecium, Tubularia and Nemertesia. Lesser spotted dogfish.	ErSEun	Urt.Cio
HTR28	8-Jun-04	Drop Video	14.09	28m	20-30	51.16333	-4.69002	Silty bedrock with cushion and branching sponges, Cliona and branching axinellids, hydroids and encrusting bryozoans (particularly on the verticals with Alcyonium). Pentapora, Caryophyllia, Marthasterias, Asterias, Halecium, Tubularia and Nemertesia.	ErSEun	
HTR29	5-Sep-04	Drop Video	15:12	35.7m	30-40	51.16836	-4.69017	Sandy, shell gravel waves. (15cm high)	CGS	

Site No.	Date	System	Time IN GMT	Depth (m) bCD	Depth Band	Lat	Long	Comments	Primary Biotope	Secondary biotope
HTR30	5-Sep-04	Drop Video	15:20	37.7m	30-40	51.16546	-4.69309	Sand waves (10cm high)	CGS	
HTR31	5-Sep-04	Drop Video	15:38	7.7m-17.7m	0-10m & 10-20m	51.16416	-4.68551	Caryophyllia, Echinus, Alcyonium, Hydroid / bryozoan turf, Pentapora, Axinellids, Cliona, Coralline crusts, Dictyopteris,	ErSPboISH?	FoR? PomByC
HTR32	5-Sep-04	Drop Video	15:55	24m	20-30	51.16606	-4.68544	Silty gravel waves	CGS	
HTR33	5-Sep-04	Drop Video	16:06	18.6m	10-20m	51.17056	-4.68309	Marthasterias, Echinus, abundant Pentapora, axinellid sponges, Pomatoceros, hydroid/ bryozoan turf (grazed), Dictyopteris, foliose red algae on large boulders. Small cobbles between.	ErSEun	PomByC
HTR34	5-Sep-04	Drop Video	16:16	18.5m	10-20m	51.16608	-4.68201	Marthasterias, Henricia, Echinus, abundant Pentapora, axinellid sponges, Cliona, Eunicella, Pomatoceros, hydroid/ bryozoan turf (grazed), Polymastia boletiformis, Dictyopteris, foliose red algae on large boulders. Small cobbles between.	ErSEun	ErSPboISH
HTR35	5-Sep-04	Drop Video	16:25	17.4m	10-20m	51.16236	-4.68366	Large silty boulders with sponge crusts, Caryophyllia, Pomatoceros, bryozoans and hydroids, Flustra, Pentapora, Echinus, Marthasterias, Halecium Cuckoo wrasse & goldsinny, Dictyopteris,	ErSEun	Flu.HByS / CorCri

Figure A2.7 Video drop locations within the Inner Anchorage fixed transect, colour coded to show the dominant biotope or sediment code recorded

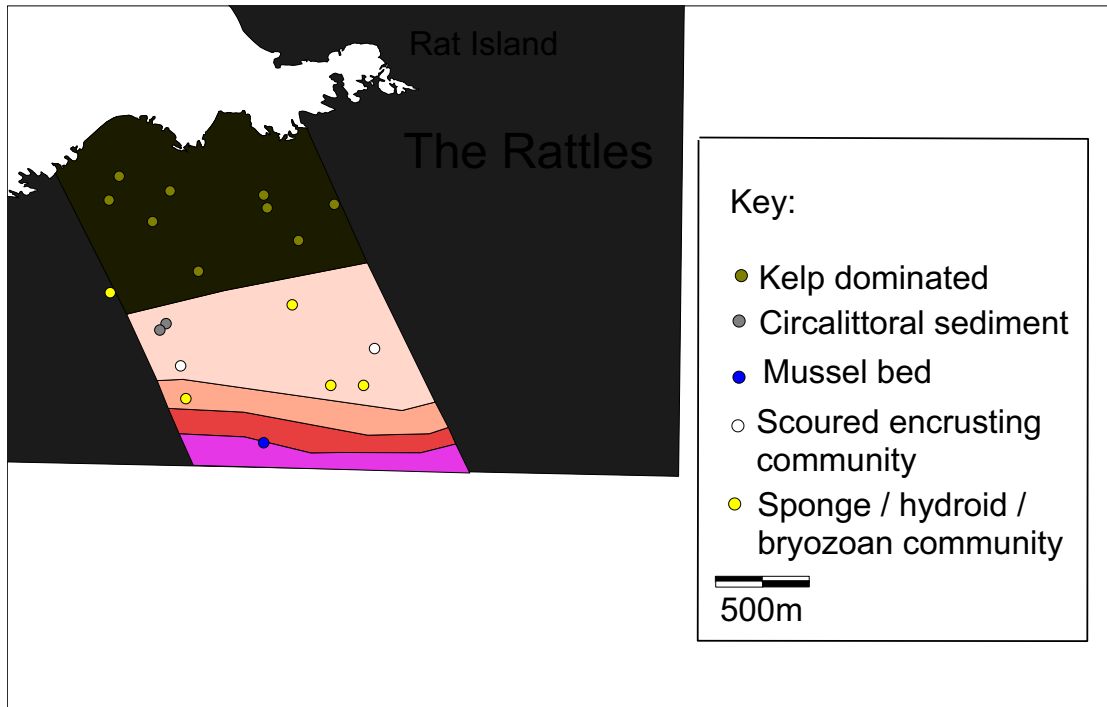


Figure A2.8 Video drop locations within the Inner Anchorage fixed transect, colour coded to show the dominant biotope or sediment code recorded.

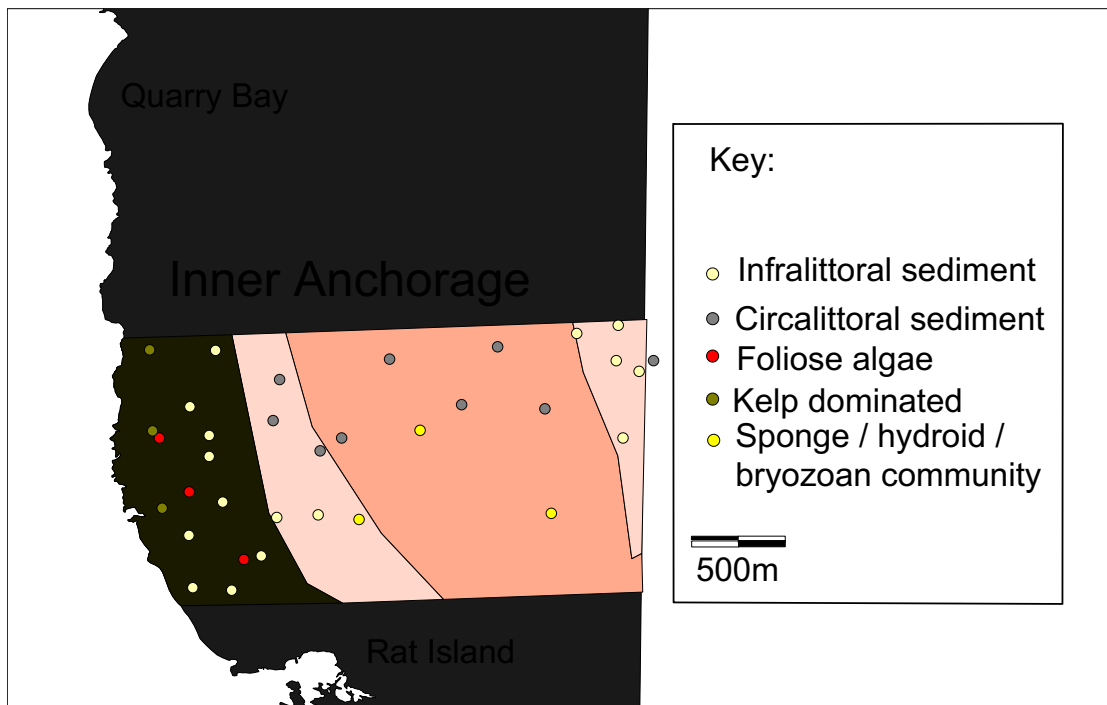


Figure A2.9 Video drop locations within the Knoll Pins fixed transect, colour coded to show the dominant biotope or sediment code recorded.

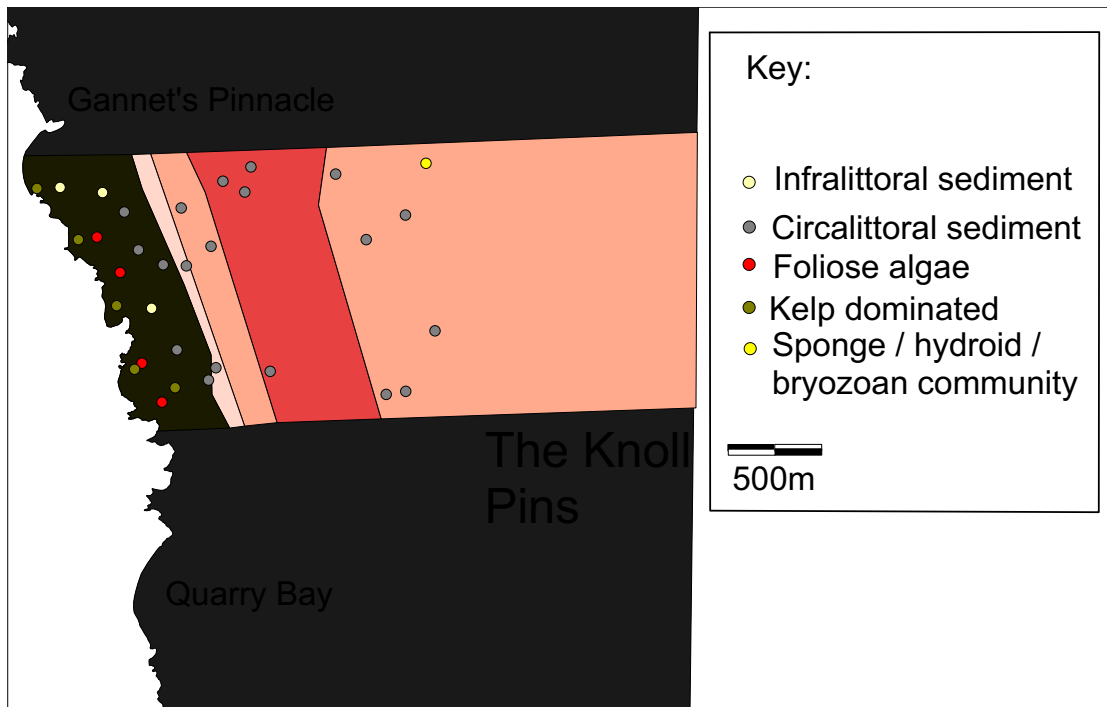


Figure A2.10 Video drop locations within the Northern Points fixed transect, colour coded to show the dominant biotope or sediment code recorded

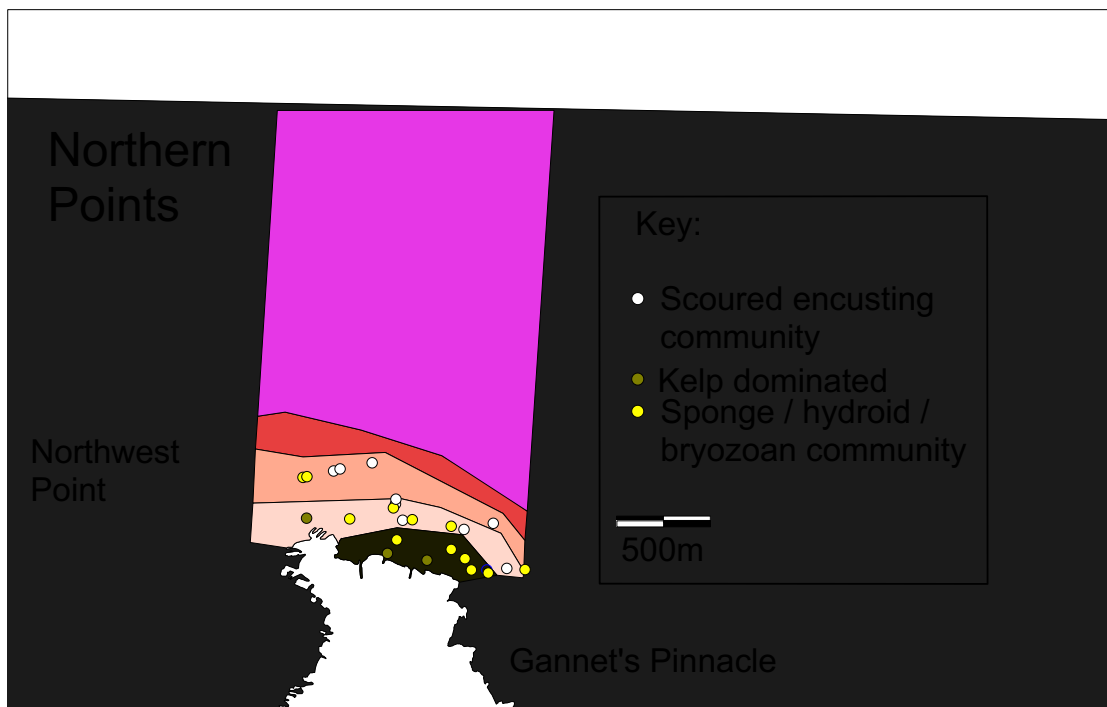


Figure A2.11 Video drop locations within the St James's Stone fixed transect, colour coded to show the dominant biotope or sediment code recorded

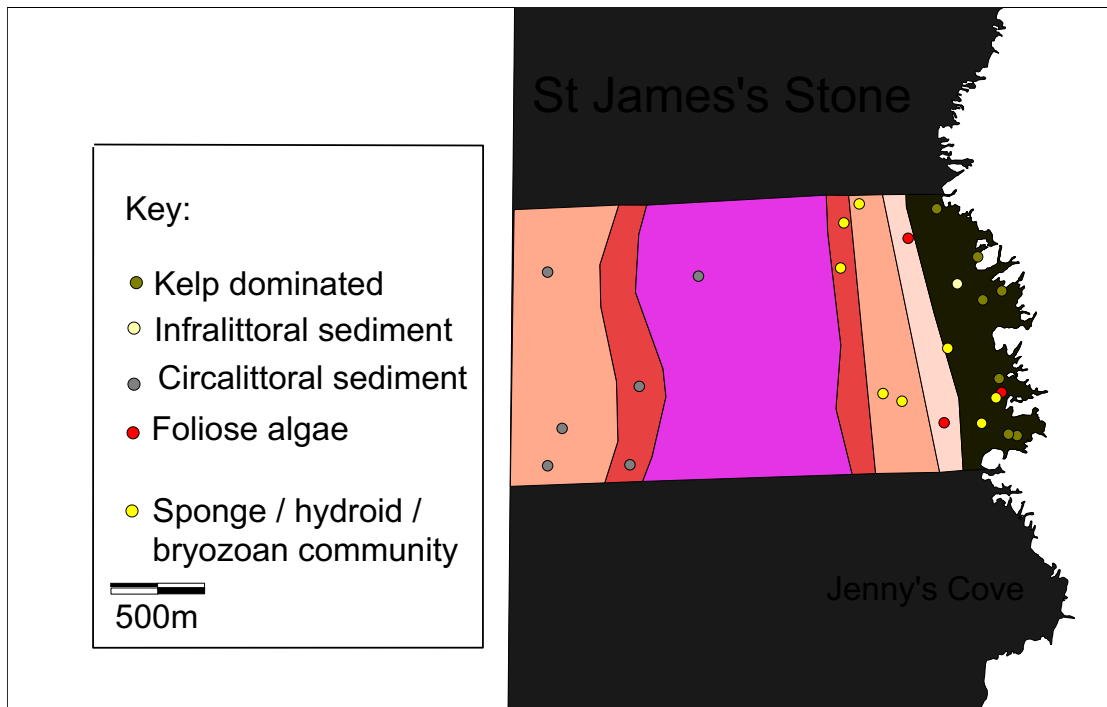
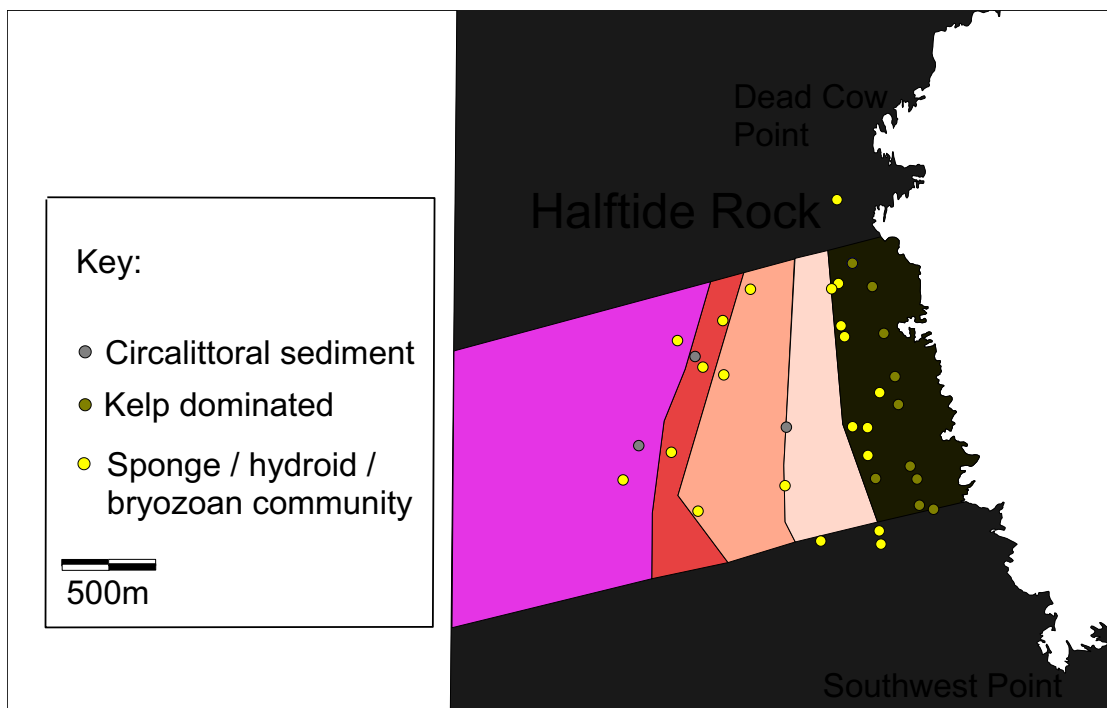


Figure A2.12 Video drop locations within the Halftide Rock fixed transect, colour coded to show the dominant biotope or sediment code recorded



Jessica Hettie contact details: -

Clive Pearson
The Thatch
Wrinkleberry
Clovelly
Bideford
Devon
EX395SU

Tel: 01237 431405

Tel: 07774 190359

Appendix 3. Detailed methods used in the diving aspects of the Lundy cSAC monitoring study

1. Diving transect surveys

1.1 Diving survey monitoring protocol – Kelp Forest communities and horizontal circalittoral bedrock

Quadrat size:

- ❖ 0.25 m²

Quadrat number:

- ❖ At least 12 quadrats

Quadrat structure:

- ❖ Quadrats should be 4-sided and marked on each side at 10 cm intervals

Transect length:

- ❖ 10 m

Transect position:

- ❖ Transect to be placed within one biotope, on reasonably level, uniform seabed, along pre-selected depth contour;

Quadrat positions:

- ❖ Pre-determined random positions;
- ❖ Adjacent quadrats should not overlap and so positions should be selected to ensure this; move to the next random number in the sequence if one will overlap with an earlier position;
- ❖ Both sides of the line can be used; the two sides should be clearly identified e.g. Left or Right, with left being the side on the left when viewed from the origin.
- ❖ L/R should also be selected at random.
- ❖ Lower (if above the line) or upper (if below the line) left hand corner of the quadrat should be placed at the chosen position, with the quadrat side lying along the line.

Species recording:

- ❖ Record both the algae, and the animals.
- ❖ The percentage cover of each species present on the seabed within the quadrat should be recorded as well as abundance counts of large mobile animals.
- ❖ Kelp epiphytes should not be included.
- ❖ A 10 x 10 cm square is equivalent to 4% cover
- ❖ Total % cover may be greater than 100% if species are lying over each other.
- ❖ If a plant is lying partly in and partly out of the quadrat, only the part within the quadrat should be recorded.
- ❖ Anything less than 0.5% or any other variation should be recorded as 0.25 so analysis by PRIMER can be carried out.
- ❖ Mature canopy kelp plants should be counted and all sporelings assessed as percentage cover.
- ❖ Remember to check for encrusting species – these may be partly covered by silt. If the species cannot be separated, or identified accurately, they should be recorded as *Coralline crusts, dark red algal crusts, and brown algal crusts.*

- ❖ Plants should be recorded to species level where possible. If the identity of a plant is uncertain, a specimen should be collected.
- ❖ It is essential that specimens can be attributed to a particular transect following a dive, to minimize confusion, unless the species is a common one throughout the transect.

Substratum:

- ❖ The percentage cover of each of the major substrata within the quadrat must be recorded.

Familiarisation:

- ❖ Half a day should be spent on biotope-species familiarisation, with collections of specimens made for identification.
- ❖ The remainder of the day should be spent with the whole team working up the specimens to ensure familiarity and consistent identification, particularly of the common species.
- ❖ A collection of the algae and invertebrates should be made for future reference if necessary. This can be a combination of pressed and pickled specimens, but pressed algal specimens are better for showing other divers what a particular species looks like.

Checklists:

- ❖ A checklist of the species likely to be found on the kelp forest transects should be compiled from the familiarisation work and pre-existing survey lists.
- ❖ This should be put together the evening before the quadrat dives and copies printed onto waterproof paper for use underwater. The checklists for the dive sites are presented below.

Phase II survey:

- ❖ A Phase II survey of the biotope in which the transect has been placed should be carried out in conjunction with the quadrat work.

Photography:

- ❖ A photographic record should be made of the communities and individual species. This can be a 35 mm still photograph, digital photography, video footage or any combination.

Specimen curation:

- ❖ A reference collection should be made for use on future surveys.
- ❖ Specimens must be preserved and labelled during the following evening to prevent a build up of specimens and consequent confusion.
- ❖ A voucher collection of taxonomically challenging species must be collated after the survey has finished.
- ❖ Survey teams must have dilute, buffered formaldehyde and 70% Industrial Methylated Spirits available on site.

1.2 Diving survey monitoring protocol – Vertical circalittoral bedrock variations from 1.1 above methodology.

Quadrat size:

- ❖ $\sim 0.1 \text{ m}^2$ (30cm x 30cm)

Quadrat number:

- ❖ At least 12 quadrats

Quadrat structure:

- ❖ Quadrats should be 4-sided and marked on each side at 6 cm intervals

Transect length:

- ❖ 10 m

Transect position:

- ❖ Transect to be placed within one biotope, along a uniform cliff / wall, at a pre-selected depth contour;

Quadrat positions:

- ❖ Pre-determined random positions;
- ❖ Adjacent quadrats should not overlap and so positions should be selected to ensure this; move to the next random number in the sequence if one will overlap with an earlier position;
- ❖ Both sides of the line can be used; the two sides should be clearly identified e.g. Left or Right, with left being the side on the left when viewed from the origin.
- ❖ L/R should also be selected at random.
- ❖ Lower (if above the line) or upper (if below the line) left hand corner of the quadrat should be placed at the chosen position, with the quadrat side lying along the line.

Species recording:

- ❖ Record both the algae, and the animals.
- ❖ The percentage cover of each species present on the seabed within the quadrat should be recorded as well as abundance counts of large mobile animals.
- ❖ Kelp epiphytes should not be included.
- ❖ A 6 x 6 cm square is equivalent to 4% cover
- ❖ Total % cover may be greater than 100% if species are lying over each other.
- ❖ If a plant is lying partly in and partly out of the quadrat, only the part within the quadrat should be recorded.
- ❖ Anything less than 0.5% or any other variation should be recorded as 0.25 so analysis by PRIMER can be carried out.
- ❖ Mature canopy kelp plants should be counted and all sporelings assessed as percentage cover.
- ❖ Remember to check for encrusting species – these may be partly covered by silt. If the species cannot be separated, or identified accurately, they should be recorded as *Coralline crusts, dark red algal crusts, and brown algal crusts.*
- ❖ Plants should be recorded to species level where possible. If the identity of a plant is uncertain, a specimen should be collected.
- ❖ It is essential that specimens can be attributed to a particular transect following a dive, to minimize confusion, unless the species is a common one throughout the transect.

1.3 Data handling and analysis protocol

1.3.1 Specimens

Specimens that were collected individually during the survey were identified and added to the appropriate data sheet. Curated specimens collected have been lodged with the National Museum of Scotland.

1.3.2 Data handling and storage

The data collected from the quadrats were treated in a number of ways before statistical analysis. Each worker entered his or her own data into a *Microsoft Excel* spreadsheet during the evening following the dive. This, combined with some on-site specimen identification, meant that many of the anomalies that have arisen on other similar surveys between different workers could be sorted out immediately. Consequently any remaining inconsistencies were few and easily rectified. For example, if one person had recorded *Pomatoceros* sp. and another *Pomatoceros triqueter*, these were combined as *Pomatoceros* sp. Duplicate species were also combined. Any records of *Present* were changed to 0.25 and any question marks addressed, generally by removing the record unless there was an obvious answer. Any species for which there were no records were removed and finally, a 0 replaced all blank cells. All of the Phase II data and the quadrat data were later entered into *Marine Recorder* for storage.

1.3.3 Quadrat data analysis

The quadrat data were analysed using the PRIMER 5 statistical package to address the following questions:

- How similar were the data for the biotope from the different sites?
- Which species characterised the biotope sampled in 2003/4?
- Did the quadrats collected from one site by different divers comprise a coherent data set or were there major differences between workers?

The data were standardised to take account of the combination of abundance measures (percentage cover and counts) at any one site and a fourth root transformation was applied. The data transformation is important on this type of data where there are a few very common species and many rare ones, as it weights the rare and common species and allows all species present to have some contribution to the similarities (Gauch 1982; Sokal & Rohlf 1981). A similarity matrix was then calculated for each data group using the *Bray-Curtis similarity coefficient*.

The following analyses were then carried out:

- Cluster analysis;
- Multi-dimensional scaling (MDS), an ordination technique;

These provided a visual assessment of the similarity of and differences between the various sites and identified outlying quadrats.

- SIMPER (similarity percentages) showed which species were primarily responsible for the different groups identified by the clustering and MDS;

1.4 References

Gauch, H.G. jr. 1982. *Multivariate analysis in community ecology*. Cambridge, Cambridge University Press.

Sokal, R.R. & Rohlf, F.J. 1981. *Biometry. The principles and practice of statistics in biological research*. 2nd edition. New York, W.H. Freeman & Co.

2. Lundy: Kelp forest waterproof recording proforma.

Surveyor:.....Date..... Recording conditions?..... Transect side (L/R).....
Time Start.....

Quadrat position:											
Time start / duration											
Depth											
Substrata %											
Counts / %	1	2	3	4	5		1	2	3	4	5
Laminaria hyperbo						<i>Phylloph crista</i>					
L. hyp. medium						<i>Phylloph pseudo</i>					
Sacchorhiza poly						<i>Phylloph sicula</i>					
						<i>Plocamium cartil</i>					
Percentage	1	2	3	4	5	<i>Pterosiphonia parasitica</i>					
<i>Acrosorium reptans</i>						<i>Rhodophyllis divar</i>					
<i>Aglaozonia</i>						<i>Rhodymenia holmseii</i>					
<i>Bonnemaisonia a</i>						<i>Rhody pseudopal</i>					
<i>Calliblepharis cili</i>						<i>Schottera niccae</i>					
<i>Callophyllis lacini</i>						<i>Sphondylothamnion</i>					
<i>Chondrus crispus</i>						<i>Sporelings kelp</i>					
<i>Corallina officinalis</i>						<i>Sporelings red</i>					
<i>Cryptopleura ram</i>						<i>Ulva</i>					
<i>Delesseria sangu</i>											
<i>Desmarestia ligul</i>						Additional species					
<i>Dictyopterus membranacea</i>											
<i>Dictyota dichoto</i>											
<i>Dilsea carnosa</i>											
Enc. browns											
Enc. Corallines											
Enc. Dark red											
<i>Erythrogloussum laciniatum</i>											
<i>Falkenbergia'</i>											
<i>Heterosiphonia pl</i>											
<i>Hypoglossum woodwardii</i>											
<i>Kallymenia renif</i>											
<i>Meredithia micro</i>											

Lundy: Knoll Pins – circalittoral verticals (FaV) waterproof recording proforma.

Surveyor:.....Date..... Recording conditions?..... Transect side (L/R).....

Time Start.....

Quadrat position:													
Time start / duration						Halecium halicinum							
Depth						Haliclona oculata							
Substrata %						Halicnemis patena							
Counts / %	1	2	3	4	5	Hydrallmania falcata							
Eunicella verrucosa						Leptopsammia pruvoti							
Echinus esculentus						Nemertesia antennina							
						Nemertesia ramosa							
						Nolella stipitata							
Percentage	1	2	3	4	5	Omalosecosa ramulosa							
Aglaophenia kirkenpauraria						Orange enc. Bryozoan							
Alcyonium glomeratum						Orange sponge crust							
Anomidae juv.s						Pachymastisma johnstoni							
Antennella secundaria						Parazoanthus anguicomis							
Armathia lendigera						Parazoanthus axinelli							
Ascidia mentula						Pentapora foliacea							
Axinella damicornis						Plagioecia patina							
Axinella dissimilis						Raspailia hispida							
Bugula flabellata						Raspailia ramosa							
Caryophyllia inornata						Rissoa sp.							
Caryophyllia smithii						Scrupocellaria reptans							
Cellaria fistulosa						Scypha ciliata							
Cellaria sinuosa						Sertularella gayi							
Cliona celata						Sertularia argentea							
Corynactis viridis						Stelligera rigida							
Crisia eburnea						Stelligera stuposia							
Drachiella heterocarpa						Stolonica socialis							
Dysidea fragilis						Thiuraria articulata							
Epizoanthus couchii						Tubularia indivisa							
Eunicella verrucosa						White sponge crust							
Eurypon sp.						Yellow sponge crust							
Halecium beanii													

Lundy: Eunicella biotope waterproof recording proforma

Surveyor:.....Date..... Recording conditions?..... Transect side (L/R).....

Time Start.....

Quadrat position:													
Time start / duration						Halecium halecin							
Depth						Haliclona oculata							
Substrata %						Halicnemia pater							
Counts / %	1	2	3	4	5	Hydrallmania falc							
Eunicella verruco						Nemertesia ante							
Echinus esculent						Nemertesia ramo							
						Nolella stipitata							
						Omalosecosa ra							
						Orang enc. Bryo							
						Orang enc spong							
						Pachymatisma jo							
Percentage	1	2	3	4	5	Pentapora foliac							
Aglaophen kirche						Plagioecia patina							
Aglaophenia tubu						Polymastia mami							
Alcyonium glome						Raspailia hispida							
Anomiidae juvs						Raspailia ramosa							
Antennella secun						Rissoa sp.							
Amathia lendiger						Scrupocellari rep							
Axinella damicor						Scypha ciliata							
Axinella dissimili						Sertularella gayi							
Bugula flabellata						Sertularia argent							
Caryophyllia smit						Stelligera rigida							
Cellaria fistulosa						Stelligera stupos							
Cellaria sinuosa						Stolonica socialis							
Ciocalypta penici						Thuiaria articulata							
Cliona celata						Tubularia indivis							
Crisia eburnea						Yello enc sponge							
Drachiella hetero													
Dysidea fragilis													
Eunicella verruco													
Eurypon sp.													
Halecium beanii													

Lundy: Gannet's Pinnacle waterproof recording proforma

Surveyor:.....Date..... Recording conditions?..... Transect side (L/R).....

Time Start.....

Quadrat position:													
Time start / duration							Halecium halecin						
Depth							Halicnemia pater						
Substrata %							Hydrallmania falc						
Counts / %	1	2	3	4	5		Hymedesm paup						
Echinus esculent							Leptopsammia pr						
Marthasterias gla							Nolella stipitata						
							Pachymatisma jo						
							Parazoanth angu						
Percentage	1	2	3	4	5		Parazoanth axin						
Alcyonium glome							Pentapora foliac						
Anomiidae juvs							Plagioecia patina						
Antennella secun							Pomatoceros sp.						
Aplysilla rosacea							Raspailia hispida						
Aplysilla sulfurea							Raspailia ramosa						
Ascidia mentula							Rhodymeni ardis						
Axinella dissimili							Rhodymen holm						
Bryoz crust oran							Rissoa sp.						
Caryophyll inorna							Salmacina dyster						
Caryophyll smithi							Schottera niccae						
Cellaria fistulosa							Scypha ciliata						
Cellaria sinuosa							Spong crus oran						
Cliona celata							Spong crus white						
Corynactis viridis							Spong crus yello						
Crisiidae sp.							Stelligera rigida						
Dictyopteris mem							Stelligera stupos						
Dictyota dichoto							Stolonica socialis						
Drachiella hetero							Tethya aurantiu						
Dysidea fragilis							Thymosia guernii						
Coralline alg enc													
Epizoanth couchi													
Eurypon sp.													
Halecium beanii													

Lundy: Jenny's Cove waterproof recording proforma

Surveyor:.....Date..... Recording conditions?..... Transect side
(L/R).....Time Start.....

Quad' position:						Obelia geniculata					
Time start /						Orange sponge enc					
Depth						Phorbis fictitius					
Substrata %						Pink/orange sponge enc					
Counts	1	2	3	4	5	Plagioecia patina					
Henricia sp.						Polyclinum aurantium					
Hinia incrassata						Pomatoceros triqueter					
Luidia ciliaris						Raspailia hispida					
Marthasterias gla						Raspailia ramosa					
						Rhodymenia ardiss					
						Rhodymenia holme					
						Schizomavella linearis					
Percentage %	1	2	3	4	5	Schottera niccaensis					
Bryozoan turf tot'						Scrupocellaria reptans					
Sponge crusts tot						Scypha ciliata					
Aplysilla rosacea						Stelligera rigida					
Aplysilla sulfurea						Stelligera stiposa					
Axinella damicor						White sponge enc					
Axinella						Dictyota dichotoma					
Balanus crenatus						Dictyopteris membranacea					
Boscia anglica						Other species %					
Bowerbankia imb											
Bryozoa enc											
Caryophylli smith											
Caryophylli											
Cellaria sinuosa											
Clathrina coriacea											
Cliona celata											
Corallines enc											
Crisia denticulata											
Crisiidae indet.											
Cryptopleura ram											
Dark red algae											
Dercitus bucklan											
Dysidea fragilis											
Erythroglloss lac											
Grey sponge enc											
Haliclona cinerea											
Haliclona viscosa											
Halicnemis patera											
Hemimycale											
Hymedesmia											
Lissoclinum											
Mycale rotalis											

Lundy: Battery Point waterproof recording proforma.

Surveyor:.....Date..... Recording conditions?..... Transect side
(L/R).....Time Start.....

Quadrat position:														
Time start/durition						Hydrallmania falc								
Depth						Nemertesia ante								
Substrata %						Omalosecosa ra								
Counts / %	1	2	3	4	5	Pentapora foliac								
Eunicella verruco						Phyloph crispa								
Echinus esculent						Plocamium carti								
Marthasterias gla						Polymastia boleti								
						Raspailia hispida								
						Raspailia ramosa								
						Rhodymeni ardis								
						Rhodymen holm								
Percentage	1	2	3	4	5	Scrupocellari rep								
Aglaophen kirche						Sertularella gayi								
Axinella damicor						Sertularia argent								
Axinella dissimili						Stelligera rigida								
Bowerban implic						Stelligera stupos								
Bugula flabellata						Tethyspira spin								
Caryophyllia smit						Gymnangi monta								
Cellaria fistulosa						Hemimyc colum								
Cellaria sinuosa						Other species %								
Cliona celata														
Clytia hemisphae														
Coralline alg enc														
Crisia denticulata														
Crisidia cornuta														
Crisiidae sp.														
Dictyopt membra														
Drachiella hetero														
Dysidea fragilis														
Epizooanth couc														
Erythrogloss lac														
Flustra foliacea														

3. Transect quadrat results:

Lundy: Rat Island - kelp														
Surveyor	TM	TM	TM	TM	FB	FB	JJ	FB	FB	FB	TM	TM	TM	TM
Date	08/31/03	09/01/03	09/01/03	09/01/03	09/01/03	09/01/03	09/01/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03
Time at start of dive	1730	1747	1801	1819	1730	1757	1825	1107	1129	1142	1107	1128	1145	1155
Quadrat No	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
Depth (actual)	3	3	3.2	3.2	3.9	4	3.7	8.2	8.5	8.3	8.4	7.8	8.6	8.3
Depth (corrected)	0.8	0.5	0.3	0.6	1.7	1.1	1.1	0.2	0.8	1	0.4	0.2	1.3	1.5
Time to complete (mins)	17	14	18	18	27	25	28	22	18	13	21	17	10	18
Substratum	Creviced Bedrock	Creviced Bedrock	Creviced Bedrock	Creviced Bedrock	Creviced Bedrock	Creviced Bedrock	Creviced Bedrock	Creviced Bedrock	Creviced Bedrock	Creviced Bedrock	Flat silty Bedrock	Flat silty Bedrock	Creviced Bedrock	Flat silty Bedrock
Count														
<i>Laminaria hyperborea</i>	4	4			4		3	4	4	3	1	1	1	6
<i>L. hyp. Medium</i>	3		4		1			2	2	1	5	1	1	1
<i>Sacchorhiza polyschides</i>			3	3		1								
<i>Laminaria ochroleuca</i>	1	1												
<i>Laminaria ochroleuca medium</i>								1			1			
<i>Kelp medium sp (L och or L. dig)</i>							2	1		1				
<i>Sacchorhiza medium</i>									1			5		
% cover														
<i>Acrosorium reptans</i>					0.25	4								
<i>Aglaozonia</i>														
<i>Bonnemaisonia asparagopsis</i>														
<i>Calliblepharis ciliata</i>			2											
<i>Callophyllis laciniata</i>	4		3	2	1			6	3	6.5	0.5	2		
<i>Chondrus crispus</i>	1		0.5		0.5		0.25	3		0.25	0.25	2		
<i>Corallina officinalis</i>					0.5	0.5	0.5			2			3	2
<i>Cryptopleura ramosa</i>	1	8	16	8	4	12	3	28	8	1	5	15	2	
<i>Delesseria sanguinea</i>	2			1	2							5		
<i>Desmarestia ligulata</i>														

Quadrat No	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
<i>Dictyopteris membranacea</i>							0.25						0.25	0.5
<i>Dictyota dichotoma</i>				2	0.25		0.25	5.5	0.25	0.25	0.25	3		
<i>Dilsea carnosa</i>				4			0.25	3	3	1				
<i>Enc. browns</i>		0.25											1	
<i>Enc. Corallines</i>	8	1	12		8	8	6	5	4	8	1	25	8	14
<i>Enc. Rhodophyta</i>	4	6	2	2		1.5	1	0.25			1		2	3
<i>Erythroglossum laciniatum</i>	8	4	2	2		0.5					0.25	2		
<i>Falkenbergia'</i>														
<i>Heterosiphonia plumosa</i>	16	8	25	6	12	6	4	3	9	2	8	7		3
<i>Hypoglossum woodwardii</i>					0.25						0.25	0.25		
<i>Kallymenia reniformis</i>	3	5	5		1	1.5	0.5	4			0.5		4	0.5
<i>Meredithia micro'</i>	2	2	6	0.25	2	0.5	1.5			4	0.5	2	3	4
<i>Phylloph crispera</i>	8		4		0.5	0.25			0.5	1				
<i>Phylloph pseudoceranooides</i>					0.5	3		6	2	2	0.5	2	4	
<i>Phylloph sicula</i>			0.25	0.25	1					0.25				
<i>Plocamium cartilaginum</i>	0.5							0.25	0.25	0.5	1	3	3	0.5
<i>Pterosiphonia parasitica</i>			0.25											
<i>Rhodophyllis divaricata</i>		1	1	1										
<i>Rhody pseudopalmata</i>				6		4		1	4	4	12	3		4
<i>Rhodymenia holmseii</i>		2		2										
<i>Schottera niccaensis</i>	2					0.5		1	0.5	0.25	0.5	1	2	0.5
<i>Sphondylothamnion sp</i>								0.25			1	0.25		
<i>Sporelings kelp</i>			1	4				1	0.25	2	1		0.5	
<i>Sporelings red</i>	4				3	4	4	2	4	2	1		1	
<i>Ulva</i>			0.5	6				0.25		0.5	0.25	1		
Additional species														
? <i>Schizymenia dubii</i>						3		1						
<i>Antithamniella</i>					0.25				0.25					
<i>Bryopsis plumosa</i>												0.25		
<i>Carpomitra</i>		0.5												
<i>Ceramium sp.</i>									0.25					0.25
<i>Cladophora sp.</i>	0.25			0.25		0.25		0.25			0.25	0.25		

Quadrat No	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
<i>Gelidium lattifolium</i>			1	1								2	0.5	
<i>Gelidium pusillum</i>														0.5
Green ball											0.25			
<i>Gymnogrongus crenulata</i>			4											
<i>Halopteris filicina</i>	0.5		1	4	0.25	0.25		2	1	3	2	2	5	2
<i>Lomentaria articulata</i>		0.5		0.5								0.25		
<i>Lomentaria clavellosa</i>													0.25	
<i>Lomentaria orcadensis</i>		0.25		0.25								0.25		
<i>Osmundea osmunda</i>											0.25			
<i>Palmaria palmata</i>	2													
<i>Polyneura bonniemaisonii</i>	1	2		1		0.5	0.5	15	12	1	4	4		1
<i>Polysiphonia elongata</i>								0.25						
<i>Rhodomenia ardansonii</i>		1	4		0.5						2	0.5		0.5
<i>Rhodothamniella sp.</i>			2	0.5	0.5			0.5	4	2	1	1	5	
<i>Sphaerococcus</i>	2	0.5				2.5	1	1.5	0.5	1				

Lundy: Dead Cow Point kelp															
Surveyor	FB	FB	FB	FB	TM	TM	TM	TM	JH	JH	JH	JJ	JJ	JJ	JJ
Date	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03	09/02/03
Time at start of dive	1504	1517	1531	1540	1450	1500	1508	1520	1450	1505	1515	1504	1516	1529	1540
Quadrat No	DC1	DC2	DC3	DC4	DC5	DC6	DC7	DC8	DC9	DC10	DC11	DC12	DC13	DC14	DC15
Depth (actual)	7.2	7.1	7.2	6.8	7.5	7.3	7.5	7.5	7.1	7.8	7.8	6.7	8.2	7.3	6.6
Depth (corrected)	5.3	5.5	5.7	5.4	4.7	4.8	5.1	5.3	4.3	5.3	5.4	5.4	5.1	4.4	4
Time to complete (mins)	13	14	8	10	9	8	9	10	15	9	11	11	11	9	11
Substratum	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock

Count

<i>Laminaria hyperborea</i>	4	2	3	4	4	3	4	2	8	4	6	3	3	3	3
<i>L. hyperborea (medium)</i>	9	8	6	4	4	4	6	6		2	2	5	7	1	5

% cover

<i>Acrosorium reptans</i>		2	1	0.25											
<i>Callophyllis laciniata</i>	1	0.5	4	0.5			3		2	4					
<i>Corallina officinalis</i>	0.5	0	0.25			1	2								
<i>Cryptopleura ramosa</i>	4	7	4	5		22	5	12	2	4	4		1	2	1.5
<i>Delesseria sanguinea</i>	11	16	8	19	8	16		7	4	4	4	1	4	3	2.5
<i>Desmarestia ligulata</i>		6													
<i>Dictyopteris membranacea</i>										4					0.25
<i>Dictyota dichotoma</i>	1	2	0.25	6	3	0.5	0.5	0.25		8	2	0.5		0.25	2
<i>Enc. Corallines</i>	4.5	14	4.5		6	1	8	12	8	8		1.5	1	3	5
<i>Enc. Rhodophyta</i>													0.25		
<i>Erythrogllossum laciniatum</i>	2	1.5	2.5	3	1		4	2	4						
<i>Falkenbergia'</i>					3	0.5									

	0.25														
Quadrat No	DC1	DC2	DC3	DC4	DC5	DC6	DC7	DC8	DC9	DC10	DC11	DC12	DC13	DC14	DC15
<i>Heterosiphonia plumosa</i>															
<i>Kallymenia reniformis</i>	1	15			3	0.5	4		4	2		0.25			
<i>Meredithia microphylla</i>	6	0.25	1	6				2	4				0.25		
<i>Phyllophora sicula</i>	2														
<i>Plocamium cartilaginum</i>							0.25								
<i>Rhodymenia holmseii</i>	0.25			1											
<i>Schottera niccaensis</i>	2	8	1	5	6		5	1		4	4	1.5	1.5		2
<i>Sporelings kelp</i>	2	3	0.25			2	5	1				0.25		1	1
<i>Sporelings red</i>	1			1	1	1						2	5	1	2
Additional species															
<i>Antithamnion type.</i>	0.5														
<i>Acrosorium venulosum</i>									4						
<i>Cladophora pellucida</i>		0.25						0.25							
<i>Phycodrys rubens</i>		2		0.25											

Lundy: Gannets Bay kelp																						
Transect no. (T1, T2, T3 etc.)	T1	T1	T2	T2	T1	T1	T2	T2	T1	T1	T2	T2	T1	T1	T2	T2	T1	T1	T2	T2	T2	T1
Surveyor	CMH	CMH	CMH	CMH	TM	TM	TM	TM	JH	JH	JH	JH	FB	FB	FB	FB	JJ	JJ	JJ	JJ	JJ	SB
Date	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04	08/30 /04
Time at start of dive	1256	1256	1640	1640	12.56	12.56	16.4	16.4	1256	1256	1640	1640	11.24	11.24	15.25	15.25	11.24	11.24	15.25	15.25	15.25	11.24
Quadrat No	GB1	GB2	GB3	GB4	GB5	GB6	GB7	GB8	GB9	GB10	GB11	GB12	GB13	GB14	GB15	GB16	GB17	GB18	GB19	GB20	GB21	GB22
Depth (actual)	2.5	2.4	7.9	8.6	2.5	2.4	7.9	8.6	2.1	2.2	7.5	8.5	2.9	2.9	4.8	5.6	2.8	2.9	5.4	6.4	6.1	2.8
Depth (corrected)	1.7	1.5	1.9	2.2	1.7	1.5	1.9	2.2	1.3	1.4	1.6	2	1	1.2	1.6	1.9	0.8	1.2	2.2	2.7	2.4	0.8
Time to complete (mins)	20	20	8	20	13	11	12	8	21	28	15	18	23	18	23	18	22	12	17	8	7	20
Substratum	Silty b'lder	Silty b'lder	Silty b'lder	Silty b'lder	Lge b'lder	Lge b'lder	Lge b'lder	Lge b'lder	Lge b'lder	Lge b'lder	Lge b'lder	Lge b'lder	Lge b'lder	Med b'lder	Med b'lder	Med b'lder	Med b'lder	Med b'lder	Med b'lder	Med b'lder	Med b'lder	Med b'lder

Count

<i>L. hyperborea</i> (medium)	1	5	2	1	1	3	11		4	1	4	5	2	9	8	4	3		4	2	1	2
<i>Laminaria</i> <i>hyperborea</i>		1	1	2						3								5		7	9	1
<i>L. ochroleuca</i> (medium)			4	2	3		3	5					2									
<i>Laminaria</i> <i>ochroleuca</i>				2					3		1				3	5						
<i>Saccorhiza</i> <i>medium</i>													2									
<i>Saccorhiza</i> <i>polyschides</i>					1	1		1					2	1		2	1					

Quadrat No	GB1	GB2	GB3	GB4	GB5	GB6	GB7	GB8	GB9	GB10	GB11	GB12	GB13	GB14	GB15	GB16	GB17	GB18	GB19	GB20	GB21	GB22
% cover																						
<i>Gelidium sp.</i>													0.25	2		0.25		0.25				
<i>Grateloupia sp.</i>					0.25	0.25																
<i>Acrosorium venulosum</i>																		0.5				
<i>Aglaothamnion sp.</i>														0.25								
<i>Aglaozonia</i>					0.5								4									
<i>Ahnfeltia plicata</i>	0.5																					
<i>Antithamnionella ternifolia</i>	3	0.5																				
<i>Apoglossum ruscifolium</i>	0.25	1.5	1.5	2	0.5		0.25			1	0.25	1	0.25	4	1	0.25				0.25		
<i>Bonnemaisonia asparagoides</i>													0.25									
<i>Brown filamentous alga</i>	0.5		0.5						1			0.25										
<i>Bryopsis plumosa</i>													0.25									
<i>Calliblepharis ciliata</i>				1.5												2		0.25				
<i>Callophyllis laciniata</i>	7	2		1	3	2	6	8	2	2		4	0.5	4	14	3						
<i>Ceramium secundatum</i>					0.25										0.25		0.25					
<i>Ceramium sp.</i>														0.25								
<i>Chondrus crispus</i>	1	0.5		1		0.25				0.25							0.5					1
<i>Cladophora sp.</i>					0.25	0.25								0.25								
<i>Corallina officinalis</i>	3.5	0.25								4										0.25		
<i>Cryptopleura ramosa</i>	9	2	1	0.5	0.25			3		0.25		1			0.25		0.5	0.5	1			
<i>Cystoclonium purpureum</i>	6							0.25												0.25		
<i>Delesseria sanguinea</i>	0.5	1.5	1.5	3	12		7	1	2	6	4	4	4	0.25	3		2					15

Quadrat No	GB1	GB2	GB3	GB4	GB5	GB6	GB7	GB8	GB9	GB10	GB11	GB12	GB13	GB14	GB15	GB16	GB17	GB18	GB19	GB20	GB21	GB22
<i>Dictyopteris membranacea</i>																	0.25					
<i>Dictyota dichotoma</i>	4	0.25			0.25	0.5		2		1												
<i>Dilsea carnosa</i>									2							2		0.5				5
<i>Ectocarpacae</i>					0.5	0.25													1	0.25	1.5	
<i>Enc. Brown algae</i>	5	5							4												0.25	
<i>Enc. Coralline algae</i>	8	4	6	9	75	25	55	8	35	16	25	3	7	8	4	7	12	0.5	3		28	1
<i>Enc. Rhodophyta</i>	4	1	1	1			2	0.5	1	1		4	4		0.25		4	2	1			5
<i>Erythrodermis traillii</i>		0.25																				
<i>Falkenbergia</i>	0.25																					
<i>Gelidium pusillum</i>				0.25																		
<i>Halidrys sporellings</i>	0.5																					
<i>Halopteris filicina</i>		2	2	2.5	35	5	12	12	8	16	2	4	4	6	25	8	2	1	1.5	6	0.5	1
<i>Halurus flosculosus</i>													0.25			0.25						
<i>Heterosiphonia plumosa</i>	5	0.5		8	3	2			1	8	2	8	3	0.5	0.25	25		0.5	2		0.5	4
<i>Hypoglossum hypoglossoides</i>		0.25		0.5	3	2		1														
<i>Kallymenia reniformis</i>		0.5		1.5			2							0.5	2	1					0.25	
<i>Lomentaria articulata</i>		0.25					0.25					0.25			0.25		0.25	0.25		1.5		2
<i>Lomentaria clavellosa</i>																	0.25				0.25	
<i>Lomentaria orcadensis</i>		0.25																				
<i>Monosporus pedicellatus</i>														0.25								
<i>Osmundea osmunda</i>					0.25							0.25			0.25							

Quadrat No	GB1	GB2	GB3	GB4	GB5	GB6	GB7	GB8	GB9	GB10	GB11	GB12	GB13	GB14	GB15	GB16	GB17	GB18	GB19	GB20	GB21	GB22	
<i>Palmaria palmata</i>	1													1								0.25	
<i>Phycodrys rubens</i>								2	0.25						0.25								
<i>Phyllophora crista</i>						0.5																	
<i>Phyllophora pseudoceranoides</i>				2.5	0.25	0.25				0.25			0.25	0.25	2	1			1.5		0.25	5	
<i>Plocamium cartilagineum</i>				0.25	0.25	0.25	15	3		2			0.25	0.5	0.25	0.25	0.25		0.25				
<i>Polyneura bonnemaisonia</i>	9	2	0.5	1.5		1	9	6			0.25	0.25		2	8	8	0.5						
<i>Polysiphonia stricta</i>					0.25	0.25																	
<i>Pterocladia capillacea</i>	0.25																						
<i>Pterosiphonia parasitica</i>					0.25		0.25						0.5										
<i>Pterothamnion plumula</i>	0.25																						
<i>Pycodrys rubens</i>																0.25							
<i>Rhodymenia pseudopalmata</i>	0.5		0.5	6	0.5	0.25	0.25			1	1.5	4					1	0.5	4	1		1	
<i>Schottera niccaensis</i>			0.5	2	6	4		0.25			0.25		8	3		4							
<i>Sphaerococcus coronopifolius</i>				0.25						2		0.25											
<i>Sphondylothamnion multifidum</i>					0.25	0.25				0.25					0.25								
<i>Sporelings kelp</i>	12	4		12			1		0.25		1		1										
<i>Sporelings red</i>	1	1	0.5	1	2	0.25	4	6	2	2			6	4	2	4	2	4	4	2	2		
<i>Ulva sp.</i>	12	2.5			0.25	0.25		0.25		1								0.25					

Lundy - North of Quarry Bay - Eunicella.														
Surveyor	FDB	TSM	TSM	TSM	TSM	TSM	FB	FB	JJ	JJ	JH	JH	CMH	CMH
Date	9/4/03	9/4/03	9/4/03	9/4/03	9/5/03	9/5/03	9/5/03	9/5/03	9/5/03	9/5/03	9/5/03	9/5/03	9/5/03	9/5/03
Time at start of dive	1635	1635	1635	1635	1107	1122	1107	1137	1245	1327	1245	1305	1245	1330
Quadrat No	NQB1	NQB2	NQB3	NQB4	NQB5	NQB6	NQB7	NQB8	NQB9	NQB10	NQB11	NQB12	NQB13	NQB14
Depth					17	17	15.7	16.5	17	17	16.8	17.4	17	17.2
Depth corrected	11.4	11	11	11	12.2	11.8	10.9	11.3	11.3	11	11.1	11.6	11.3	11.2
Time to complete (mins)	38	18	18	18	15	17	28	28	42	33	20	30	45	20
Substratum	Silty b'lder	Silty b'lder	Silty b'lder	Silty b'lder	Silty b'lder	Silty b'lder	Silty b'lder	V.silty beers	Silty b'lder	Silty b'lder	Silty b'lder	Silty b'lder	Silty b'lder	Silty b'lder

Position WGS 84**Counts**

<i>Asterias rubens</i>	1										1			
<i>Axinella dissimilis</i>	13	3	6		3	3		1	1	6	1		5	
<i>Eunicella verrucosa</i>				2								1		
<i>Marthasterias glacialis</i>		2								1				

Percentage cover

<i>Aetea anguina</i>	1	0.25	0.5	0.25	0.25	0.25	0.25	0.25		1				
<i>Anemonia viridis</i>				0.25										
<i>Anomiidae</i>	0.25	0.25	0.25		0.25	0.25	0.25	0.25			0.25	0.25	0.25	0.25
<i>Antenella secundaria</i>		0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25	0.25	
<i>Antithamnionella ternifolia</i>		2	2		0.25	0.25			1.5	1	0.5	0.5		0.25
<i>Axinella dissimilis</i>	6		0.5	0.5	1	0.5		1	0.25				5	
<i>Boscia anglica</i>				0.25	0.25	0.25			0.25	0.5				
<i>Bowerbankia pustulosa</i>				0.5	0.25	0.25								
<i>Bryozoan crust white (Dull grey on weed)</i>		0.25	0.25				0.5	0.5	0.25	0.25	0.25	0.25		
<i>Bryozoan crust white (Spiky on weed)</i>		0.25		0.25			0.25			0.25				
<i>Bryozoan crust white (Crystalline on weed.)</i>	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25		0.25				
<i>Calliblepharis ciliata</i>		14			6	24	45	4			2	1	7	

Quadrat No	NQB1	NQB2	NQB3	NQB4	NQB5	NQB6	NQB7	NQB8	NQB9	NQB10	NQB11	NQB12	NQB13	NQB14
<i>Carpomitra costata</i>				0.25			4	2						
<i>Caryophyllia smithii</i>	0.5	0.25	0.25	0.25	0.5	0.5	0.25	1	3	3		0.25	0.5	
<i>Ceramium sp.</i>	0.25						0.25							
<i>Crisia denticulata</i>							0.25	0.25				0.25	1.5	0.5
<i>Crisia eburnea</i>	0.25	0.25	0.25	0.25	0.5	0.5					0.25	0.25	0.25	0.25
<i>Crisidia cornuta</i>	0.5	0.25	0.25		0.5	0.5	0.25	0.25				0.25	0.25	0.25
<i>Enc. Coralline algae</i>		2			3	2		0.25					0.25	0.25
<i>Enc. Rhodophyta</i>														
<i>Dictyopterus membranacea</i>	4	1	16	11	8	7		2	3	2	2	4	0.25	12
<i>Dictyota dichotoma</i>	15	12	32	4	33	3	2	3		12	2	3	23	24
<i>Didemnidae indet. (white small)</i>		0.25	0.25		0.25	0.25	0.25	0.25						
<i>Diplosoma listerianum</i>		0.25					0.5							
<i>Drachiella heterocarpa</i>	11	3	2	2	0.5	1	3	0.5		4		0.25	0.25	
<i>Electra pilosa</i>		0.5					4	0.25	0.5	2	0.25	0.25	1.5	0.5
<i>Falkenbergia</i>	0.25				0.25				0.25	0.25				
<i>Heterosiphonia plumosa</i>	4				2	3				1	0.5			0.25
<i>Isozoanthus sulcatus</i>	0.5													
<i>Mimosella verticillata</i>								0.25						
<i>Musculus sp.</i>										0.25				
<i>Phyllophora crispa</i>	0.25	1	0.25	2	18	1	4	3	1	1	8	15	32	6
<i>Phyllophora sicula</i>	2	6	0.5	1	1								0.25	
<i>Plagioecia patina</i>	0.25									0.25			0.25	
<i>Plocamium cartilaginum</i>											0.5			
<i>Plyllophora pseudoceranooides</i>	2						4	2					0.5	1.5
<i>Polysiphonia elongata</i>	2	2	4	1				0.25	2	2	2	8	4	3
<i>Polysiphonia elongella</i>		0.25		0.25				0.25			1			
<i>Polysiphonia fine</i>			0.25											
<i>Pomatoceros lamarcki.</i>	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25		0.25		0.25		
<i>Pterothamnion pluma</i>								0.25	0.25					
<i>Raspailia hispida</i>							0.25			1.5	0.5			
<i>Raspailia ramosa</i>	1	0.25			0.5	0.25			1.75	0.5				
<i>Sporelings Red</i>	4				1	1	0.25	0.25	0.25	0.25			3	1.5
<i>Rhodomela confervoides</i>					0.5	2			1	2		1	8	1
<i>Rhodymenia holmesii</i>	0.5						0.5							

Quadrat No	NQB1	NQB2	NQB3	NQB4	NQB5	NQB6	NQB7	NQB8	NQB9	NQB10	NQB11	NQB12	NQB13	NQB14
<i>Rhodymenia pseudopalmata</i>				4										
<i>Rissoidae</i>	0.25	0.25	0.25	0.25	0.5	0.25			0.25	0.25			0.25	0.25
<i>Spirorbis sp.</i>		0.25	0.25		0.25	0.25	0.25	0.25			0.25	0.25	0.25	0.25
<i>Stelligera rigida</i>	0.5	0.25	0.25	0.5	0.5		0.25		0.5	0.5			2	
<i>Stelligera stuposa</i>	0.25							1					1.5	
<i>Verruca stroemia</i>	0.25	0.25	1	1	3	1		0.25					0.25	
<i>Walkera uva</i>		0.25	0.25		0.25	0.25							0.25	0.25
Additional Species														
<i>Eurypon sp.</i>	0.25				0.25				9	7			0.25	0.5
<i>Halicnemis patera</i>	0.25									0.5				
<i>Axinella juv.sp</i>									0.5	0.25			0.5	0.5
<i>Acrosorium venulosum</i>													0.25	
<i>Axinella damicornis</i>										0.25				0.25
<i>Axinella infundibuliformis</i>									0.25					
<i>Bugula turbinata</i>									0.25					
<i>Cellaria fistulosa</i>													0.25	
<i>Chondria dasyphylla</i>							2.5							0.5
<i>Ciocalyptra penicillus</i>													2	0.25
<i>Clavellina lepadiformis</i>											0.25			
<i>Cordylecladia erecta</i>								0.25						
<i>Cryptopleura ramosa</i>							2						2	2
<i>Enc. orange bryozoan on algae</i>							0.25			0.25				
<i>Enc. Coralline (on Phyllophora crispa)</i>							0.25	0.25						
<i>Furcellaria lumbricalis</i>													1	
<i>Halopteris filicina</i>								0.5						
<i>Hemimycale columella</i>									3					
<i>Hinia reticulata</i>					0.25	0.25								
<i>Microporella ciliata</i>														0.25
<i>Nemertesia antennina</i>				0.25						0.25				
<i>Nolella stipitata</i>	0.25													
<i>Phyllophora traillii</i>							2							
<i>Plumulaira setacea</i>													0.25	
<i>Polyclinum aurantium</i>					0.25	0.25								

Quadrat No	NQB1	NQB2	NQB3	NQB4	NQB5	NQB6	NQB7	NQB8	NQB9	NQB10	NQB11	NQB12	NQB13	NQB14
<i>Polymastia boletiformis</i>													0.25	
<i>Polymastia mamillaris</i>	0.25				0.25	1	1	2	0.5	0.25			0.25	
<i>Pseudosuberites sulphureus</i>	0.25	0.25		0.25	0.25	0.25		0.25	25				0.25	
<i>Pterosiphonia adraeana</i>							0.25							
<i>Pterosiphonia parasitica</i>											0.25			
<i>Rhodophyllis divaricata</i>							0.25						0.5	0.5
<i>Sphondylothamnion multifidum</i>													0.25	

Lundy: Knoll Pins Eunicella - horizontal

Surveyor	CMH	FDB	TSM	TSM	TSM	JH	JH	JH	JJ	JJ	JJ	CMH	CMH	FB
Date	09/08/03	09/08/03	09/08/03	09/08/03	09/08/03	09/08/03	09/08/03	09/08/03	09/08/03	09/08/03	09/08/03	09/09/03	09/09/03	09/09/03
Time at start of dive	1511	1411	1411	1411	1037	1145	1205	1511	1145	1202	1511	1208	1222	1208
Quadrat No	KPH1	KPH2	KPH3	KPH4	KPH5	KPH6	KPH7	KPH8	KPH9	KPH10	KPH11	KPH12	KPH13	KPH14
Depth	30	28.1	27.5	27.8	24.5	25.6	25.3	29.2	24.6	24.8	29.4	25.7	25.5	25.3
Depth corrected	24.6	23.9	23.3	23.4	22.3	23.5	23.3	23.8	22.5	22.8	24	23.7	23.1	23.8
Time to complete (mins)	15	11	11	11	14	18	17	12	16	13	20	12	11	20
Substratum	Sand 10; Rock 90	Bedrock with shell gravel cover over most of rock	Bedrock with shell gravel cover over most of rock	Bedrock with shell gravel cover over most of rock	Bedrock with shell gravel cover over most of rock			Bedrock with shell gravel			Bedrock	Sand 12; Rock 88	Sand 7; Rock 93	Bedrock with little vertical faces and pockets of sediment. Virtually all the rock had some sediment cover.

Counts

Eunicella verrucosa
Echinus esculentus
Marthasterias glacialis

1

1

1

1

Percentage cover

Aglaophenia kirchenpaueri
Aglaophenia tubulifera
Alcyonium glomeratum
Amathia lendigera
Anomiidae
Antennella secundaria
Axinella damicornis

0.25 0.25

0.5

0.25

0.5

8

2

0.25

0.25

0.25

0.25

2

2

2

1

0.25

0.25

0.25

0.25

3

0.25

0.25

2

Quadrat No	KPH1	KPH2	KPH3	KPH4	KPH5	KPH6	KPH7	KPH8	KPH9	KPH10	KPH11	KPH12	KPH13	KPH14
<i>Axinella dissimilis</i>														
<i>Bugula flabellata</i>					0.25		0.25	0.5						
<i>Caryophyllia smithii</i>		0.25	1		0.25	0.25	0.25	1	0.5	0.25		0.25	0.25	0.25
<i>Cellaria fistulosa</i>	55	1	1	15	55	12	3	16	25	1	2	16	24	3
<i>Cellaria sinuosa</i>	7.5	15	5	5	2	4	4	4	5	8	2	3	1.5	8
<i>Ciocalypta penicillus</i>														
<i>Cliona celata</i>	6	4	1			16	25					2	1.5	18
<i>Crisia eburnea</i>						8	8	8						1
<i>Drachiella heterocarpa</i>		3	1											
<i>Dysidea fragilis</i>														
<i>Eunicella verrucosa</i>									1					
<i>Eurypon sp.</i>														0.25
<i>Halecium beanii</i>													0.5	4
<i>Halecium halecinum</i>	4		0.5	1	0.25	0.25	0.25		0.5		0.25		1	2
<i>Haliclona oculata</i>														
<i>Halicnemia patera</i>											0.25			
<i>Hydrallmania falcata</i>	4			2	15	0.25	16	2	0.5	3	1	1	1.5	1
<i>Hymedesmiidae sp</i>			0.25	0.25		8					3	0.25	0.5	
<i>Nemertesia antennina</i>	2	3	0.25	0.25	1	4	4	2	2	1	0.25	0.5	2	2
<i>Nemertesia ramosa</i>														
<i>Nolella stipitata</i>			1	1	1	16	2	8						0.25
<i>Omalosecosa ramosa</i>	0.5	0.25	0.25		0.25	2			0.25	0.25	0.5	2	0.25	1
<i>Orange encrusting bryozoa</i>													2	0.25
<i>Pachymatisma johnstonia</i>														
<i>Pentapora foliacea</i>	6			2	1				12	0.25	8	9	3	
<i>Plagioecia patina</i>	0.25	0.25	0.25	0.25	0.25				0.25	0.25	0.25	0.25	0.25	0.25
<i>Polymastia mamillaris</i>														
<i>Raspailia hispida</i>			0.5	0.25					0.5	0.2		0.5	0.5	
<i>Raspailia ramosa</i>	3	1	0.5	0.5	0.5		1	0.5	0.5	0.5	8	7	5	2
<i>Rissoidae</i>														

Quadrat No	KPH1	KPH2	KPH3	KPH4	KPH5	KPH6	KPH7	KPH8	KPH9	KPH10	KPH11	KPH12	KPH13	KPH14
<i>Scrupocellaria reptans</i>										2	0.25			
<i>Scypha ciliata</i>														
<i>Sertularella gayi</i>				0.25					0.25	0.25	0.25			0.5
<i>Sertularia argentea</i>					3		8		0.5	0.5	0.25			
<i>Stelligera rigida</i>	0.5	0.25							0.5	0.25	0.25	0.5	0.25	0.5
<i>Stelligera stuposa</i>	1	4	3		2	1.5	1	1	0.25	0.5	1.5	1	1.5	3
<i>Stolonica socialis</i>			0.25	1	0.5			1	0.25		0.5	1	2.5	0.25
<i>Thuiaria articulata</i>						0.25			2		0.5		1	
<i>Tubularia indivisa</i>														
Additional species														
<i>Alcyonium digitatum</i>				0.5									0.5	
<i>Ascidiella aspersa</i>														0.25
<i>Boscia anglica</i>			0.25	0.25	0.25									
<i>Bougainvillea sp.</i>								1		0.25				
<i>Caryophyllia inornata</i>					0.25								0.25	
<i>Crisia denticulata</i>	3													
<i>Crisiidae</i>		2	4	25	5				2	25	3	14	2	
<i>Doto eireana</i>											0.25			
<i>Enc. Coralline algae</i>	1.5	1												
<i>Epizoanthus couchii</i>	2		1	0.5	1	8	12		5	5	4	0.5	4	1
<i>Eurypon major</i>														0.25
<i>Halicnemis patera</i>		1												
<i>Heterosiphonia</i>						0.25								
<i>Hinia reticulata</i>					0.25				0.25	0.25				
<i>Homaxinella subdola</i>			0.5											
<i>Hydroides sp.</i>					0.25									
<i>Hymedesmiidae sp.</i>		0.25		0.25										
<i>Lafoea dumosa</i>											0.25			
<i>Mimosella gracilis</i>											0.25			
<i>Nassarius reticulatus</i>														0.25
<i>Paguridae</i>			0.25											
<i>Plumularia setacea</i>	1													
<i>Polycera faeroensis</i>									0.25					
<i>Pomatoceros lamarcki</i>	0.25	0.25	0.25	0.25	0.25	0.25		0.25	0.25	0.25	0.25			0.25

Quadrat No	KPH1	KPH2	KPH3	KPH4	KPH5	KPH6	KPH7	KPH8	KPH9	KPH10	KPH11	KPH12	KPH13	KPH14
<i>Raspailia / Stelligera</i> juvs.														0.25
<i>Sabellidae</i> indet.														0.5
<i>Salmacina dysteri</i>						0.25					0.25			0.5
<i>Sertularella</i> <i>polyzonias</i>	3													
<i>Spirorbis</i> sp.,														0.25
<i>Terebellidae</i> indet.														2
<i>Verruca stroemia</i>		2	1	1										0.25

Lundy: Knoll Pins - Faunal turf - vertical

Surveyor	CMH	CMH	CMH	CMH	TM	TM	TM	TM	FB	FB	FB	JH	JH	JH	JH	JJ	JJ	JJ	JJ
Date	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03	9/7/03
Time at start of dive	1106	1122	1446	1459	0941	0956	1330	1342	0941	1000	1330	1106	1130	1446	1502	1106	1130	1446	1500
Quadrat No	KPV1	KPV2	KPV3	KPV4	KPV5	KPV6	KPV7	KPV8	KPV9	KPV10	KPV11	KPV12	KPV13	KPV14	KPV15	KPV16	KPV17	KPV18	KPV19
Depth	22.1	21.7	25.5	26.1	20.8	20.8	23.4	23.4	21.7	21.6	23.1	21.7	21.9	25.1	25.5	21	22	25	25
Depth corrected	19.4	18.8	19	19.3	18	18.1	18.4	18.1	18.9	18.9	18.1	19	18.9	18.6	18.7	18.3	19	18.5	18.2
Time to complete (mins)	14	12	11	13	15	18	11	16	18	16	12	20	22	16	20	19	15	14	15
Substratum	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck	Vert' rck

Counts

<i>Diaphorodoris luteocincta</i>			3																
<i>Echinus esculentus</i>																			
<i>Eunicella verrucosa</i>		1																	
<i>Leptosammia pruvoti</i>	5		1						7				5				2		
<i>Marthasterias glacialis</i>							1											0.25	
<i>Procereus vittatus</i>									1										

Percentage cover

<i>Aglaophenia kirchenpaueri</i>																			
<i>Alcyonium glomeratum</i>				6	18	7				1									
<i>Amathia lendigera</i>			1																

Quadrat No	KPV1	KPV2	KPV3	KPV4	KPV5	KPV6	KPV7	KPV8	KPV9	KPV10	KPV11	KPV12	KPV13	KPV14	KPV15	KPV16	KPV17	KPV18	KPV19
<i>Anomiidae</i>					0.25	0.5	0.5	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25			
<i>Antennella secundaria</i>	0.25				0.25	0.25	0.25	3			1	0.25		2	4			0.25	0.25
<i>Ascidia mentula</i>																			
<i>Axinella damicornis</i>								0.25											
<i>Axinella dissimilis</i>								0.25					0.5	4	0.25				
<i>Bugula flabellata</i>														0.25					
<i>Caryophyllia inornata</i>	0.25	0.25	0.25			0.25	0.25										0.25	0.25	0.25
<i>Caryophyllia smithii</i>	1	1	0.5	0.25	0.25	0.5	0.5	0.25	1	1	0.5	0.5	4	0.25	0.25	0.25	0.25	0.25	0.25
<i>Cellaria fistulosa</i>	1	35	4	4	8	3	22	6	38	3	25	12	2	2	35	3	12	25	15
<i>Cellaria sinuosa</i>		2	1	1	3	8		1		8						0.25			
<i>Cliona celata</i>	0.25		0.5									4							
<i>Corynactis viridis</i>			0.5		0.25	0.5	1	0.25	0.25	0.25	0.25		2		2	0.5	0.25	0.25	0.5
<i>Crisiidae</i>	48	14	3		5	6	25	32	21	29	6	1	2	1	2	25	2	25	2
<i>Drachiella heterocarpa</i>							0.5	0.5						4	2				0.25
<i>Dysidea fragilis</i>	0.5				2	0.5	2		0.25	0.25			2		0.5	0.25	0.25	0.25	
<i>Epizoanthus couchii</i>	0.25	1					0.25		0.25					0.5	0.5				0.5
<i>Eunicella verrucosa</i>		0.25																	
<i>Eurypon sp.</i>	2	7		1						0.25			4	4	2		0.25	0.25	4
<i>Halecium beanii</i>								0.5						0.25		0.25			
<i>Halecium halecinum</i>						2	0.25				2								
<i>Haliclona oculata</i>																			

Quadrat No	KPV1	KPV2	KPV3	KPV4	KPV5	KPV6	KPV7	KPV8	KPV9	KPV10	KPV11	KPV12	KPV13	KPV14	KPV15	KPV16	KPV17	KPV18	KPV19
<i>Hydrallmania falcata</i>											1								
<i>Hymedesmiidae</i>	8	52	6	8	35	2	8	1	7	6			8	15	2		1	35	15
<i>Leptopsammia pruvoti</i>	1.5		0.25						2				4				2		
<i>Nemertesia antennina</i>		1					0.25		1		0.25	0.25	0.5	6		0.25			0.25
<i>Nemertesia ramosa</i>																			
<i>Nolella stipitata</i>	2	12	1		15	1	12	1	11	4	11	3	2	2	3	2	15	2	2
<i>Omalosecosa ramulosa</i>		0.5				0.25		0.25			0.25	0.25		1	1	0.25		0.25	
<i>Orange encrusting bryozoan</i>									1		0.5					0.5	0.5	0.5	0.25
<i>Pachymatisma johnstoni</i>																			
<i>Parazoanthus anguicomis</i>																			
<i>Parazoanthus axinellae</i>				1				6								0.25			
<i>Pentapora foliacea</i>																			
<i>Plagioecia patina</i>	0.25	0.25	0.25	0.25	0.25	1	0.25	0.5	0.25	0.25	0.25					0.25	0.25	0.25	0.25
<i>Raspailia hispida</i>		2				0.25	1	0.25											0.25
<i>Raspailia ramosa</i>		2			0.25						1	1		0.25	0.25	0.25		0.25	0.25
<i>Rissoiidae</i>																			
<i>Scrupocellaria reptans</i>	4	6	18	2	2	1					0.25					0.25	4	0.25	0.25

Quadrat No	KPV1	KPV2	KPV3	KPV4	KPV5	KPV6	KPV7	KPV8	KPV9	KPV10	KPV11	KPV12	KPV13	KPV14	KPV15	KPV16	KPV17	KPV18	KPV19
<i>Scypha ciliata</i>							0.25												0.25
<i>Sertularella gayi</i>								0.5											
<i>Sertularia argentea</i>														4					
<i>Stelligera rigida</i>	0.5	1			0.25	0.25		0.25			0.25						0.25	0.25	
<i>Stelligera stuposa</i>		1				0.25	0.5									0.25			
<i>Stolonica socialis</i>																			
<i>Thuiaria articulata</i>							3												
<i>Thyrosia gurnei</i>					2	1	2												
<i>Tubularia indivisa</i>																			
Additional species																			
<i>Aglaophenia tubulifera</i>			0.5				0.25						0.25						
<i>Aplidium punctum</i>																			0.25
<i>Ascidiella aspersa</i>									p										
<i>Axinellidae</i>										1									
<i>Balanus crenatus</i>									0.5	0.5	0.25								
<i>Boscia anglicum</i>			0.25			0.25	0.25	0.25	0.25	0.25	0.25								
<i>Bugula plumosa</i>			0.5																
<i>Halicnemida patera</i>										8	3								0.25
<i>Heteronomia sp.</i>							0.25												

Quadrat No	KPV1	KPV2	KPV3	KPV4	KPV5	KPV6	KPV7	KPV8	KPV9	KPV10	KPV11	KPV12	KPV13	KPV14	KPV15	KPV16	KPV17	KPV18	KPV19
<i>Hymedesmia</i>	0.25		0.25		0.25	0.25	0.25		0.25	0.25							0.25	0.25	
<i>paupertas</i>																			
<i>Hymedismiidae sp</i>																	4		0.25
<i>Lissoclinum</i>								0.25											
<i>perforatum</i>																			
<i>Morchellium</i>						0.25													
<i>argus</i>																			
<i>Ophiothrix</i>									0.25										
<i>fragilis</i>																			
<i>Pink encrusting</i>									0.25	0.25	0.25								
<i>bryozoan</i>																			
<i>Polycera</i>																			0.25
<i>faeroensis</i>																			
<i>Pomatoceros</i>	0.25		0.25		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25				
<i>lamarcki</i>																			
<i>Purple didemnid</i>					0.25			0.25											
<i>Salmacina</i>					0.25	0.25		0.25							0.25				
<i>dysteri</i>																			
<i>Spirorbis sp.</i>											0.25								

Lundy: Gannets Pinnacle - vertical rock (Quadrats GP1-GP18)

Surveyor	CMH	CMH	CMH	TSM	TSM	TSM	TSM	TSM	JH	JH	JH	JH	JJ	JJ	JJ	JJ	FB	FB
Date	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03	09/10/03
Time at start of dive	1400	1409	1422	1400	1416	1427	1438	1448	1220	1235	1248	1303	1220	1230	1243	1255	1220	1236
Quadrat No	GP1	GP2	GP3	GP4	GP5	GP6	GP7	GP8	GP9	GP10	GP11	GP12	GP13	GP14	GP15	GP16	GP17	GP18
Depth	16	15.4	16.1	15.2	15.1	15.5	15.6	16.7	15.3	15.3	15.5	15.5	15.3	15.1	15.1	15.2	14.8	15
Depth corrected	14.3	13.5	14.2	13.5	13.1	13.2	13.3	14	13.9	13.9	14.2	14.3	13.9	13.8	13.8	14	13.4	13.7
Time to complete (mins)	8	12	12	15	10	10	8	10	14	12	14	10	10	12	11	13	15	10
Substratum	Vertl B'rck	Vertl B'rck	Vertl B'rck	Vertl B'rck	Vertl B'rck	Ov'rh' ging	Ov'rh' ging	Ov'rh' ging	Vertl B'rck	Vertl B'rck	Vertl B'rck	Vertl B'rck	Vertl B'rck	Vertl B'rck	Vertl B'rck	Vertl B'rck	Vertl B'rck	Vertl B'rck

Counts

<i>Leptopsammia pruvoti</i>			2										6	1	2	1		1
<i>Macropodia sp.</i>						3												
<i>Marthasterias glacialis</i>				1					1									
<i>Polycera faeroensis</i>				1			1									1		

Percentage cover

<i>Alcyonium glomeratum</i>			12	2					17	3	8		4		3				
<i>Anomiidae</i>	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25	0.25	0.25	26	3
<i>Antennella secundaria</i>														0.25					
<i>Aplysilla rosacea</i>														0.25	0.25				
<i>Aplysilla sulfurea</i>	2	2	0.25										0.25	0.25					
<i>Ascidia mentula</i>															0.25				
<i>Axinella dissimilis</i>																			
Orange encrusting bryozoan				0.25	0.5	4	2	1					1	0.25	1	0.5		1	

Quadrat No	GP1	GP2	GP3	GP4	GP5	GP6	GP7	GP8	GP9	GP10	GP11	GP12	GP13	GP14	GP15	GP16	GP17	GP18
<i>Caryophyllia inornata</i>	1		0.25												1			
<i>Caryophyllia smithii</i>	0.25		1	0.25	0.25		0.25	0.25	0.25		2	0.5	0.25	2	1	0.25	0.25	0.25
<i>Cellaria fistulosa</i>		1		2	2		0.25	0.25	4	4	25	0.5	1	1	15	25	7	1
<i>Cellaria sinuosa</i>			4											1	0.5	4		
<i>Cliona celata</i>									8				4		2			
<i>Enc. Coralline algae</i>	75		1				0.25				6		0.5	0.25	0.5	0.5		
<i>Corynactis viridis</i>	1	65		45	15	45	32	12	7	2	0.5	2	15	3		0.5		0.25
<i>Crisiidae</i>	54	32		8	4	2	2	2	2		4	2	25	3	35	2	5	16
<i>Drachiella heterocarpa</i>																		
<i>Dysidea fragilis</i>		0.5	0.5	0.25	0.5	2	2	1	0.25	0.5		0.5	0.25	0.25	0.25	0.25		0.25
<i>Epizoanth couchi</i>																		
<i>Eurypon sp.</i>	4	2		32	1	15	2	12	3	8	8	4	5	1	2	0.5		
<i>Eurypon sp.</i>			4											0.5		0.25		
<i>Halecium beanii</i>																0.25		
<i>Halecium halecinum</i>																0.25		
<i>Halicnemia patera</i>			2										0.25	0.25	0.5	0.25		
<i>Hymedesmia paupertas</i>			0.25										0.25	0.25		0.25		0.25
<i>Hymedesmiidae sp.</i>			84	4	8	2	25	18	2	1			1	0.25		5	0.5	35
<i>Leptopsammia pruvoti</i>			1.5										4	0.25	0.25	0.25		0.25
<i>Nolella stipitata</i>			0.25	4	2	2	2	1	4	0.25	16		2	0.5	4	6	4	2
<i>Pachymatisma johnstoni</i>																		
<i>Parazoanthus axinellae</i>								12		2						16	4	5
<i>Pentapora foliacea</i>																		
<i>Plagioecia patina</i>				0.25														
<i>Pomatoceros lamarcki</i>	1			0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25
<i>Raspailia hispida</i>										0.25					0.25			

Quadrat No	GP1	GP2	GP3	GP4	GP5	GP6	GP7	GP8	GP9	GP10	GP11	GP12	GP13	GP14	GP15	GP16	GP17	GP18
<i>Raspailia ramosa</i>					1					0.25			0.5			4		
<i>Rhaphidostyla kitchingi</i>				1				4			1							
<i>Rhodymenia ardissonii</i>					0.25													
<i>Rhodymenia holmesi</i>					25													
<i>Salmacina dysteri</i>				0.5	1.5	0.25	0.25	0.25		0.25				0.25	0.25	0.25	0.25	0.25
<i>Schottera niccaensis</i>					0.5		0.25											
<i>Scypha ciliata</i>																		0.25
<i>Stelligera rigida</i>		0.5									1			0.25		1	0.5	0.25
<i>Stelligera stuposus</i>					0.25			1							1			
<i>Thymosia guernii</i>																		
Additional species																		
<i>Hymedesmiidae sp.</i>																		
<i>Eurypon sp.</i>																	4	2
<i>Amathia lendigera</i>																		
<i>Ascidia virginea</i>			0.25												0.25			
<i>Ascidiella scabra</i>																		
<i>Boscia anglicum</i>	0.25		0.25		0.25		0.25						0.25	0.25	0.25	0.25		
<i>Botylloides leachii</i>																		
<i>Bowerbankia pustulosa</i>										0.25								
<i>White encrusting bryozoan</i>	16																	
<i>Bugula flabellata</i>						0.25				0.25				0.25	0.25		0.5	
<i>Diaphodoris luteocincta</i>																0.25		
<i>Diplosoma listerianum</i>																		
<i>Green encrusting bryozoan</i>																		

Quadrat No	GP1	GP2	GP3	GP4	GP5	GP6	GP7	GP8	GP9	GP10	GP11	GP12	GP13	GP14	GP15	GP16	GP17	GP18
<i>Green filamentous algae</i>	29																	
<i>Haliclona oculata</i>																		
<i>Halicnemia patera</i>												12						
<i>Microciona atrasanguinea</i>				1	0.25	0.25		6									2	
<i>Microciona atrasanguinea</i>		8																
<i>Nemertesia antennina</i>																		
<i>Purple didemnid</i>				0.5	0.5	1	0.5	0.25					0.25					0.25
<i>Enc. Rhodophyta</i>							0.5				16							
<i>Rhaphidostyla kitchingi</i>	2	4																
<i>Scupocellaria sp.</i>				0.25				0.25										
<i>Sporelings red</i>				0.25				0.25										
<i>Stelligera / Raspailia juvs.</i>																	1	
<i>Stylostichon dives</i>																0.25		
<i>Verruca stroemi</i>	0.25																	

Lundy: Gannets Pinnacle - vertical (Quadrats GP19-GP34)

Surveyor	FB	CMH	CMH	CMH	CMH	FB	FB	TSM	TSM	TSM	TSM	TSM	JJ	JJ	JJ	JJ
Date	09/10/0	09/11/0	09/11/0	09/11/0	09/11/0	09/11/0	09/11/0	09/11/0	09/11/0	09/11/0	09/11/0	09/11/0	09/11/0	09/11/0	09/11/0	09/11/0
	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Time at start of dive	1248	1254	1414	1428	1440	1414	1434	1259	1310	1318	1330	1340	1259	1310	1318	1330
Quadrat No	GP19	GP20	GP21	GP22	GP23	GP24	GP25	GP26	GP27	GP28	GP29	GP30	GP31	GP32	GP33	GP34
Depth	15.1	15.9	16.2	16.6	17.2	15.6	16	14.8	14.7	14.7	15.1	15	15.7	15.7	15.4	15.5
Depth corrected	13.8	14.7	14.2	14.6	14.5	14.2	14.1	13.8	13.7	13.7	14.1	14	14.7	14.6	14.4	14.5
Time to complete (mins)	4	8	12	12	10	27	9	9	6	8	9	10	9	7	9	10
Substratum	Vertl	Vertl	Vertl	Vertl	Vertl	Vertl	Vertl	Ov'rh'gi	Vertl	Ov'rh'gi	Ov'rh'gi	Ov'rh'gi	Vertl	Vertl	Vertl	Vertl

	B'rck	B'rck	B'rck	B'rck	B'rck	B'rck	B'rck	ng	B'rck	ng	ng	ng	B'rck	B'rck	B'rck	B'rck	
Counts																	
<i>Leptopsammia pruvoti</i>		1							6				1				
<i>Macropodia sp. glacialis</i>							1						1				
<i>Polycera faeroensis</i>									1								
Percentage cover																	
<i>Alcyonium glomeratum</i>			2.5				1	4	3				25				
<i>Anomiidae</i>		0.25	0.25	0.25	0.25	0.5			0.25		2	0.5	0.25	0.5	1	0.5	0.25
<i>Antennella secundaria</i>																	
<i>Aplysilla rosacea</i>																	8
<i>Aplysilla sulfurea</i>		0.25	2	0.25	0.25									3	0.25		3
<i>Ascidia mentula</i>																	
<i>Axinella dissimilis</i>				1.5													
<i>Orange encrusting bryozoan</i>							1	3	1	0.5	0.5	0.25		4	0.5		
<i>Caryophyllia inornata</i>			0.25		0.25				0.25								0.25
<i>Caryophyllia smithii</i>	2	0.25	2	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.25	1	0.25	0.25	1
<i>Cellaria fistulosa</i>		6	8	58	22	4			4			9	25	16	2		12
<i>Cellaria sinuosa</i>																	
<i>Cliona celata</i>				13													
<i>Enc. Coralline algae</i>	8	0.5	1	0.5		4	33			3				16			4
<i>Corynactis viridis</i>	2	4	3		3	4	11	2	7	3	7	6	4	4	4	2	8
<i>Crisiidae</i>	3	64	49	12	32	1	0.25	2	0.25	0.25	0.25	6	15	25	2		25
<i>Drachiella heterocarpa</i>				3													
<i>Dysidea fragilis</i>		4				1	2		1		1	0.25	0.5	0.25	0.25	0.25	1
<i>Epizoanth couchi</i>				0.25												2	0.5
<i>Eurypon sp.</i>									8	0.25	25	3		4	6	3	1
<i>Eurypon sp.</i>		1	0.5	3	1								8	12	2		
<i>Halecium beanii</i>								2									

Quadrat No	GP19	GP20	GP21	GP22	GP23	GP24	GP25	GP26	GP27	GP28	GP29	GP30	GP31	GP32	GP33	GP34
<i>Halecium halecinum</i>											0.5				0.25	0.25
<i>Halicnemis patera</i>			1													
<i>Hymedesmia paupertas</i>			0.25		0.25						3			0.25	0.25	0.25
<i>Hymedesmiidae sp.</i>		8	4	2	4		3	3	0.25		25	45	4	6		6
<i>Leptopsammia pruvoti</i>		0.5						2								
<i>Nolella stipitata</i>		0.25	0.25	0.25	0.25	1	4	8	0.25	6	4	2	3	5	6	8
<i>Pachymatisma johnstoni</i>				2												
<i>Parazoanthus axinellae</i>					8	18					0.5			12		
<i>Pentapora foliacea</i>							0.25									
<i>Plagioecia patina</i>		0.25	0.25	0.25	0.25											
<i>Pomatoceros lamarcki</i>	4					2	6	0.25	1	0.25	0.25	0.25	1		0.5	
<i>Raspailia hispida</i>				4											0.5	0.25
<i>Raspailia ramosa</i>		2		1		0.25								0.25	0.25	
<i>Rhaphidostyla kitchingi</i>		6			1			1	0.5	2	2	1				
<i>Rhodymenia ardissonii</i>																
<i>Rhodymenia holmesi</i>																
<i>Salmacina dysteri</i>		0.25	0.25	0.25		0.25		0.25			0.25	0.25		0.5	0.5	
<i>Schottera niccaensis</i>				0.5		1										
<i>Scypha ciliata</i>													0.25			
<i>Stelligera rigida</i>		0.25		0.5	0.25									0.5	0.5	0.5
<i>Stelligera stuposa</i>		0.25						0.25			0.5	0.25				
<i>Thyrosia guernii</i>					0.5	2										
Additional species																
<i>Hymedesmiidae sp.</i>						3										

Quadrat No	GP19	GP20	GP21	GP22	GP23	GP24	GP25	GP26	GP27	GP28	GP29	GP30	GP31	GP32	GP33	GP34
<i>Eurypon sp.</i>	2					8										
<i>Amathia lendigera</i>						0.25										
<i>Ascidia virginea</i>														0.25	0.25	
<i>Ascidiella scabra</i>			0.25													
<i>Boscia anglicum</i>			0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25				
<i>Botylloides leachii</i>											2	0.25				
<i>Bowerbankia pustulosa</i>										0.25						
White encrusting bryozoan																
<i>Bugula flabellata</i>		0.25								0.25						
<i>Diaphodoris luteocincta</i>																
<i>Diplosoma listerianum</i>											2					2
Green encrusting bryozoan						2										
Green filamentous algae						2							0.25		0.25	
<i>Haliclona oculata</i>																0.25
<i>Halicnemia patera</i>													2	0.25		
<i>Microciona atrasanguinea</i>	2	72	6	6												
<i>Microciona atrasanguinea</i>																
<i>Nemertesia antennina</i>				0.25												
Purple didemnid						2				0.25		0.25	0.25			0.5
Enc.Rhodophyta									85							
<i>Rhaphidostyla kitchingi</i>						2		16		3		8				
<i>Scupocellaria sp.</i>														0.25		
Sporelings red																

Quadrat No	GP19	GP20	GP21	GP22	GP23	GP24	GP25	GP26	GP27	GP28	GP29	GP30	GP31	GP32	GP33	GP34
<i>Stelligera / Raspailia</i>						2										
<i>juvs.</i>																
<i>Stylostichon dives</i>																
<i>Verruca stroemi</i>																

Lundy Jenny's Cove – Vertical (Quadrats JC1 – JC15)

Surveyor	FB	FB	JJ	JJ	JJ	JJ	JJ	TM	TM	TM	TM	JH	JH	JH	SB
Date	09/01/0	09/01/0	09/01/0	09/01/0	09/01/0	09/02/0	09/02/0	09/01/0	09/01/0	09/01/0	09/01/0	09/01/0	09/01/0	09/01/0	09/01/0
Time at start of dive	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Quadrat No	JC1	JC2	JC3	JC4	JC5	JC6	JC7	JC8	JC9	JC10	JC11	JC12	JC13	JC14	JC15
Depth	20.3	20.1	20.6	20.1	20.1	19.6	18.4	19	19	18.4	18.7	20.8	22.3	23.2	19.3
Depth corrected	15.2	15.5	15.5	15.2	16	16.7	15.5	16	15.1	15.1	15.5	15.7	16	16.1	15.6
Time to complete (mins)	24	35	19	26	19	27	15	33	18	20	25	26	22	17	36
Substratum	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock

Counts

<i>Anemonia viridis</i>											1				
<i>Gibbula cineraria</i>								1							
<i>Henricia sp.</i>											1				
<i>Hinia incrustata</i>		2	2	3	5	2		8		1	2				3
<i>Luidia ciliaris</i>															
<i>Marthasterias glacialis</i>															
<i>Prostheceraeus vittatus</i>															

Percentage cover

<i>Aplysilla rosacea</i>			2						2	0.25					
<i>Aplysilla sulphurea</i>		1	0.5			1		4	4	0.25	0.25	0.25	0.5		
<i>Axinella damicornis</i>				0.25											
<i>Axinella dissimilis</i>								0.25	0.25			1			0.25
<i>Balanus crenatus</i>								0.25	0.5	0.5	0.5				
<i>Boscia anglica</i>		0.5						0.25	0.25	0.25					
<i>Bowerbankia imbricata</i>				0.25	0.5					3					
<i>Encrusting orange bryozoa</i>		1	6	2	4	3	0.5		0.5	1			4		
<i>Bryozoan turf total</i>			5	5	6	3	8	75	55	6	24	6	7	3	3
<i>Caryophyllia inornata</i>		2	0.25		0.25			0.25		0.25		0.25	0.25		2
<i>Caryophyllia smithii</i>	3		1.5	1	0.25	0.25	0.25	0.5	0.5	0.25		1.5	1	0.25	2
<i>Cellaria sinuosa</i>				0.5					0.25						1
<i>Clathrina coriacea</i>															

Quadrat No	JC1	JC2	JC3	JC4	JC5	JC6	JC7	JC8	JC9	JC10	JC11	JC12	JC13	JC14	JC15
<i>Cliona celata</i>															
<i>Enc. Coralline algae</i>	0.25							6	3		1	1	4		
<i>Crella sp.</i>			4	0.25	3	4	4					2	2		
<i>Crisia denticulata</i>	2	16	3	4	1	3	6								
<i>Crisiidae indet.</i>	2	2	8	5	2	1	3	24	5	15	1	24	6	16	25
<i>Cryptopleura ramosa</i>															
<i>Enc. Rhodopyta</i>								2	1		0.5	0.25	2		
<i>Dercitus bucklandii</i>															
<i>Dysidea fragilis</i>	2	4	3	1	0.5	0.25	0.5	12	4	1	3	1.5	6	4	1
<i>ErythroGLOSSUM</i>	1	21	1	3	1	6	0.5	15	2	3	8	4	2	1	1
<i>laciniatum</i>															
<i>Haliclona cinerea</i>								3		2					1
<i>Haliclona fistulosa</i>	0.25							3		2.5	0.25				2
<i>Haliclona viscosa</i>		2	2				0.25		3	2		2	0.5	1	
<i>Halicnemis patera</i>		1	1	2								1			
<i>Hemimycale columella</i>							3			0.5	3				
<i>Hymedesmia paupertas</i>		0.25	0.5	0.25	0.25										
<i>Lissoclinum perforatum</i>			0.25	0.25		0.25		0.25	0.25	0.25	0.5		0.5	0.5	0.25
<i>Mycale rotalis</i>															
<i>Myxilla rosacea</i>			1		2	4					0.5		0.5		19
<i>Obelia geniculata</i>									0.25	0.25	0.25				
<i>Phorbas fictitius</i>	0.25		0.25			0.5			0.5						15
<i>Plagioecia patina</i>		0.25	0.25	0.5	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.25	0.25	
<i>Polyclinum aurantium</i>	0.25							0.25	0.25	0.25	0.25				
<i>Pomatoceros lamarcki</i>					0.25	0.25	0.25	0.25	0.25	0.25			0.25	0.25	
<i>Pseudosuberites sulphureus</i>	1		1	0.5	3	1	0.5	2			1		2	0.25	
<i>Raspailia hispida</i>															
<i>Raspailia ramosa</i>	1													0.25	
<i>Rhodymenia ardissoni</i>					2		0.25	0.5	0.5						
<i>Rhodymenia holmesii</i>	2	4							3	1	1	8	2	1	4
<i>Schizomavella linearis</i>								3		2	2				
<i>Schottera niccaensis</i>			1				0.5	0.5	3					1	
<i>Scrupocellaria reptans</i>	13	2	2	4	2	2	15	55	34	2	1	8	8	12	
<i>Scypha ciliata</i>								0.25		0.25	0.25				0.5
<i>Sponge crusts total</i>			16	4	2	2	14	2	15	2	15	16	12	8	25

Quadrat No	JC1	JC2	JC3	JC4	JC5	JC6	JC7	JC8	JC9	JC10	JC11	JC12	JC13	JC14	JC15
<i>Stelligera rigida</i>	0.25	0.5	1.5	1	0.25		0.25	0.5	0.5		0.25	0.5	0.5		0.5
<i>Stelligera stuposa</i>														0.5	
Additional species															
<i>Aglaophenia tubulifera</i>								0.25							
<i>Antho involvens</i>							0.5								
<i>Ascidia virginea</i>									0.25						
<i>Ascidiella scabra</i>						0.25									
<i>Bicellariella ciliata</i>						0.25	0.25				0.25				
<i>Biemna varianta</i>	2														
<i>Bugula flabellata</i>											0.25				
<i>Cellaria fistulosa</i>															
<i>Chelonapsylla (Purple sponge)</i>							0.25			0.25					
<i>Ciona intestinalis</i>															
<i>Clathrina lacunosa</i>		0.25													
<i>Clytia hemisphaerica</i>	0.25														
<i>Corella parallelogramma</i>															
<i>Corynactis viridis</i>															
<i>Dictyopterus membranacea</i>	6		0.5	0.25	0.25			2	3	0.25		12	8	12	5
<i>Dictyota dichotoma</i>	4	2	0.25	0.25	0.5		0.25	0.25	2	1		2	4	1	2
<i>Didemum maculosum</i>															
<i>Diplosoma listerianum</i>															
<i>Dysidea fragilis</i>		2					0.5								
<i>Esperiopsis fucorum</i>															
<i>Eurypon major</i>															
<i>Eurypon sp.</i>															
<i>Haliclona viscosa</i>							4				2				
<i>Halicnemis patera</i>		4													
<i>Hemimycale columella</i>															
<i>Hydroid indet</i>		1			0.25										
<i>Hydroides norvegica</i>								0.25		0.25					
<i>Hymedesmia jecusculum</i>		1	8	0.25											
<i>Hymedesmia pansa</i>							4								
<i>Hymedesmia sp.</i>															

Quadrat No	JC1	JC2	JC3	JC4	JC5	JC6	JC7	JC8	JC9	JC10	JC11	JC12	JC13	JC14	JC15
<i>Hypoglossum hypoglossoides</i>															
<i>Leucosolenia sp.</i>													2	0.5	
<i>Lissoclinum perforatum orange</i>									0.25	0.25	0.25				
<i>Microcionia strepsitoxa</i>									0.25	0.25	0.25				
<i>Morchellium argus</i>															
<i>Mycale rotalis</i>				0.25											
<i>Myxilla rosacea</i>															
<i>Nemertesia antennina</i>			0.25												
<i>Orange didemnid</i>							1								
<i>Pachymatisma johnstonia</i>													4		
<i>Phorbas sp.</i>				0.25											
<i>Plocamilla coriacea</i>	1														
<i>Plocamium cartilagineum</i>															
<i>Polycarpa scuba</i>		0.25						0.25	0.25						
<i>Pseudosuberites sp?</i>							1.5								
<i>Red?</i>															
<i>Pseudosuberites sulphureus</i>			0.25			0.25									
<i>Red ascidian siphons</i>															
<i>Salmacina disteri</i>								0.25							
<i>Sidnyum turbinatum</i>															
<i>Stelligera stuposa</i>				0.25											
<i>Stylostichon dives</i>		0.5						0.5	2	1		8			1.5
<i>Thin pale orange sponge (no specimen)</i>															
<i>Thymosia gurnei</i>	2	1					3			0.25					
<i>Tompot blenny</i>							1								1
<i>White sponge crust</i>															
<i>indet.</i>															

Lundy Jenny's Cove – Vertical (Quadrats JC 16 – JC 30)

Surveyor	SB	CH	CH	CH	CH	CH	CH	CH	SB	SB	JH	JH	JH	FB	FB
Date	09/01/0	09/01/0	09/01/0	09/01/0	09/02/0	09/02/0	09/02/0	09/02/0	09/02/0	09/02/0	09/02/0	09/02/0	09/02/0	09/02/0	09/02/0
	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Time at start of dive	1700	1227	1725	1725	1054	1054	1505	1505	1054	1505	1054	1505	1505		
Quadrat No	JC16	JC17	JC18	JC19	JC20	JC21	JC22	JC23	JC24	JC25	JC26	JC27	JC28	JC29	JC30
Depth	22.4	19.1	22.4	23	21.8	21.5	17.1	17.6	23.2	18	21.9	17.6	18.2	19	18.4
Depth corrected	15.8	15.5	15.7	15.8	15.8	15.8	15.9	161	15.5	15.6	15.9	15.8	161	15.8	16
Time to complete (mins)	35	35	24	20	18	15	30	20	35	37	31	24	22	25	14
Substratum	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock	Vert Rock

Counts*Anemonia viridis**Gibbula cineraria**Henricia* sp.*Hinia incrassata**Luidia ciliaris**Marthasterias glacialis**Prostheceraeus vittatus***Percentage cover***Aplysilla rosacea**Aplysilla sulphurea**Axinella damicornis**Axinella dissimilis**Balanus crenatus**Boscia anglica**Bowerbankia imbricata**Encrusting orange**bryozoa**Bryozoan turf total**Caryophyllia inornata**Caryophyllia smithii**Cellaria sinuosa**Clathrina coriacea**Cliona celata*

Quadrat No	JC16	JC17	JC18	JC19	JC20	JC21	JC22	JC23	JC24	JC25	JC26	JC27	JC28	JC29	JC30
<i>Enc. Coralline algae</i>						1	4	5	1.25	2		2	1	0.5	
<i>Crella sp.</i>															
<i>Crisia denticulata</i>														18	1
<i>Crisiidae indet.</i>	28	63	28	35	43	43	24	4	5	5	14	16	6		
<i>Cryptopleura ramosa</i>		2	4												
<i>Enc. Rhodopyta</i>												2			
<i>Dercitus bucklandii</i>															
<i>Dysidea fragilis</i>	1	1.5	1				3		3	15	4	4	2		1
<i>ErythroGLOSSUM</i>	21		22	6	3	14	12	15	1	5		1	2	26	1
<i>laciniatum</i>															
<i>Haliclona cinerea</i>															
<i>Haliclona fistulosa</i>									3	4	0.5				0.25
<i>Haliclona viscosa</i>				2		1			1		1	0.25			
<i>Halicnemis patera</i>							0.5								
<i>Hemimycale columella</i>	2					0.5	1.5					2	1		
<i>Hymedesmia paupertas</i>	2			0.25				0.25	1.5	0.25					
<i>Lissoclinum perforatum</i>			2	0.25	2		0.25	0.25	0.25		1	1			
<i>Mycale rotalis</i>	1														
<i>Myxilla rosacea</i>											0.5	2			
<i>Obelia geniculata</i>					0.25		0.5	0.25		6.5					
<i>Phorbas fictitius</i>	2						1	1						0.25	0.25
<i>Plagioecia patina</i>	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25		0.25				
<i>Polyclinum aurantium</i>		0.5		0.25	0.25		2							0.25	
<i>Pomatoceros lamarcki</i>			0.25		0.25		0.25	0.25		0.25		0.25			
<i>Pseudosuberites sulphureus</i>			4						3.5	6		0.25	0.25	0.25	1
<i>Raspailia hispida</i>								0.25	0.75						
<i>Raspailia ramosa</i>															
<i>Rhodymenia ardissoni</i>			0.5			3								2	
<i>Rhodymenia holmesii</i>	2							4	2	3	2	1	1	5	
<i>Schizomavella linearis</i>		6	8	5	1	4	6			1.5					
<i>Schottera necaeensis</i>		1		13	6	1	22	3			6	8	4		6
<i>Scrupocellaria reptans</i>	1	9	18	15	21	2			1.5	1	8	12	16	18	3
<i>Scypha ciliata</i>					0.25	1	8	4		0.25					
<i>Sponge crusts total</i>	21	59	26	45	2	12	2	25	17	25	16	25	16	2	5
<i>Stelligera rigida</i>	2	1	1.5	1.5	0.5	3	0.5	2				0.5			

Quadrat No	JC16	JC17	JC18	JC19	JC20	JC21	JC22	JC23	JC24	JC25	JC26	JC27	JC28	JC29	JC30
<i>Stelligera stuposa</i>							0.5								
Additional species															
<i>Aglaophenia tubulifera</i>															
<i>Antho involvens</i>															
<i>Ascidia virginea</i>		0.25			0.25										
<i>Ascidiella scabra</i>															
<i>Bicellariella ciliata</i>					0.25	12		0.25							
<i>Biemna varianta</i>	3														
<i>Bugula flabellata</i>					0.25										
<i>Cellaria fistulosa</i>								0.25							
<i>Chelonapsylla (Purple sponge)</i>															
<i>Ciona intestinalis</i>							0.25								
<i>Clathrina lacunosa</i>															
<i>Clytia hemisphaerica</i>															
<i>Corella parallelogramma</i>		0.25													
<i>Corynactis viridis</i>		0.5													
<i>Dictyopterus membranacea</i>	2		3		1	2.5	1	1		5		4	8		22
<i>Dictyota dichotoma</i>	9	1	1	3				3	2	2	0.25	1	0.5	4	
<i>Didemum maculosum</i>														0.25	
<i>Diplosoma listerianum</i>															0.25
<i>Dysidea fragilis</i>		6				4	1	6							
<i>Esperiopsis fucorum</i>								1.5							
<i>Eurypon major</i>								1							
<i>Eurypon sp.</i>		0.5		0.5						4					
<i>Haliclona viscosa</i>															
<i>Halicnemis patera</i>		5				3									
<i>Hemimycale columella</i>		5							2	1	6	2	1		
<i>Hydroid indet</i>	0.5													0.25	
<i>Hydroides norvegica</i>															
<i>Hymedesmia jecusculum</i>															0.5
<i>Hymedesmia pansa</i>															

Quadrat No	JC16	JC17	JC18	JC19	JC20	JC21	JC22	JC23	JC24	JC25	JC26	JC27	JC28	JC29	JC30
<i>Hymedesmia</i> sp.													1	1	
<i>Hypoglossum hypoglossoides</i>					0.25		0.25								
<i>Leucosolenia</i> sp.		4									0.5	0.5	1.5		
<i>Lissoclinum perforatum orange</i>			2		0.5		2								
<i>Microcionia strepsitoxa</i>							5	2							2
<i>Morchellium argus</i>															
<i>Mycale rotalis</i>					6										
<i>Myxilla rosacea</i>			3												
<i>Nemertesia antennina</i>											0.5				
<i>Orange didemnid</i>		4					2	1							
<i>Pachymatisma johnstonia</i>		2		7											
<i>Phorbas</i> sp.		3													
<i>Plocamilla coriacea</i>															
<i>Plocamium cartilagineum</i>		0.25	0.25		0.5							0.25			
<i>Polycarpa scuba</i>							0.25								
<i>Pseudosuberites</i> sp? Red?															
<i>Pseudosuberites sulphureus</i>		4	1	1	3										
<i>Red ascidian siphons</i>		0.25													
<i>Salmacina disteri</i>															
<i>Sidnyum turbinatum</i>					0.25										
<i>Stelligera stuposa</i>															
<i>Stylostichon dives</i>			15	22											
<i>Thin pale orange sponge (no specimen)</i>							2								
<i>Thymosia gurnei</i>					5										
<i>Tompot blenny</i>															
<i>White sponge crust indet.</i>									2						

Lundy: Battery Point horizontal & low angled reef (Quadrats BP1 – BP12)												
Surveyor	CMH	CMH	CMH	CMH	CMH	SB	SB	SB	JH	JH	JH	JH
Date	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04
Time at start of dive	1201	1222	1509	1526	1542	1201	1230	1630	1258	1320	1627	1650
Quadrat No	BP1	BP2	BP3	BP4	BP5	BP6	BP7	BP8	BP9	BP10	BP11	BP12
Depth	24.1	24	20.6	20.3	19.5	23.7	23.5	20	22.4	22.1		
Depth corrected	17.1	17.3	17.7	17.4	16.2	16.7	16.8	17.1	16.2	16.2	16.8	16.9
Time to complete (mins)	20	20	16	14	12	17	20	22	21	22	20	10
Substratum	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck
Counts												
<i>Acanthochitona crinitus</i>	1											
<i>Asterias rubens</i>			3									
<i>Echinus esculentus</i>												
<i>Eunicella verrucosa</i>												
<i>Hinia incrassata</i>												
<i>Marthasterias glacialis</i>							1					
Percentage cover												
<i>Aglaophenia kirchenpaueri</i>	1.5	9				0.25	15	8				
<i>Axinella damicornis</i>						0.25	0.25		0.25	0.25	1	
<i>Axinella dissimilis</i>			5			1.5		0.25		4		
<i>Bowerbankia imbricata</i>				0.25								
<i>Bugula flabellata</i>		0.25		0.25			0.25					
<i>Caryophyllia smithii</i>	2	2	1	1	1	0.25	0.25	0.25	0.5	0.25	0.25	0.25
<i>Cellaria fistulosa</i>			0.25		0.5			0.25				
<i>Cellaria sinuosa</i>									0.5	0.5	2	
<i>Cliona celata</i>			0.25				1	0.25		1		
<i>Clytia hemisphaerica</i>						0.25		0.5	0.5			
<i>Enc. Coralline algae</i>	8	2	1	1			5		1	8		
<i>Crisia denticulata</i>	6	6	1	2	35			1	2	8	4	25

Quadrat No	BP1	BP2	BP3	BP4	BP5	BP6	BP7	BP8	BP9	BP10	BP11	BP12
<i>Crisiidae</i>	1.5				0.5	3	2	15	4	5		
<i>Dictyopteris membranacea</i>	29	1	48	18	62	18	3	4	4	25	2	1
<i>Drachiella heterocarpa</i>	3.5	3	2	14	6							
<i>Dysidea fragilis</i>							0.5		1			
<i>Epizooanthus couchii</i>	4	1	8			0.25				12	8	2
<i>Erythroglossum laciniatum</i>				2				1	4	1	1	4
<i>Flustra foliacea</i>												
<i>Gymnangium montagui</i>												
<i>Hemimycale columella</i>					1.5							
<i>Hydrallmania falcata</i>			0.5			0.25	0.25		0.25	0.5		
<i>Nemertesia anteninna</i>	0.5	1	1	0.5	0.5	0.25	0.25		1	0.5	4	1
<i>Omalosecosa ramulosa</i>						0.25		0.25				
<i>Pentapora foliacea</i>					12				4			
<i>Phyllophora crispa</i>	3	4	1		11				4	1	16	4
<i>Plocamium cartilagineum</i>	0.5	0.5	3	4	1.5		4	4	2			
<i>Polymastia boletiformis</i>	2	1.5	0.25	0.5		0.25			2	1	1	0.5
<i>Polymastia mamillaris</i>	0.5											
<i>Raspailia hispida</i>								0.25	0.5	1	6	1
<i>Raspailia ramosa</i>			0.25		2				0.25	0.5		
<i>Rhodymenia ardissoni</i>						15	12		1			
<i>Rhodymenia holmesii</i>	2		5	15	8			2		6	2	0.25
<i>Scrupocellaria reptans</i>			4	0.25				1				
<i>Sertularella gayi</i>							0.25	0.25				
<i>Sertularia argentea</i>	1.5	7										0.25
<i>Stelligera rigida</i>	1.5		0.5	0.25	0.25		0.25			0.5		
<i>Stelligera stuposa</i>	0.25		0.5	0.5	0.25							1

Quadrat No	BP1	BP2	BP3	BP4	BP5	BP6	BP7	BP8	BP9	BP10	BP11	BP12
<i>Tethyspira spinosa</i>					1				1.5	0.5		
Additional species												
? <i>Plocamila coriacea</i>												
<i>Balanus crenatus</i>		0.25										
<i>Boscia anglica</i>												
<i>Enc. Bryozoa</i>								3				
<i>Caryophyllia inornata</i>							0.25					
<i>Ciocalypta penicillus</i>												
<i>Enc. Rhodophyta</i>	1.5							1				
<i>Delesseria sanguinea</i>	0.5		0.5									
<i>Dictyota dichotoma</i>	0.25	4	1	2	2		2	1	0.5	0.5		0.25
<i>Diphasia rosacea</i>												
<i>Electra pilosa</i>												
<i>Halecium halecinum</i>												
<i>Halicnemis patera</i>												
<i>Haplopoma impressum</i>												
<i>Heterosiphonia</i>												
<i>Homaxinella subdola</i>			1	0.25							0.5	
<i>Hydroides sp.</i>				0.25						1		
<i>Isozoanthus</i>												
<i>Microciona armata cf. Skomer</i>	1											
<i>Obelia geniculata</i>												
<i>Paratimea constellata</i>			3	4								
<i>Plagioecia patina</i>				0.25						1	0.25	
<i>Polyclinum aurantium</i>			0.25									
<i>Pomatoceros lamarcki</i>		0.25										
<i>Raspailia/Stelligera juv</i>												
<i>Scrupocellaria sp</i>	1											
<i>Scypha ciliata</i>			0.25									
<i>Spondyllothamnion</i>												
<i>Taonia</i>												
<i>Tethyspira spinosa</i>			4	8	12						0.5	0.5

Tubularia
Yellow Eurypon sp.

Lundy: Battery Point horizontal & low angled reef (Quadrats BP13 – BP26)

Surveyor	TM	TM	TM	TM	TM	TM	JJ	JJ	JJ	JJ	FB	FB	FB	FB
Date	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04	09/06/04
Time at start of dive	1105	1115	1128	1509	1520	1533	1258	1320	1627	1650	1105	1115	1509	1525
Quadrat No	BP13	BP14	BP15	BP16	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24	BP25	BP26
Depth	22.7	22.7	22.5	21.9	21.2	20	22.5	21.5	19.2	19.6	22.9	23	20.2	20
Depth corrected	17.5	17.6	17.6	17	16.7	16.5	16.3	16	16.8	17	17.7	17.6	16	16.7
Time to complete (mins)	9	12	11	11	11	10	20	17	20	12	9	12	11	10
Substratum	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Sl'p'g B'rck	Sl'p'g B'rck	Sl'p'g B'rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Horiz' l Rck	Sl'p'g B'rck	Sl'p'g B'rck

Counts

Acanthochitona

crinitus

Asterias rubens

2

1

Echinus esculentus

Eunicella verrucosa

2

1

Hinia incrassata

3

2

Marthasterias

glacialis

Percentage cover

Aglaophenia

0.25

0.25

0.25

0.25

0.5

0.5

3

2

0.5

kirchenpaueri

Axinella damicornis

Axinella dissimilis

0.5

0.5

0.25

3

0.25

3

2

4

3

3

Bowerbankia

0.25

0.5

0.25

0.5

imbricata

Bugula flabellata

Caryophyllia smithii

0.25

0.25

0.25

0.5

0.5

0.25

0.25

0.25

0.25

0.5

1.5

0.5

Cellaria fistulosa

0.25

0.5

1.5

1

0.5

0.5

Cellaria sinuosa

1

Cliona celata

Clytia hemisphaerica

0.5

0.5

0.5

1

2

0.25

0.25

0.5

0.24

0.5

Enc. Coralline algae

0.25

0.25

0.5

1

2

8

0.5

1.5

1

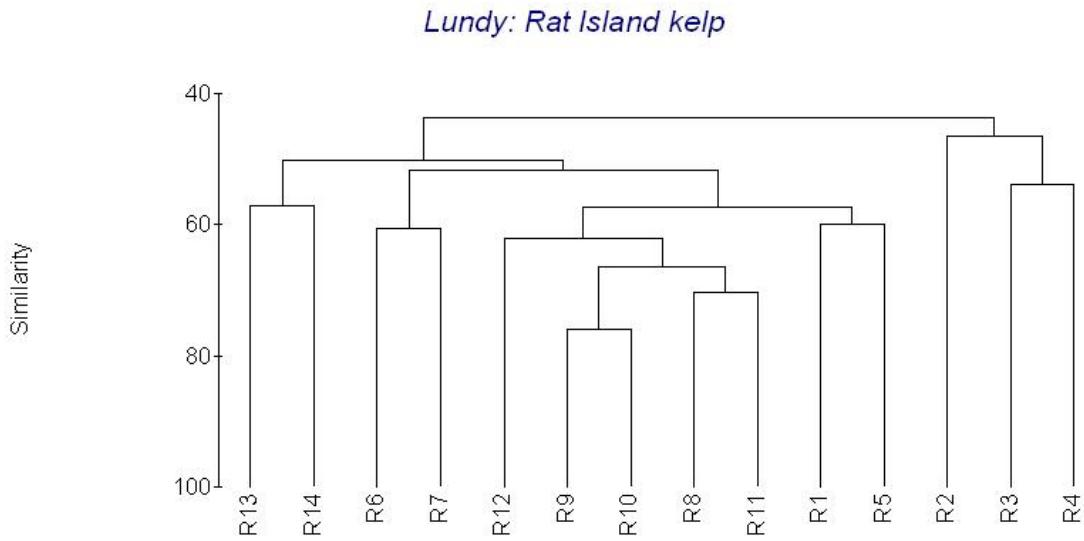
Quadrat No	BP13	BP14	BP15	BP16	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24	BP25	BP26
<i>Crisia denticulate</i>						2	4	0.5	5	1	3	2	2	4
<i>Crisiidae</i>	2	0.5	0.25	1			3	15	3	35			1	0.25
<i>Dictyopteris</i>	6	25	4	5	7	5	4	8	4	8	2	3	15	14
<i>membranacea</i>														
<i>Drachiella</i>	0.5			1	18	9					6	2	14	6
<i>heterocarpa</i>														
<i>Dysidea fragilis</i>			0.25		0.25		2	0.5	0.75					
<i>Epizooanthus couchii</i>		0.25		0.5		0.5	0.5	0.5			4	2		2
<i>Erythroglossum</i>									0.75	0.5				
<i>laciniatum</i>														
<i>Flustra foliacea</i>														
<i>Gymnangium</i>														
<i>montagui</i>														
<i>Hemimycale</i>														
<i>columella</i>														
<i>Hydrallmania falcata</i>			0.25						0.25	0.25			1	
<i>Nemertesia anteninna</i>	0.5	0.25	0.25		0.25	0.25	0.25		0.25	0.25	4	1	8	
<i>Omalosecosa</i>	0.25	0.25	0.25	0.25										
<i>ramulosa</i>														
<i>Pentapora foliacea</i>		4						14			14	0.5		2
<i>Phyllophora crista</i>		16	7			6					8			
<i>Plocamium</i>	0.5	0.25		0.25		1		0.75	0.5	2	2	1		
<i>cartilagineum</i>														
<i>Polymastia</i>	3	2	0.5		2		4				0.5	4	0.25	0.25
<i>boletiformis</i>														
<i>Polymastia mamillaris</i>		0.5												
<i>Raspailia hispida</i>		0.25		0.5		0.25	0.5							
<i>Raspailia ramosa</i>		0.25	0.25						0.5	0.25	0.25			
<i>Rhodymenia</i>	2										1	2		
<i>ardissonei</i>														
<i>Rhodymenia holmesii</i>			0.25	8	2	3	8		0.25	0.5	0.5		4	12
<i>Scrupocellaria</i>	2	3	1	2	2	16	1	0.5	4	1	2	2	4	4
<i>reptans</i>														
<i>Sertularella gayi</i>														
<i>Sertularia argentea</i>	0.5	0.25	0.25					0.25	0.25	0.25	1	1	0.5	0.25
<i>Stelligera rigida</i>			0.25	0.5		0.25	0.25		0.25		1	1	1	

Quadrat No	BP13	BP14	BP15	BP16	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24	BP25	BP26
<i>Stelligera stuposa</i>	0.5	0.5				0.5	0.25	1			0.5			
<i>Tethyspira spinosa</i>			0.5			0.5			0.5	0.5	2	0.5		0.25
Additional species														
? <i>Plocamila coriacea</i>											2	4		
<i>Balanus crenatus</i>							0.25	0.25						
<i>Boscia anglica</i>			0.25										0.25	
<i>Enc. Bryozoa</i>										0.5				
<i>Caryophyllia inornata</i>										0.25				
<i>Ciocalypta penicillus</i>				0.25										
<i>Enc. Rhodophyta</i>														
<i>Delesseria sanguinea</i>											4			
<i>Dictyota dichotoma</i>	0.25	2	3		3	2		0.5			1		0.25	
<i>Diphasia rosacea</i>												0.25		
<i>Electra pilosa</i>														0.25
<i>Halecium halecinum</i>											0.25			
<i>Halicnemis patera</i>			0.25				4	3	3	3		6	2	0.25
<i>Haplopoma impressum</i>												0.25		
<i>Heterosiphonia</i>		4												
<i>Homaxinella subdola</i>					0.25		0.5							2
<i>Hydroides sp.</i>		0.25			0.25									
<i>Isozoanthus</i>					0.25									
<i>Microcionia armata cf. Skomer</i>														
<i>Obelia geniculata</i>	0.25		0.25		0.25	0.25								
<i>Paratimea constellata</i>									0.5					
<i>Plagioecia patina</i>			0.25	0.25	0.25	0.25	0.5	0.5		0.25			0.25	
<i>Polyclinum aurantium</i>														
<i>Pomatoceros lamarcki</i>								0.25					0.25	
<i>Raspailia/Stelligera juv</i>	0.25	0.25	0.25	0.25	0.25	0.25	1.5	1	2	0.8	1.5	4	2	1
<i>Scrupocellaria sp</i>														
<i>Scypha ciliata</i>												0.25		
<i>Spondylothamnion</i>						0.25								
<i>Taonia</i>			0.25											

Quadrat No	BP13	BP14	BP15	BP16	BP17	BP18	BP19	BP20	BP21	BP22	BP23	BP24	BP25	BP26
<i>Tethyspira spinosa</i>				0.5										
<i>Tubularia</i>													0.5	
Yellow Eurypon sp.												0.25	0.25	0.25

4. Primer 5 output from the statistical analysis of the diver transect's stratified random quadrats.

4.1a Rat Island kelp: Cluster analysis for the diver transect quadrats.

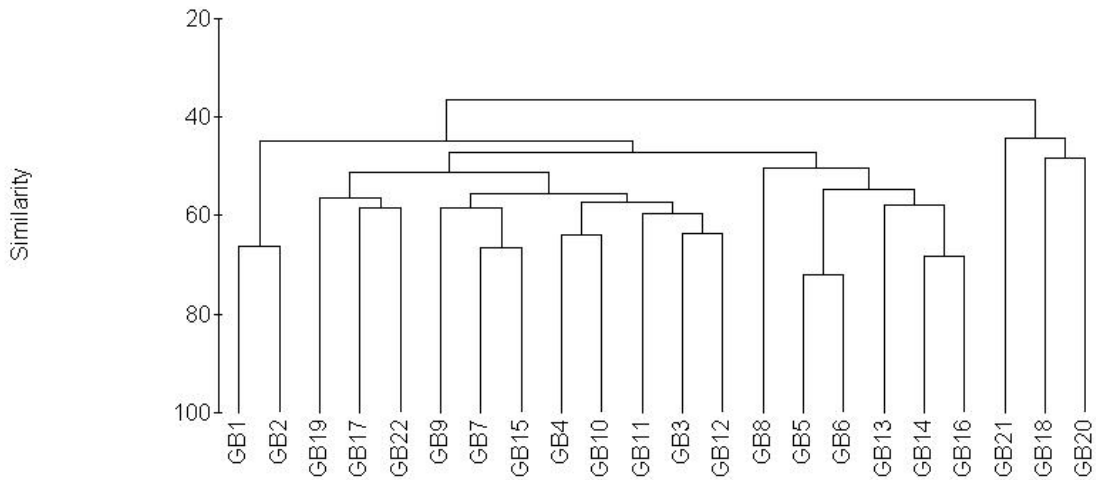


4.1b Rat Island kelp: MDS analysis for the diver transect quadrats.



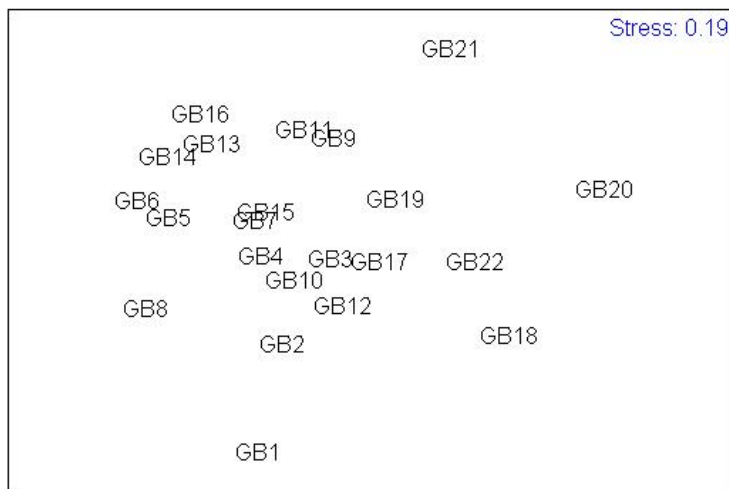
4.2a Gannet's Bay kelp: Cluster analysis for the diver transect quadrats.

Lundy: Gannets Bay kelp

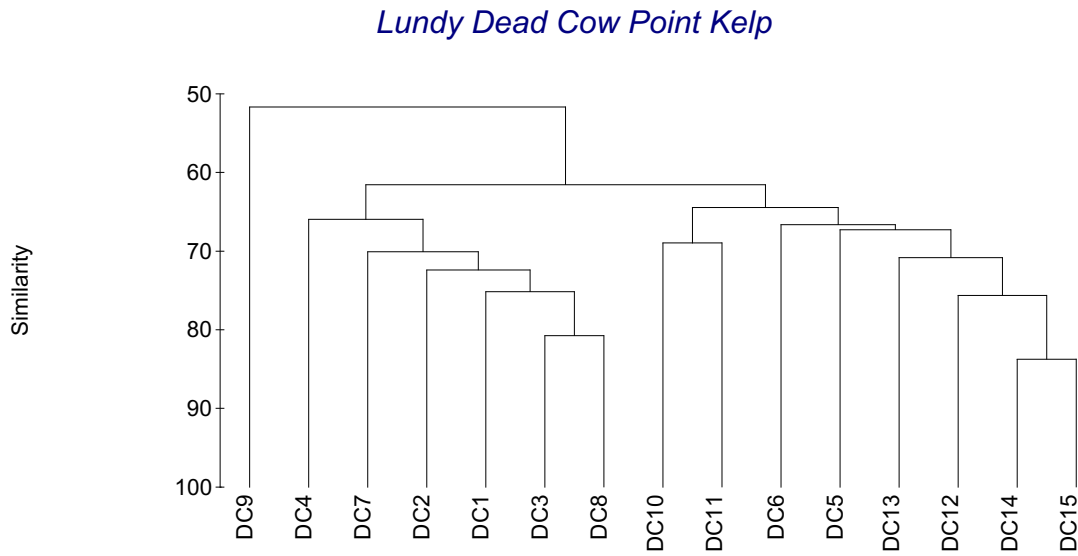


4.2b Gannet's Bay kelp: MDS analysis for the diver transect quadrats.

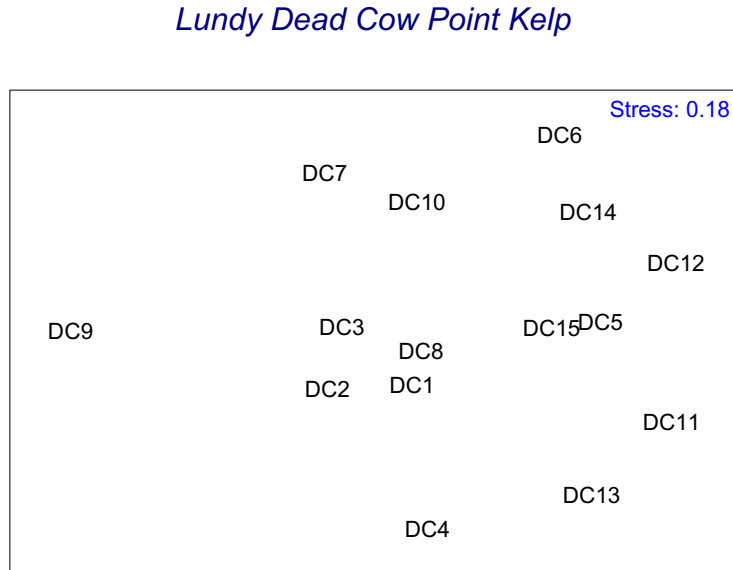
Lundy: Gannets Bay kelp



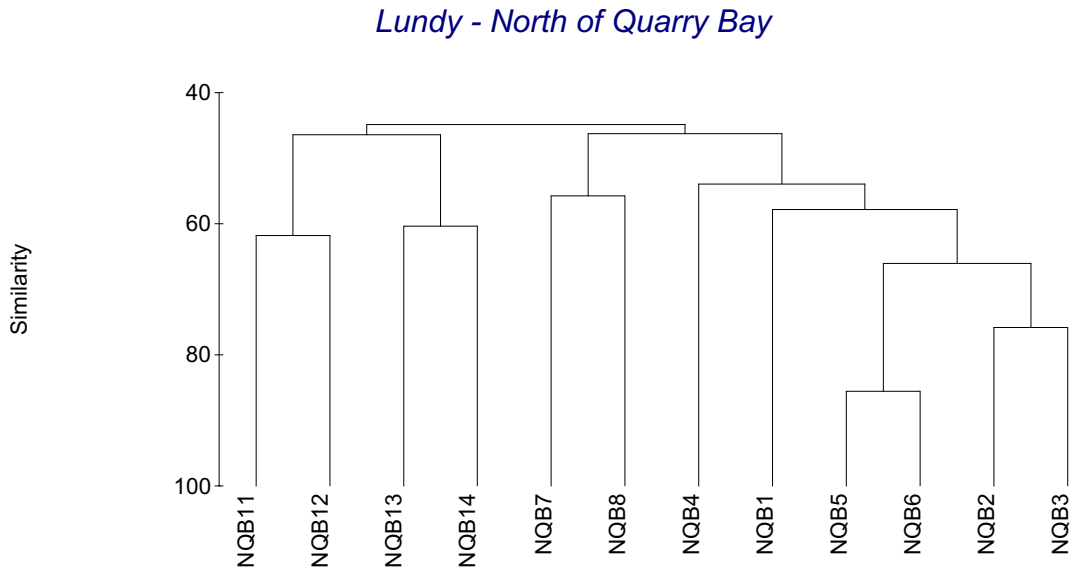
4.3a Dead Cow Point kelp: Cluster analysis for the diver transect quadrats.



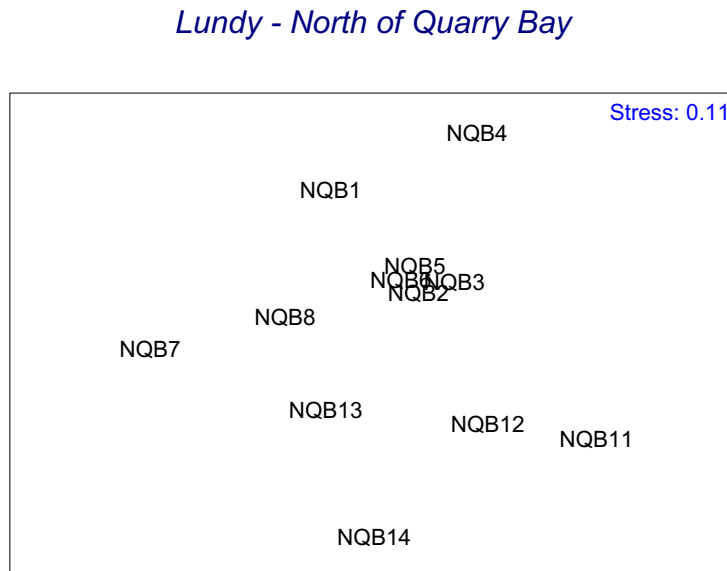
4.3b Dead Cow Point kelp: MDS analysis for the diver transect quadrats.



4.4a North Quarry Bay: Cluster analysis for the diver transect quadrats (outliers removed).

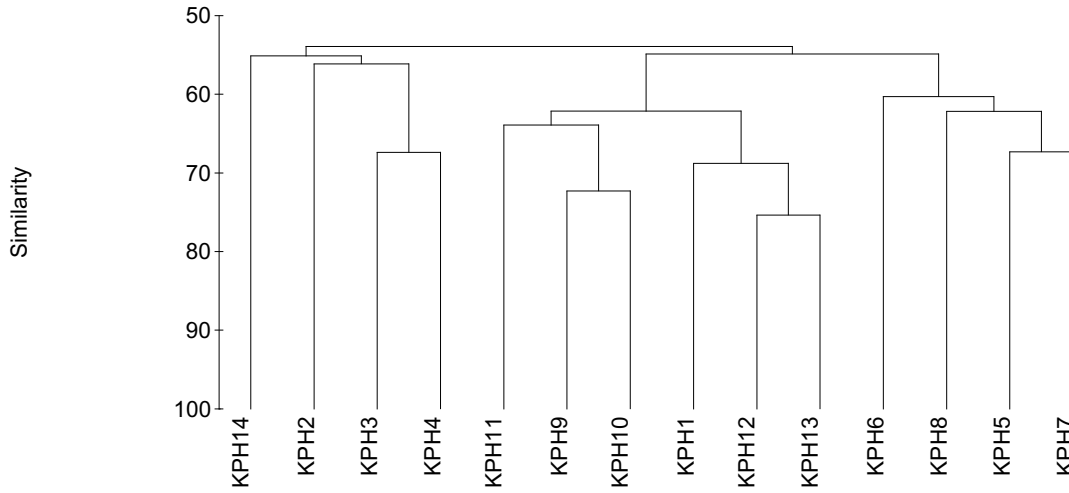


4.4b North Quarry Bay: MDS for the diver transect quadrats (outliers removed)



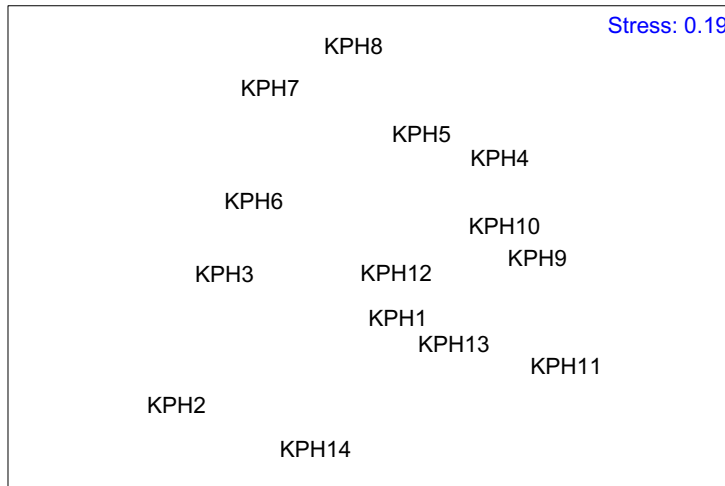
4.5a Knoll Pins - Horizontal: Cluster analysis for the diver transect quadrats.

Lundy: Knoll Pins Horizontal - Eunicella



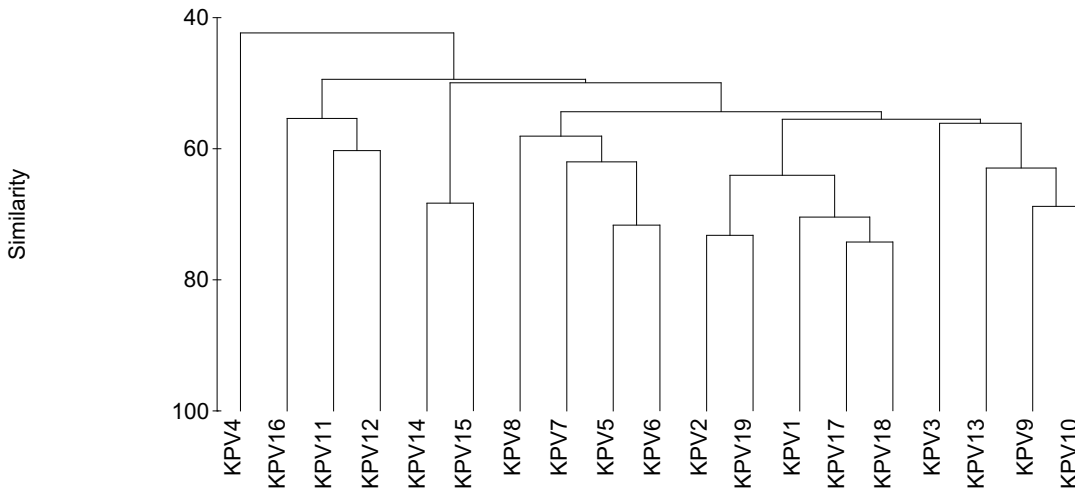
4.5b Knoll Pins - Horizontal: MDS analysis for the diver transect quadrats.

Lundy: Knoll Pins Horizontal - Eunicella



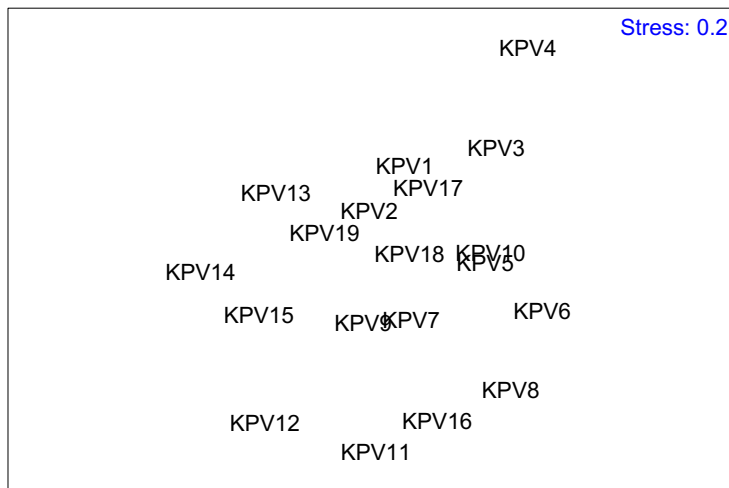
4.6a Knoll Pins - Vertical: Cluster analysis for the diver transect quadrats.

Lundy: Knoll Pins - Verticals - Leptopsammia



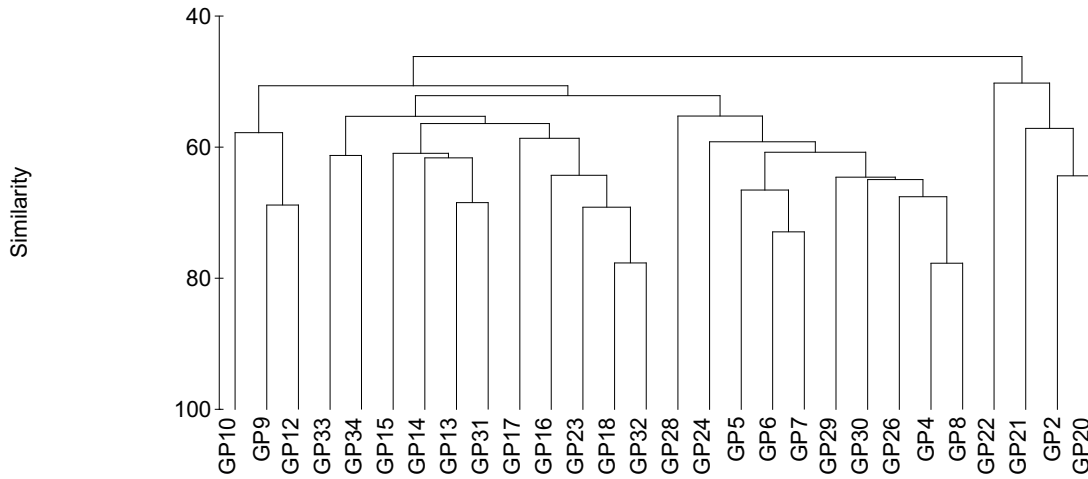
4.6b Knoll Pins - Vertical: MDS analysis for the diver transect quadrats.

Lundy: Knoll Pins - Verticals - Leptopsammia



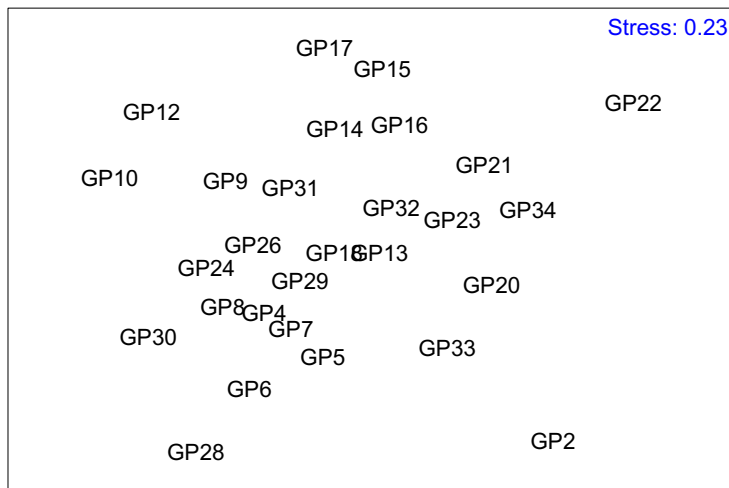
4.7a Gannet's Pinnacle: Cluster analysis for the diver transect quadrats (outliers removed).

Lundy: Gannets Pinnacle - Vertical



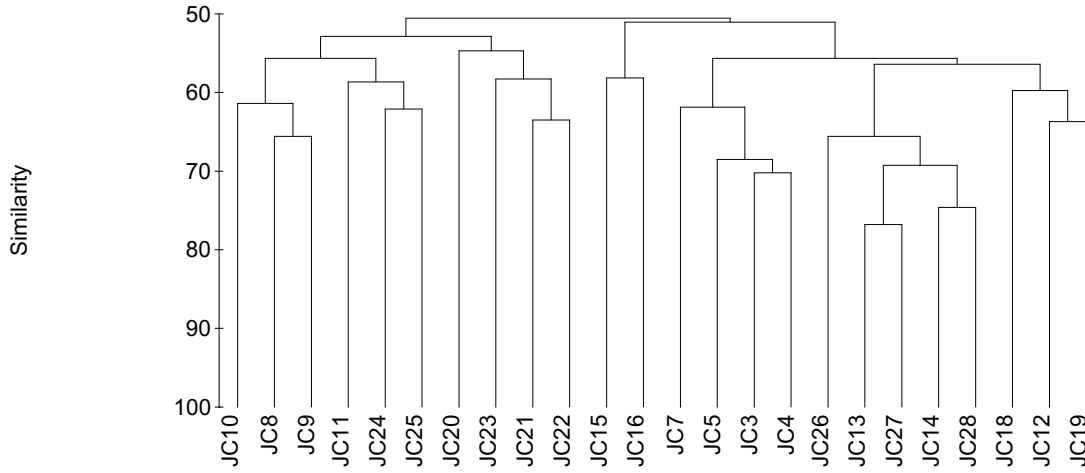
4.7b. Gannet's Pinnacle: MDS analysis for the diver transect quadrats (outliers removed).

Lundy: Gannets Pinnacle - Vertical



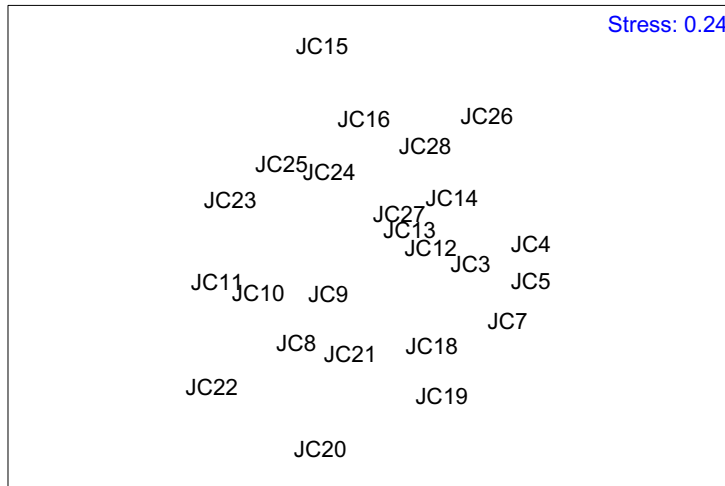
4.8a Jenny's Cove: Cluster analysis for the diver transect quadrats (outliers removed).

Lundy: Jenny's Cove Vertical



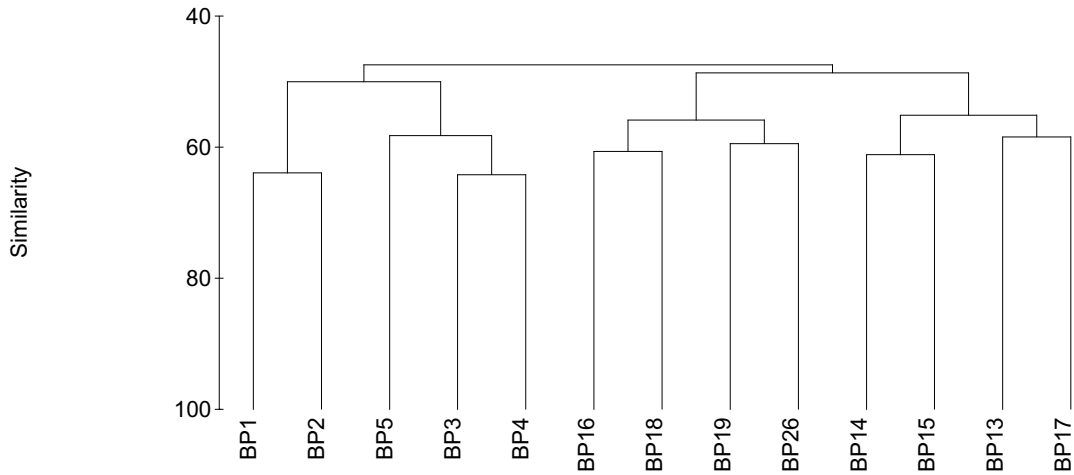
4.8b Jenny's Cove: MDS analysis for the diver transect quadrats (outliers removed).

Lundy: Jenny's Cove Vertical



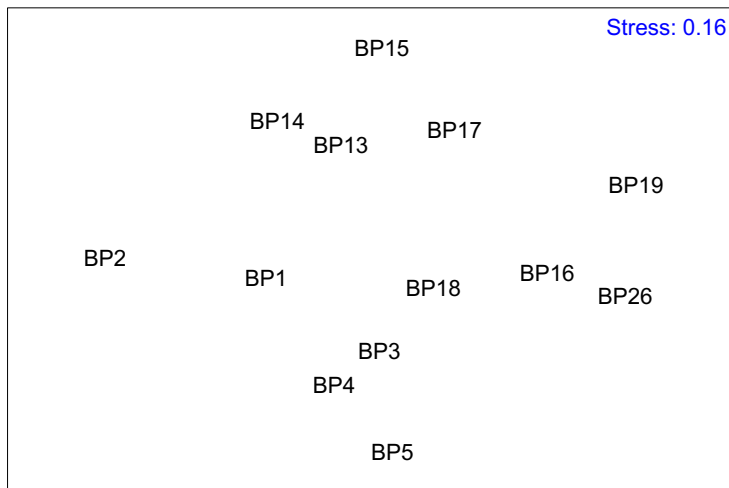
4.9a Battery Point: Cluster analysis for the diver transect quadrats (outliers removed).

Lundy: Battery Point - Horizontal

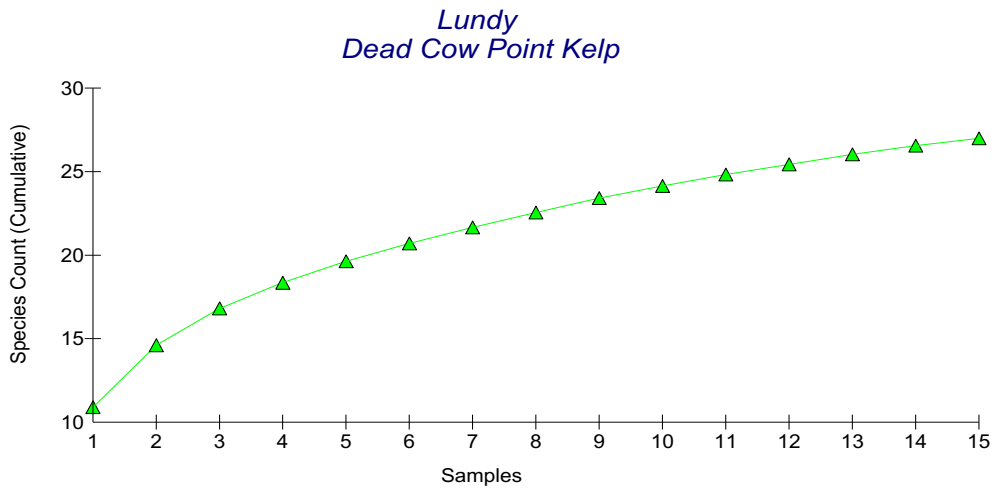
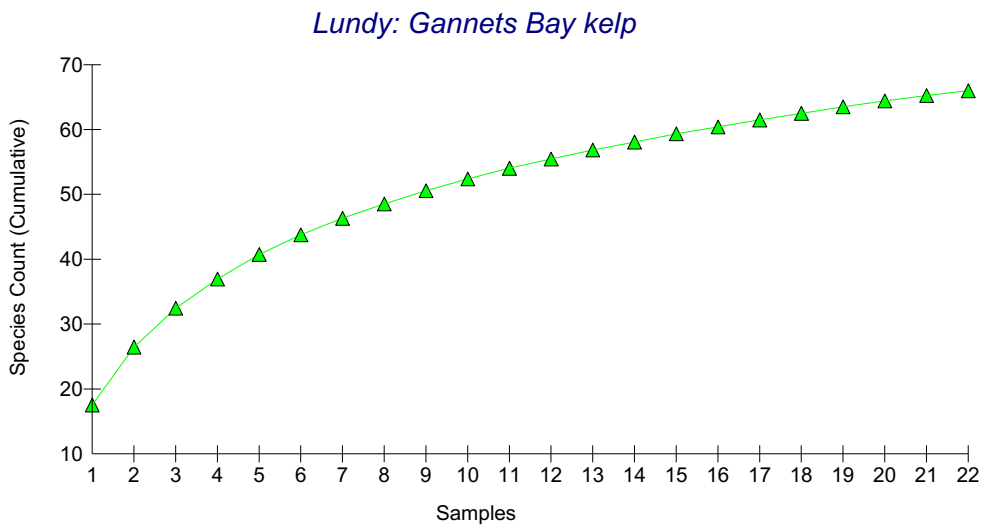
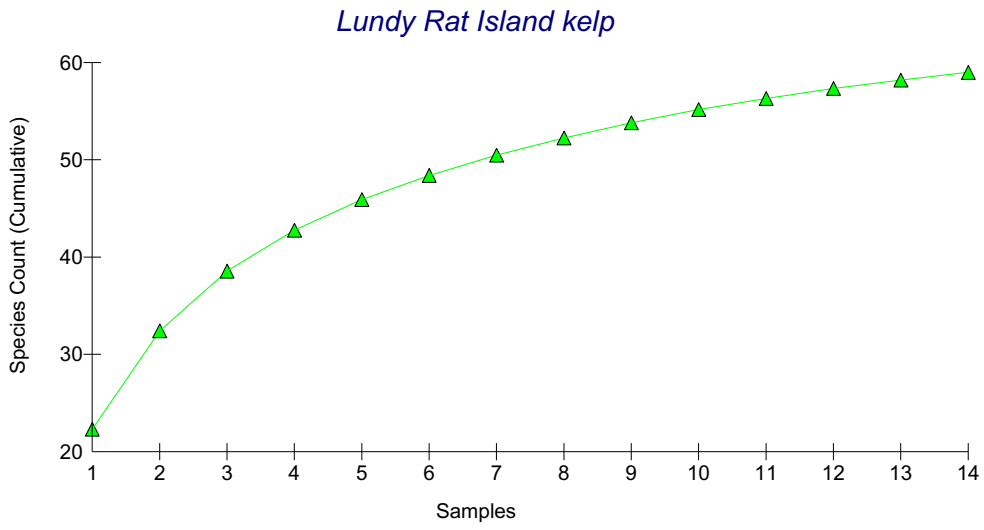


4.9b Battery Point: MDS analysis for the diver transect quadrats (outliers removed)

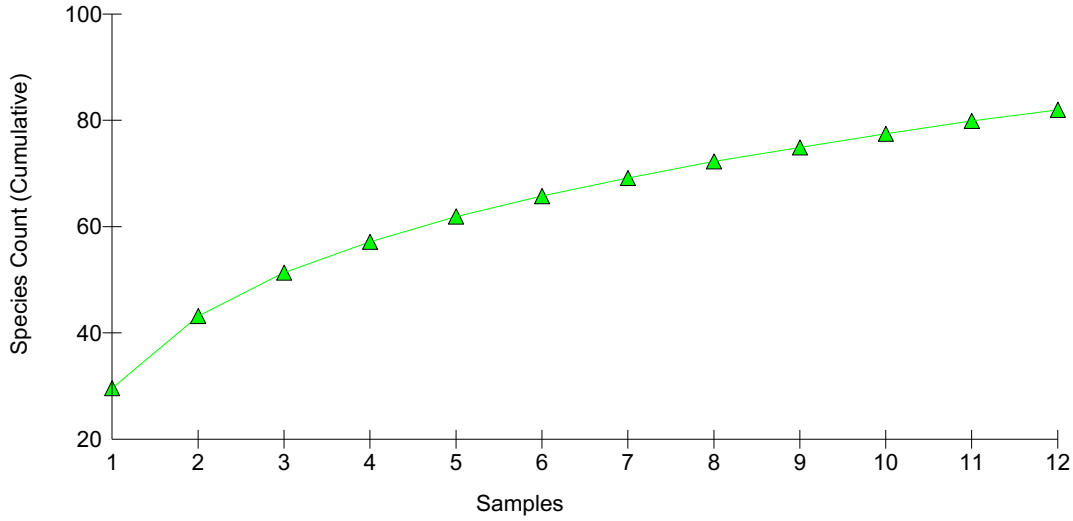
Lundy: Battery Point - Horizontal



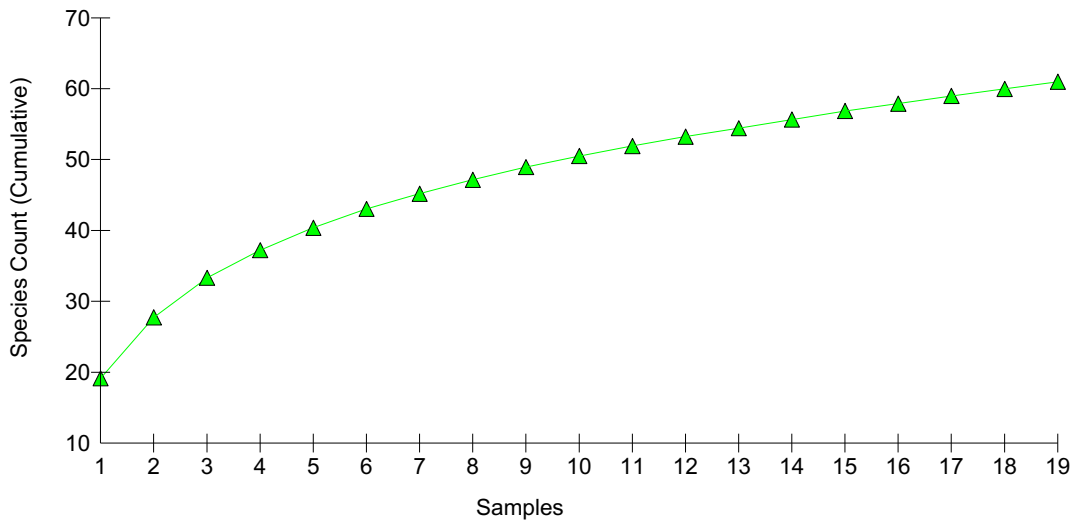
4.10 Species area curves for the diver transect quadrat data.



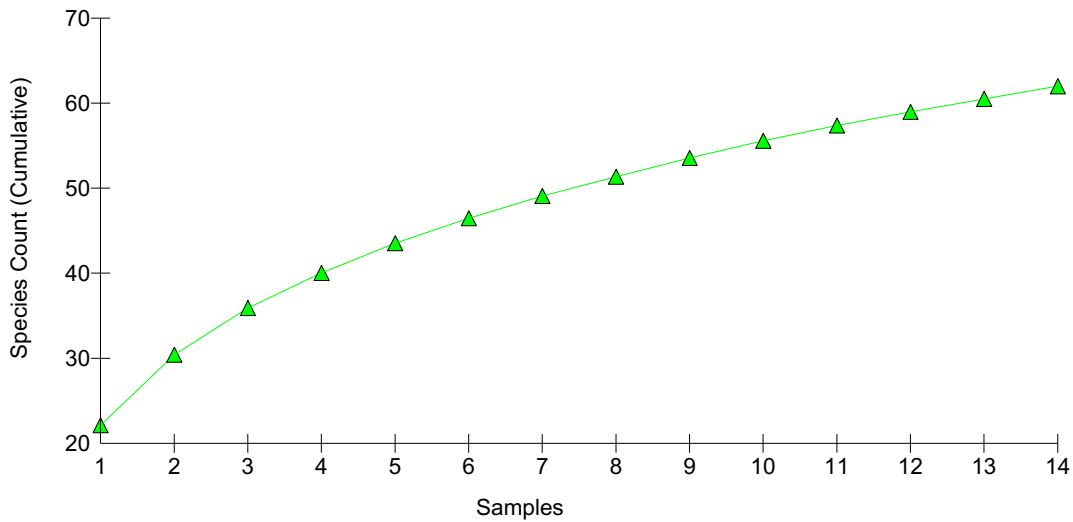
Lundy - North of Quarry Bay



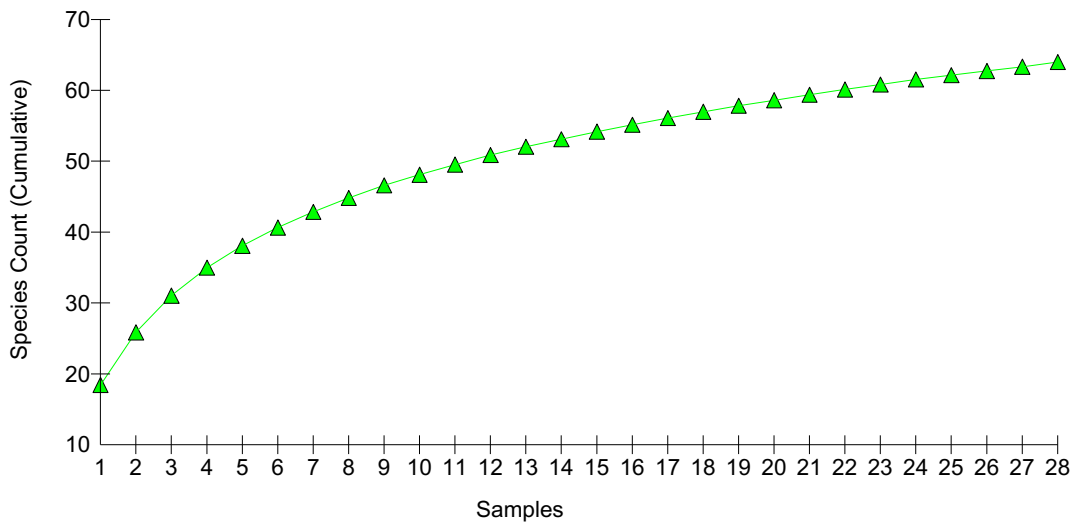
Lundy: Knoll Pins - Verticals - Leptopsammia



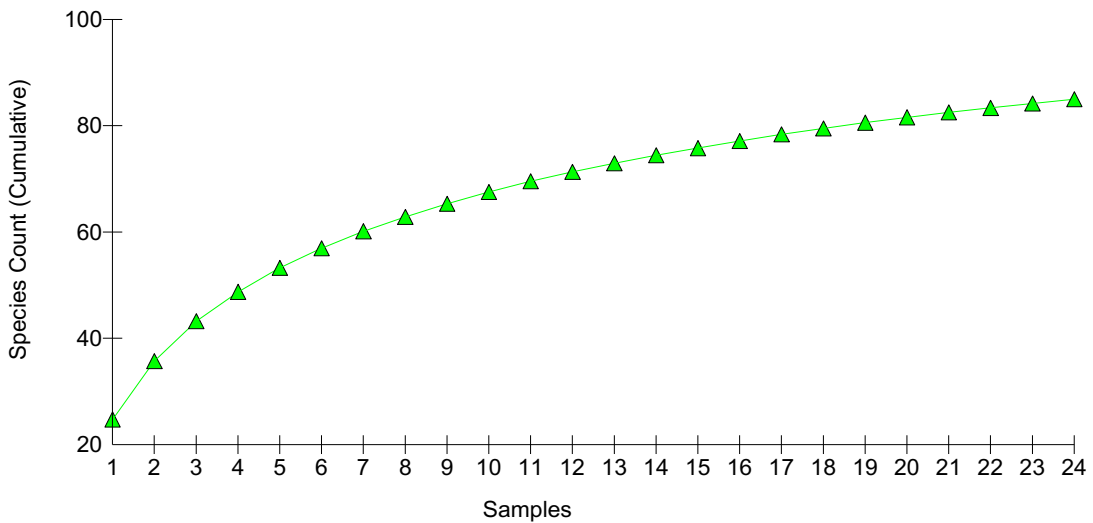
Lundy: Knoll Pins Horizontal - Eunicella



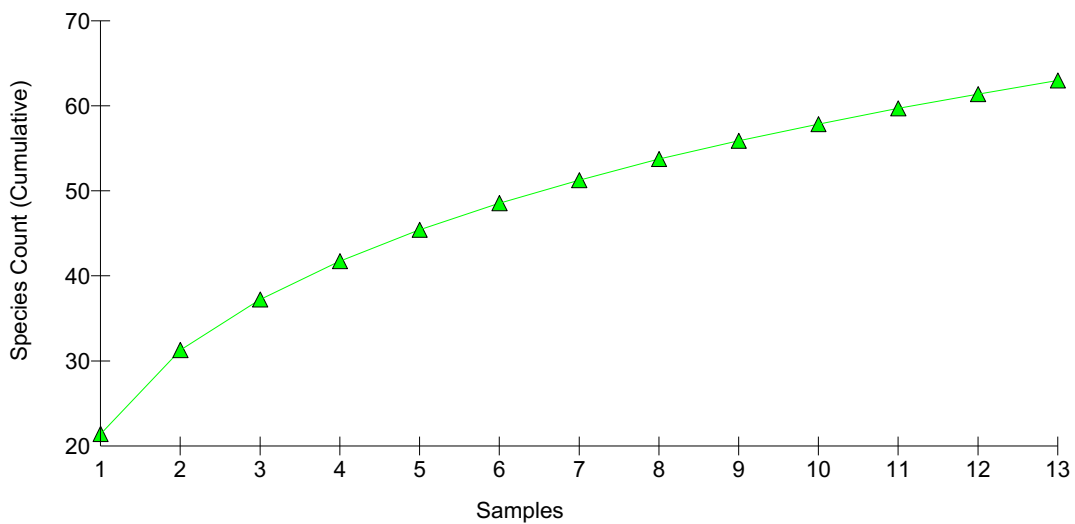
Lundy: Gannets Pinnacle - Vertical



Lundy: Jenny's Cove Vertical



Lundy: Battery Point - Horizontal



5. Kelp forest structure results

5.1 Rat Island kelp forest structure

Rat Island					
Date:	05/09/2004		Depth	1m bCD	
Quad	L hyperborea	Ldigitata	L. ochroleuca	Juvenile Laminaria spp.	Saccorhiza polyschides
1	11	0	0	0	0
2	16	0	0	0	0
3	9	0	1	0	0
4	10	0	0	0	0
5	8	0	0	0	0
6	10	0	0	0	0
7	8	0	0	0	0
8	14	0	0	0	0
9	5	0	0	0	0
10	3	0	1	0	0
11	5	0	3	0	0
12	12	0	0	0	0
13	7	0	0	0	0
14	15	1	0	0	0
15	1	5	0	0	0
16	8	0	0	0	0
17	7	0	0	3	0
18	8	0	1	0	0
19	12	0	1	0	0
20	9	0	0	0	0
21	9	0	0	0	0
22	3	0	0	0	0
23	7	0	0	7	0
24	9	0	1	2	0
25	1	0	0	0	0
26	8	0	4	5	0
27	14	0	0	0	0
28	11	0	0	0	0
29	20	0	0	5	0
30	9	0	0	2	0
31	11	0	2	2	0
32	6	0	2	0	0
33	9	0	1	0	0

5.2 Gannet's Bay kelp forest structure

Gannet's Bay					
Date:	30/08/2004		Depth	1m bCD	
Quad	L hyperborea	Ldigitata	L. ochroleuca	Juvenile Laminaria spp.	Saccorhiza polyschides
1	16	0	0	7	0
2	28	0	0	2	0
3	26	0	1	2	0
4	18	0	0	0	0
5	19	0	0	4	2
6	9	0	4	4	3
7	29	0	0	7	1
8	25	0	0	9	0
9	15	0	1	10	2
10	14	0	0	1	2
11	14	0	0	0	0
12	7	0	5	0	1
13	8	0	0	3	2
14	11	0	0	4	2
15	31	0	0	0	0
16	7	0	0	3	0
17	23	0	0	2	4
18	24	0	0	0	4
19	5	0	1	2	3
20	14	0	2	2	3
21	9	0	8	4	2

6. Seafan population assessment results.

Jenny Hill						
Quadra 2x10m t = (contiguous)	No. Sea fans		Notes	Substra % te		
	Adults	Juv.s (<10cm)		Rock	Sediment	
0 10	1	0	Clean & healthy	60	40	
10 20	1	0	50% epiphytised	35	65	
20 30	4	0	All 100% epiphytised	30	70	
30 40	1	0	All 100% epiphytised	60	40	
40 50	3	0	All 100% epiphytised	40	60	
50 60	2	0	All 100% epiphytised	70	30	
60 70	2	1	1+j= Clean & healthy, 1= 100% epiphytised	60	40	
70 80	2	0	1= 100% epiphytised, 1 =50% epiphytised	75	25	
80 90	5	0	1= 100% epiphytised, 4 =50% epiphytised	70	30	
90 100	5	0	3 = Clean & healthy, 2 =50% epiphytised	80	20	
<u>Total</u>		<u>26</u>	<u>1</u>			
<u>Density per 10m²</u>		<u>1.35</u>				

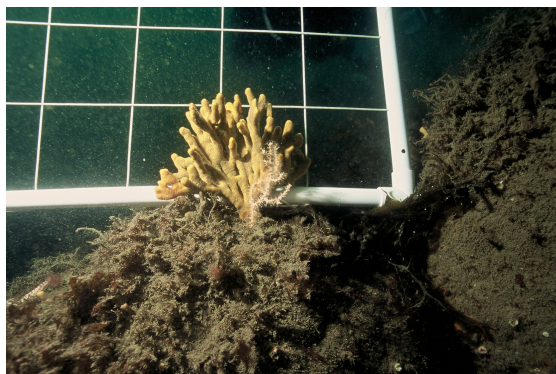
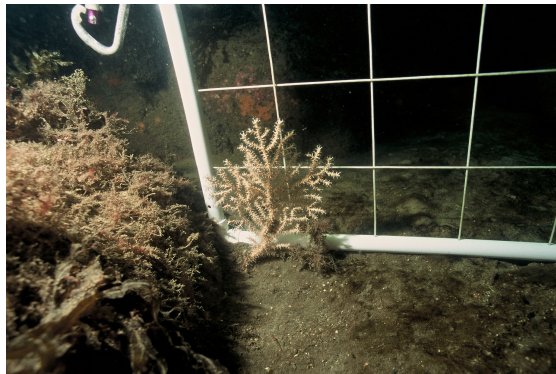
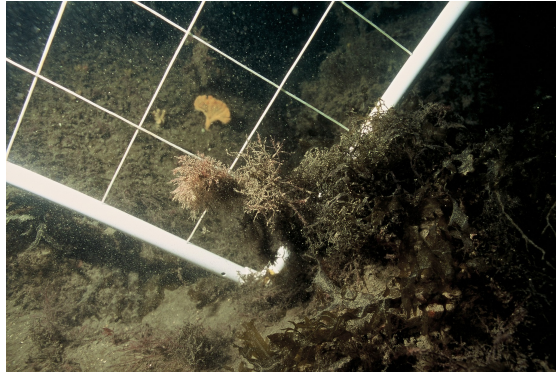
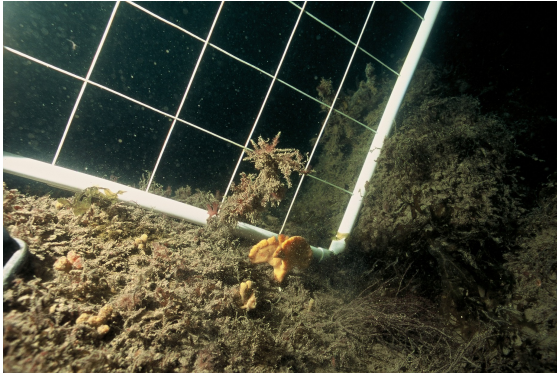
Tom Mercer						
Quadra 2x10m t = (contiguous)	No. Sea fans		Notes	Substra % te		
	Adults	Juv.s (<10cm)		Rock	Sediment	
0 10	1	0	100% epiphytised	65	35	
10 20	2	1	Adults 100% epiphytised. Healthy juv.	50	50	
20 30	5	0	1= Clean & healthy, 4 = 100% epiphytised	60	40	
30 40	5	0	1= Clean & healthy, 1 =50% epiphytised,3 = 100% epiphytised	90	10	
40 50	6	1	All 6 adults 100% epiphytised, Healthy juv.	50	50	
50 60	4	0	1= Clean & healthy, 3 = 100% epiphytised	70	30	
60 70	4	1	2= Clean & healthy, 2 = 100% epiphytised. Healthy juv.	80	20	
70 80	3	0	3= 100% epiphytised.	50	50	
80 90	2	0	1= Clean & healthy, 1 = 100% epiphytised	65	35	
90 100	3	0	3 =50% epiphytised.	70	30	
<u>Total</u>		<u>35</u>	<u>3</u>			
<u>Density per 10m²</u>		<u>1.9</u>				

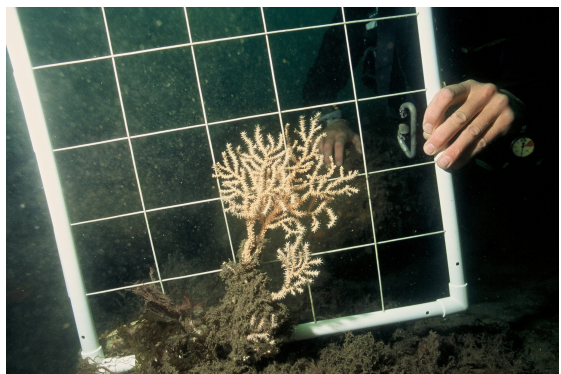
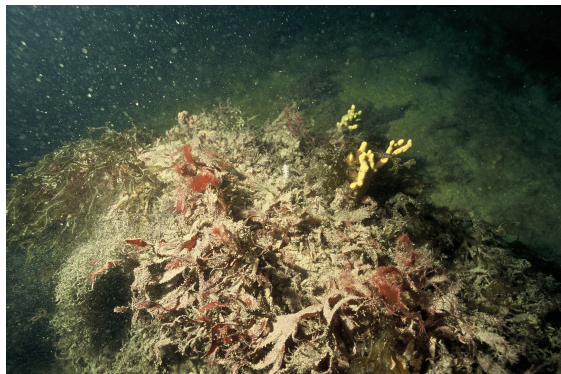
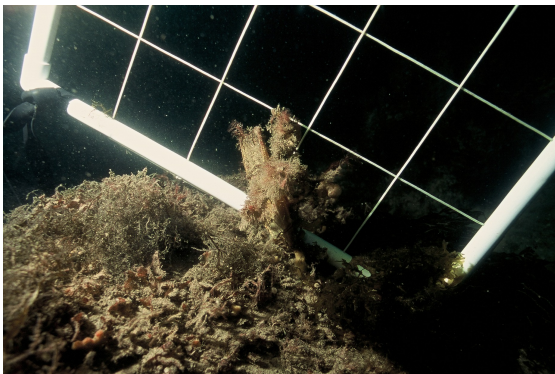
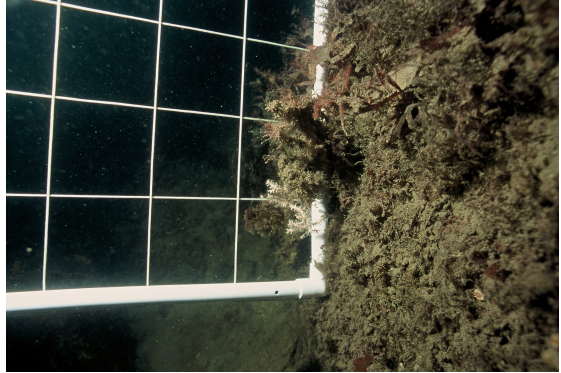
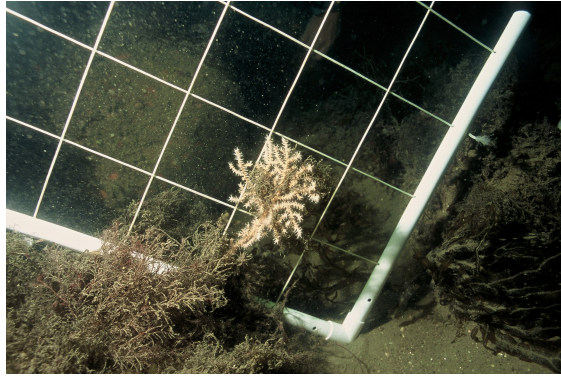
Francis Bunker						
Quadra 2x10m t = (contiguous)	No. Sea fans		Notes	Substra % te		
	Adults	Juv.s (<10cm)		Rock	Sediment	
0 10	4	0	3= Clean & healthy, 1= 100% epiphytised	90	10	
10 20	0	0		70	30	
20 30	3	0	2= Clean & healthy, 1= 100% epiphytised	95	5	
30 40	0	0		95	5	
40 50	1	0	1= 100% weed overgrowth	95	5	
50 60	0	0		95	5	
60 70	0	0		90	10	
70 80	0	0		95	5	
80 90	0	0		95	5	
90 100	1	0	1= Clean & healthy (small and branched)	90	10	
100 110	2	0	2= very epiphytised and more or less dead	90	10	
110 120	6	0	2= Clean & healthy, 2= 50% epiphytised, 2=very epiphytised and more or less dead	90	10	
<u>Total</u>		<u>17</u>	<u>0</u>			
<u>Density per 10m²</u>		<u>0.85</u>				

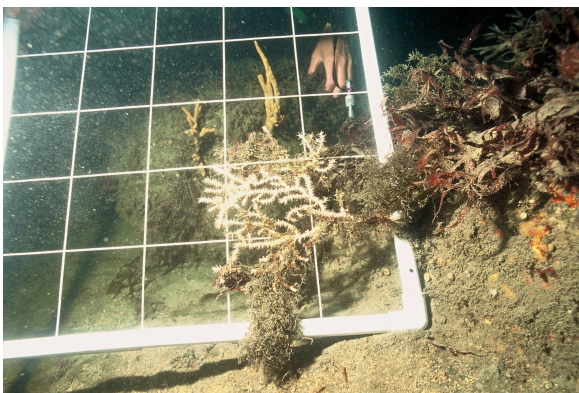
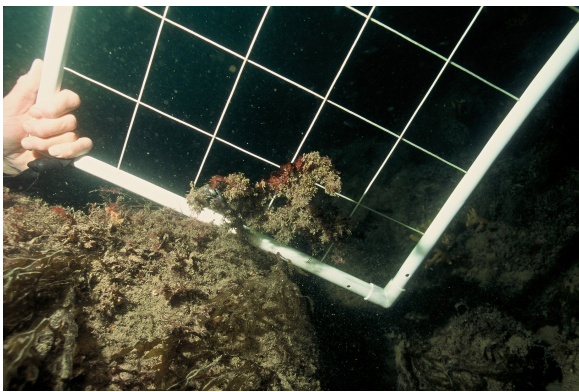
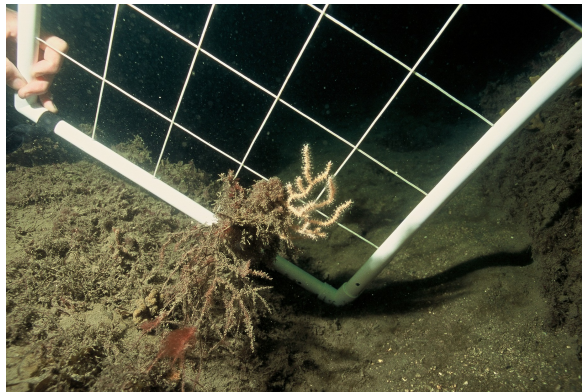
Jen Jones						
Quadra 2x10m t = (contiguous)	No. Sea fans		Notes	Substra % te		
	Adults	Juv.s (<10cm)		Rock	Sediment	
0 10	2	4	5 x Clean & healthy 1x 100% weed overgrowth	80	20	
10 20	0	2	2x Clean & healthy	80	20	
20 30	6	1	4x clean and healthy and 3x 100% overgrown	70	30	
30 40	0	0		75	25	
40 50	1	0	1x50% epiphytised	40	60	
50 60	0	0		40	60	
60 70	0	0		45	55	
70 80	0	0		80	20	
80 90	3	0	3=50% epiphytised	80	20	
90 100	1	0	1=50% epiphytised	80	20	
100 110	2	0	2= Almost clean	80	20	
110 120	13	0	1=clean, 12= 100% epiphytised,	60	40	
<u>Total</u>		<u>28</u>	<u>7</u>			
<u>Density per 10m²</u>		<u>1.75</u>				

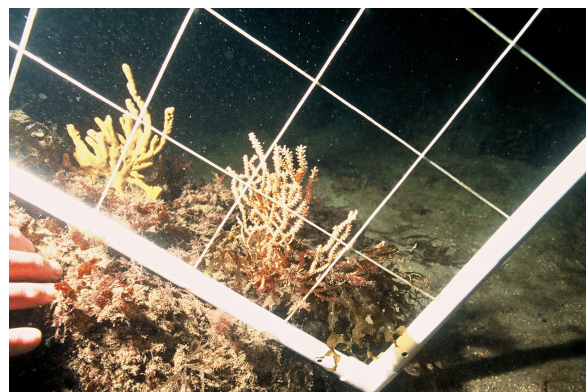
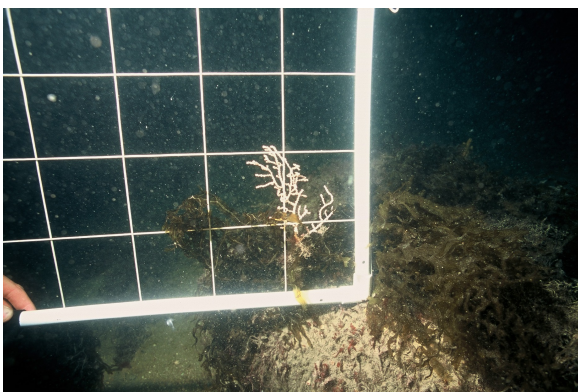
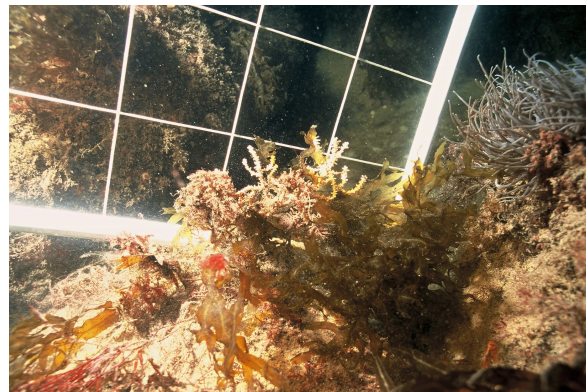
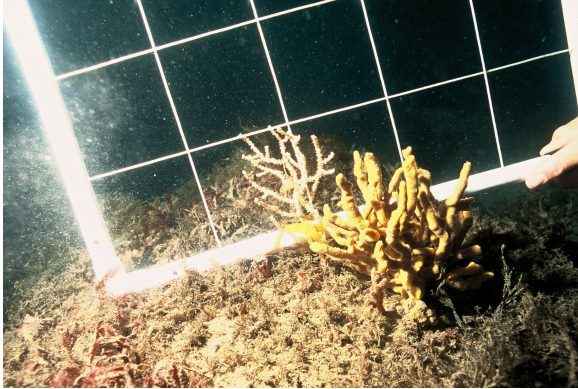
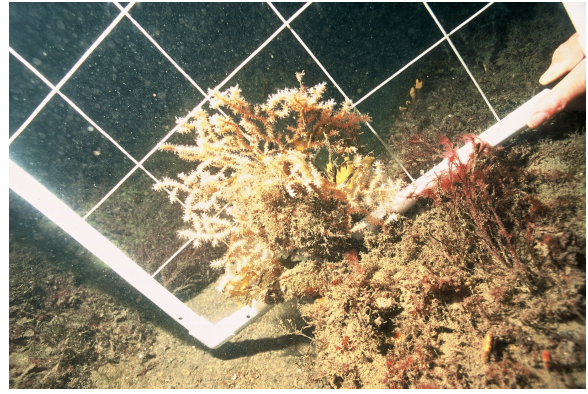
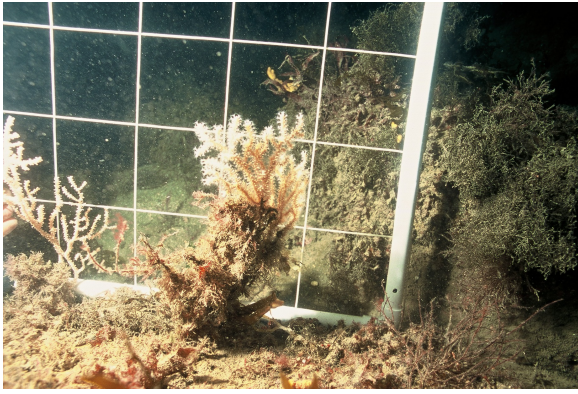
A study of the condition of sea fans by using a simple scoring system (1 = pristine or <5% cover by weed or epizoic organisms; 2 = <20% cover; 3 = 20-50% cover; 4 = 50-80% cover; and 5 = >80% cover). Using this scoring system the ASML study returned an average condition index of 2.93.

7. Seafan epiphytisation photographs.









Appendix 4. Survey site and task log for the Lundy cSAC monitoring study.

Table A4.1 2003 monitoring surveys

Date	Site no	Site name	Site position		Survey type		Work completed		Photos		Vid	Biotope	Surveyor
			Start	Finish	Ph II	Q's	Quad size	No	Cam/lens	No			
June 03			Inner Anchorage, Knoll Pins & Northern Points				70+ Video drops in transect areas					Various	TM, IS, LH, IR
31/8/03	1	Dead Cow Point	SS12643 – 45230 (wp3)		*		Collect		Coolpix	15		LhypTFt	FB,JJ,JH
31/8/03	1	Dead Cow Point	SS12668 – 45170 (wp5)	12642 – 45168 (wp6)	*		Collect		Nikon F50	14		LhypTFt	TM,CH
1/9/03	2	Rat Island	SS14610 – 43860 (wp24)			*	0.25m ²	4				LhypR.Ft	TM,JH
1/9/03	2	Rat Island	SS14610 – 43860 (wp24)			*	0.25m ²	3			5min	LhypR.Ft	FB,JJ
2/9/03	2	Rat Island	SS14610 – 43860 (wp24)		*	*	0.25m ²	4+3				LhypR.Ft	TM,FB,JJ
2/9/03	1	Dead Cow Point	SS12642 – 45168 (wp6)			*	0.25m ²	4+4+4+3			5min	LhypTFt	TM,FB,JJ, JH
3/9/03	3	N. of Quarry Bay	SS14113 – 45256 (wp13)	SS14116 – 45246 (wp14)	*		Collect		Coolpix	20		ErSEun?	FB,JJ

Date	Site no	Site name	Site position		Survey type		Work completed		Photos		Vid	Biotope	Surveyor
			Start	Finish	Ph II	Q's	Quad size	No	Cam/lens	No			
3/9/03	3	N. of Quarry Bay	SS14116 – 45246 (wp14)	SS14102 – 45347 (wp15)	*		Collect					ErSEun?	TM,JH
3/9/03	3	N. of Quarry Bay	SS14116 – 45246 (wp14)	SS14115 – 45347 (wp17)		*	40m ² (4x10m)	20	Sea fan counts and health			ErSEun?	TM,JH
3/9/03	3	N. of Quarry Bay	SS14123 – 45399 (wp16)	SS14120 – 45488 (wp18)		*	40m ² (4x10m)	24	Sea fan counts and health			ErSEun?	FB,JJ
4/9/03	3	N. of Quarry Bay	SS14116 – 45246 (wp14)			*	0.25m ²	4			5min	ErSEun?	TM,FB
5/9/03	3	N. of Quarry Bay	SS14120 – 45488 (wp18)			*	0.25m ²	4				ErSEun?	TM,FB
5/9/03	3	N. of Quarry Bay	SS14120 – 45488 (wp18)			*	0.25m ²	6	Nikon F50 c/u	6		ErSEun?	CH,JJ,JH
6/9/03	4	Knoll Pins	SS 14210 - 46607		*				Coolpix Nikon F50 (c/u)	20 25		FaV	CH,JJ,JH, FB
6/9/03	3	N. of Quarry Bay	SS14116 – 45246 (wp14)				Photographing all encountered sea fans		Nikon F50 (w/a)	32		ErSEun?	CH, TM
7/9/03	4	Knoll Pins (verticals)	SS 14227 – 46591 (wp24)			*	30cm x 30cm	4				FaV	TM,FB
7/9/03	4	Knoll Pins (verticals)	SS 14227 – 46591 (wp24)			*	30cm x 30cm	6	Nikon F50	15		FaV	CH,JJ,JH
7/9/03	4	Knoll Pins (verticals)	SS 14227 – 46591 (wp24)			*	30cm x 30cm	3			5 mins	FaV	TM,FB

Date	Site no	Site name	Site position		Survey type		Work completed		Photos		Vid	Biotope	Surveyor
			Start	Finish	Ph II	Q's	Quad size	No	Cam/lens	No			
7/9/03	4	Knoll Pins (verticals)	SS 14227 – 46591 (wp24)			*	30cm x 30cm	6				FaV	CH,JJ,JH
8/9/03	5	Knoll Pins (horizontal)	SS 14227 – 46591 (wp24)			*	0.25m ²	1			c/u 5 mins	ErSPbolSH	TM,FB
8/9/03	5	Knoll Pins (horizontal)	SS 14227 – 46591 (wp24)			*	0.25m ²	4				ErSPbolSH	JJ,JH
8/9/03	5	Knoll Pins (horizontal)	SS 14227 – 46591 (wp24)			*	0.25m ²	3			W/a 5 mins	ErSPbolSH	TM,FB
8/9/03	5	Knoll Pins (horizontal)	SS 14227 – 46591 (wp24)			*	0.25m ²	3	Nikon F50	4		ErSPbolSH	CM,JJ,JH
9/9/03	5	Knoll Pins (horizontal)	SS 14227 – 46591 (wp24)			*	0.25m ²	2	Nikon F50	10	W/a 5 mins	ErSPbolSH	CM,FB
9/9/03	5	Knoll Pins (horizontal)	SS 14227 – 46591 (wp24)			*						ErSPbolSH	TM,JH
9/9/03	6	Gannet's Pinnacle	SS13753 – 47641 (wp27)			*	Collect					CorCri?	TM,JH, CH,FB,JJ
10/9/03	6	Gannet's Pinnacle	SS13753 – 47641 (wp27)			*	30cm x 30cm	19	Nikon F50	19	5 mins	CorCri?	TM,JH, CH,FB,JJ
11/9/03	6	Gannet's Pinnacle	SS13753 – 47641 (wp27)			*	30cm x 30cm	15	Nikon F50	15	5 mins	CorCri?	TM,JH, CH,FB,JJ
12/9/03		Gannet's Bay	+ Knoll Pins	SS 14227 – 46591 (wp24)			Work with BBC for Chris Davis		Nikon F50	15	*	General	CH,FB,JJ, JH,TM

Table A4.2 2004 monitoring surveys

Date	Site no	Site name	Site position		Survey type		Work completed		Photos		Vid	Biotope	Surveyor
			Start	Finish	Ph II	Q's	Quad size	No	Cam/lens	No			
June 04			Northern Points, St James Stone, Half tide Rocks, The Rattles				65 video drops in transect areas					Various	TM, CH, CD, LH
29/08/04	7	Brazen Ward	51.19072°N 04.66453°W	N/A	*	-	Collect					LhypR.Ft	TM,JH,JJ, CH,FB,SB
30/08/04	8	Gannets Bay	51.19509°N 04.66879°W	N/A	*	*	0.25m ² & 1m ²	22 20 kelp counts	Nikon F50, Digital video	10	5 mins	LhypR.Ft	TM,JH,JJ, CH,FB,SB
31/08/09	9	Jenny's Cove	51.18243°N 04.67841°W	N/A	*	-	Collect		Nikon F50,	10		ScAs.ByH	TM,JH,JJ, CH,FB,SB
01/09/04	9	Jenny's Cove	51.18243°N 04.67841°W	N/A			0.01m ²	14	Nikon F50, Digital video	10	5 mins	ScAs.ByH	TM,JH,JJ, CH,FB,SB
02/09/04	9	Jenny's Cove	51.18243°N 04.67841°W	N/A			0.01m ²	16	Nikon F50, Nikon Coolpix	10 10		ScAs.ByH	TM,JH,JJ, CH,FB,SB

Date	Site no	Site name	Site position		Survey type		Work completed		Photos		Vid	Biotope	Surveyor
			Start	Finish	Ph II	Q's	Quad size	No	Cam/lens	No			
03/09/04	10	Battery Point	51.17116 °N 04.68385 °W	51.17119 °N 04.68456 °W	*	-	Collect	-	Nikon F50, Nikon Coolpix	10 10	-	ErSPbolSH	TM,JH,JJ, CH,FB,SB
05/09/04	2	Rat Island	51.16375 °N 04.65288 °W			*	1 m ²	33 Kelp counts				Lhyp.Ft	CH,JH,SB
05/09/04		West coast	Half Tide Rocks	The Rattles			Drop down video	10 sites				Various	TM,CH,JJ
06/09/04	10	Battery Point	51.17116 °N 04.68385 °W	51.17119 °N 04.68456 °W		*	0.25m ²	27	Nikon F50, Digital video	20	5 mins	ErSPbolSH	TM,JH,JJ, CH,FB,SB
07/09/04	Weathered Off												
08/09/04	Weathered Off												
09/09/04		West coast	St James Stone, Northern Points and The Rattles				Drop down video –	28 sites				Various	SB,TM,CH.
10/09/04	De-mob survey gear.												