

Ramsey Bay Marine Nature Reserve Base-Line Survey (August 2011) Preliminary Report.

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Introduction

A three week survey of the proposed Ramsey Bay marine nature reserve (MNR), fisheries management zone (FMZ) and *Modiolus* conservation zone (MCZ) was undertaken between the 8th-28th August 2011. The purpose of the survey was to provide base-line information on the following criteria; substrate type, habitat types and major faunal/floral assemblages. The aim of the survey was primarily as a data collection exercise to enable the region to be classified under the European Union Nature Identification System (EUNIS).

The initial two week survey was conducted to provide a base-line of sea-floor characteristics (see figure 1). This was achieved via the use of a commercially available ground discrimination system (GDS) linked to the SeaScan transducer on the FPV Barrule. The third week of surveys included further data gathering via video surveying to establish habitat differences, major biota typologies and sediment characteristics of the area. These video surveys were further supported by sediment collection via a Van-Veen grab to further assess grain-size characteristics and for faunal analysis of the sediments.

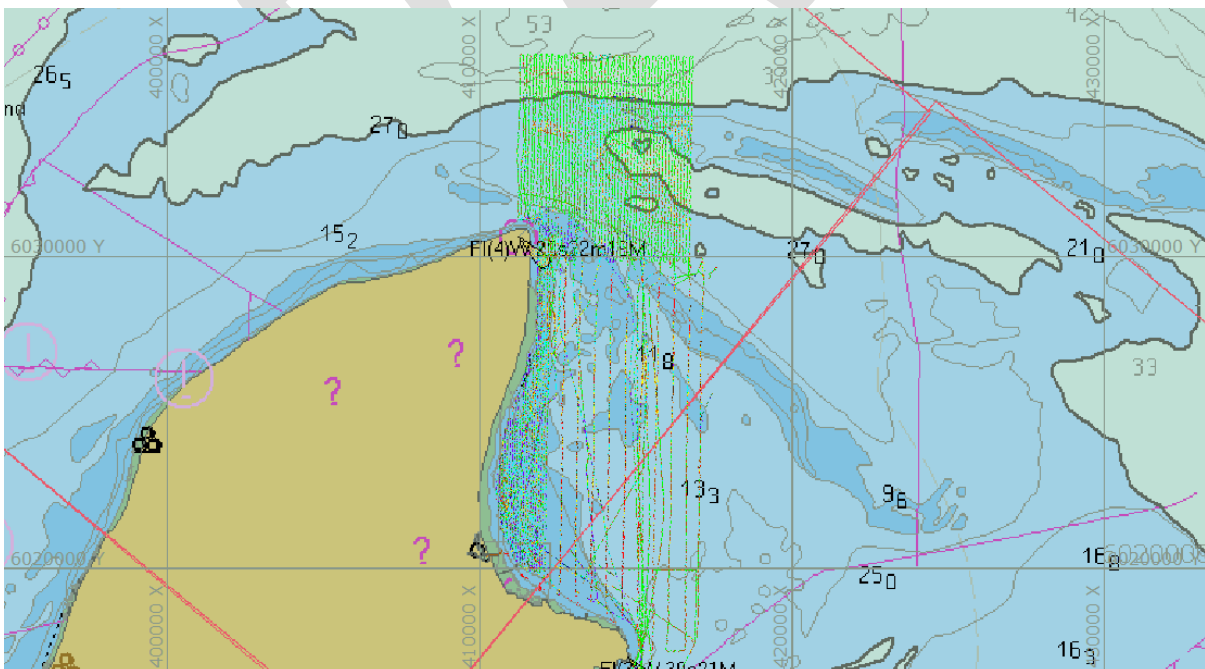


Figure 1. Area covered by the Hypack Ground Discrimination Survey. Transect distance separations are; Horse Mussel Zone = 100m, Conservation zone = 75m, Fisheries Management Zone = 500m.

Methodology

Ground Discrimination Survey

The ground discrimination survey (GDS) was undertaken using a Simrad ES60 transducer mounted on the FPV Barrule's hull and transmitting at a frequency of 38 kHz. The return signal from the transducer was interpreted via a Seatronics Seascan system which allows for the interpretation of ground hardness and roughness. These data are then date and position stamped via the ships GPS before being incorporated into the Hypack software.

The Hypack system was calibrated by re-surveying grounds previously surveyed in 2009 by the R.V. Prince Madoc. The FPV Barrule would be stationed at one location and measurements of ground hardness and roughness were recorded. Where possible a drop-down camera was used to validate the readings. A calibration table and graph could then be created (figure 2.) The calibration seabed identification square used in the present study can be found in the file 12Aprilcalib.six on the ships Hypack computer.

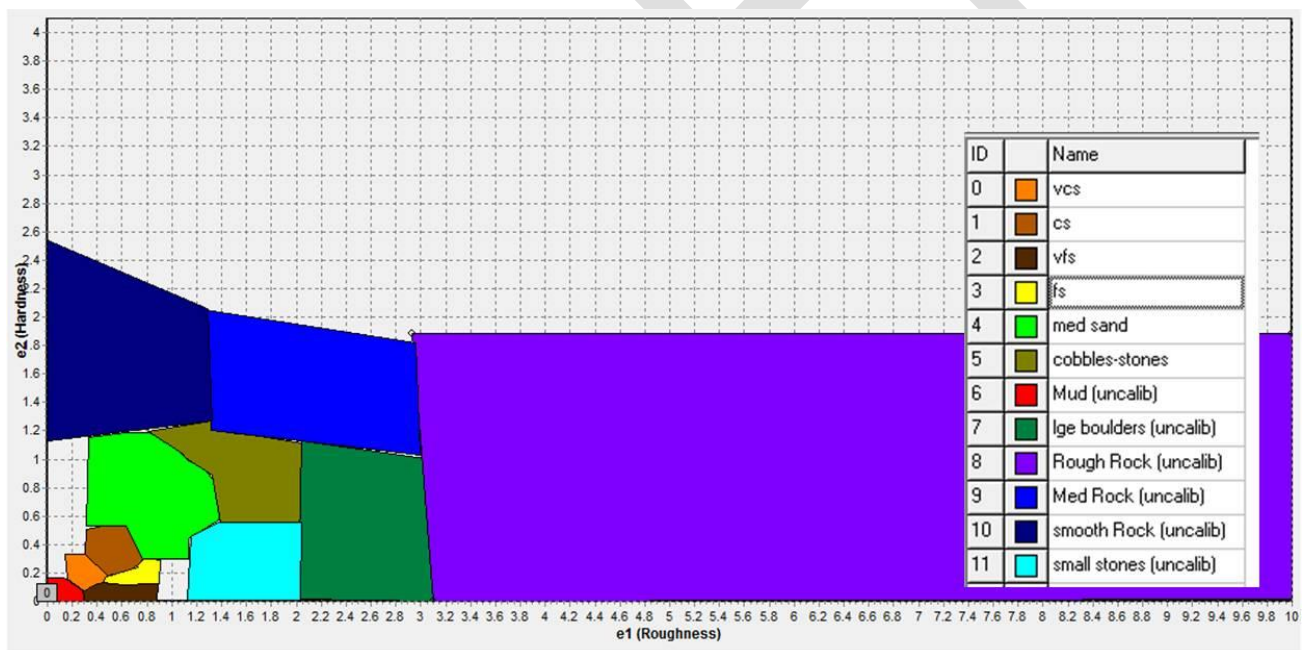


Figure 2. Calibration graph used for the Hypack data (x axis = Roughness, y axis = Hardness). Key: vcs = very coarse sand, cs = coarse sand, vfs = very fine sand, fs = fine sand.

Video Surveys

Video images were captured on a conventional dive camera (SeaLife model DC1200) mounted on a purpose built 'flying' sled called a flying video array (figure 3). The flying array travels over the seafloor with the minimal of contact and as such reduces damage to sensitive habitats/species etc. Illumination was achieved by mounting three LED dive torches to the sled. Post video processing for screen grabs (etc.) was achieved using free software (Movavi Screen Capture v2). The flying video array was deployed behind the FPV Barrule and the ship was left to drift with the prevailing currents whilst the videos were recorded.

A drop down frame was also employed for video capturing using the same camera. The drop down frame was useful in shallow water environments where it could be deployed from small boats. The drop down video was also used for Hypack calibration purposes.

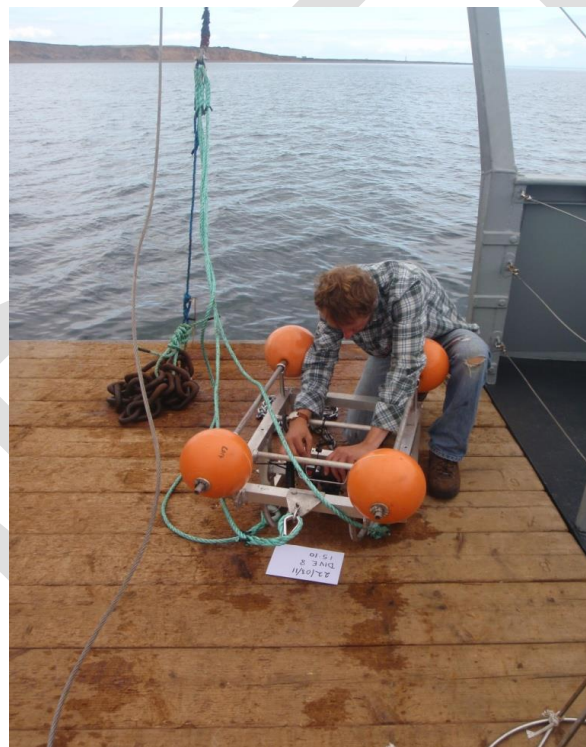


Figure 3. Flying video array being prepared for deployment

Van-Veen Grab Samples

A total of ten Van-Veen grab samples were retrieved from the conservation zone and the fisheries management zone (see figure 4, table 1). At each location the volume of sediment and a brief field description was recorded. Two sub-samples were taken from each location, one sub-sample was collected for particle size analysis (PSA) and the second was sieved through a 1mm sieve before being preserved in 5% formalin, this sample was used for faunal identification.

Samples for PSA were dried at 100°C for 24 hours and were dry-sieved through a sieve column containing 63, 125, 250, 500, 1000, 2000, 4000, 8000, 16000, 31500 and 63000 micron sieves.

Station No.	Grab No.	Litres	Time	Latitude	Longitude	Broad location
1	1	4	10.07	54 19.011	004 21.527	South Ramsey Bay
2	2	4	10.25	54 18.987	004 20.942	South Ramsey Bay
2	3	4	10.30	54 18.984	004 21.006	South Ramsey Bay
3	4	4	10.48	54 18.870	004 19.765	South Ramsey Bay
3	5	3 to 4	10.55	54 18.855	004 19.882	South Ramsey Bay
4	6	3	11.10	54 18.890	004 18.419	South Ramsey Bay
5	7	6	12.00	54 20.298	004 22.594	Mid Ramsey Bay
6	8	6	12.15	54 20.395	004 21.384	Mid Ramsey Bay
7	9	4	12.35	54 20.501	004 18.658	Mid Ramsey Bay
8	10	2.5	13.00	54 22.235	004 21.844	North Ramsey
9	11	2	13.25	54 22.284	004 20.868	North Ramsey
10	12	2	14.00	54 22.298	004 19.619	North Ramsey

Table 1. Co-ordinates of Van-Veen grab locations in Ramsey Bay

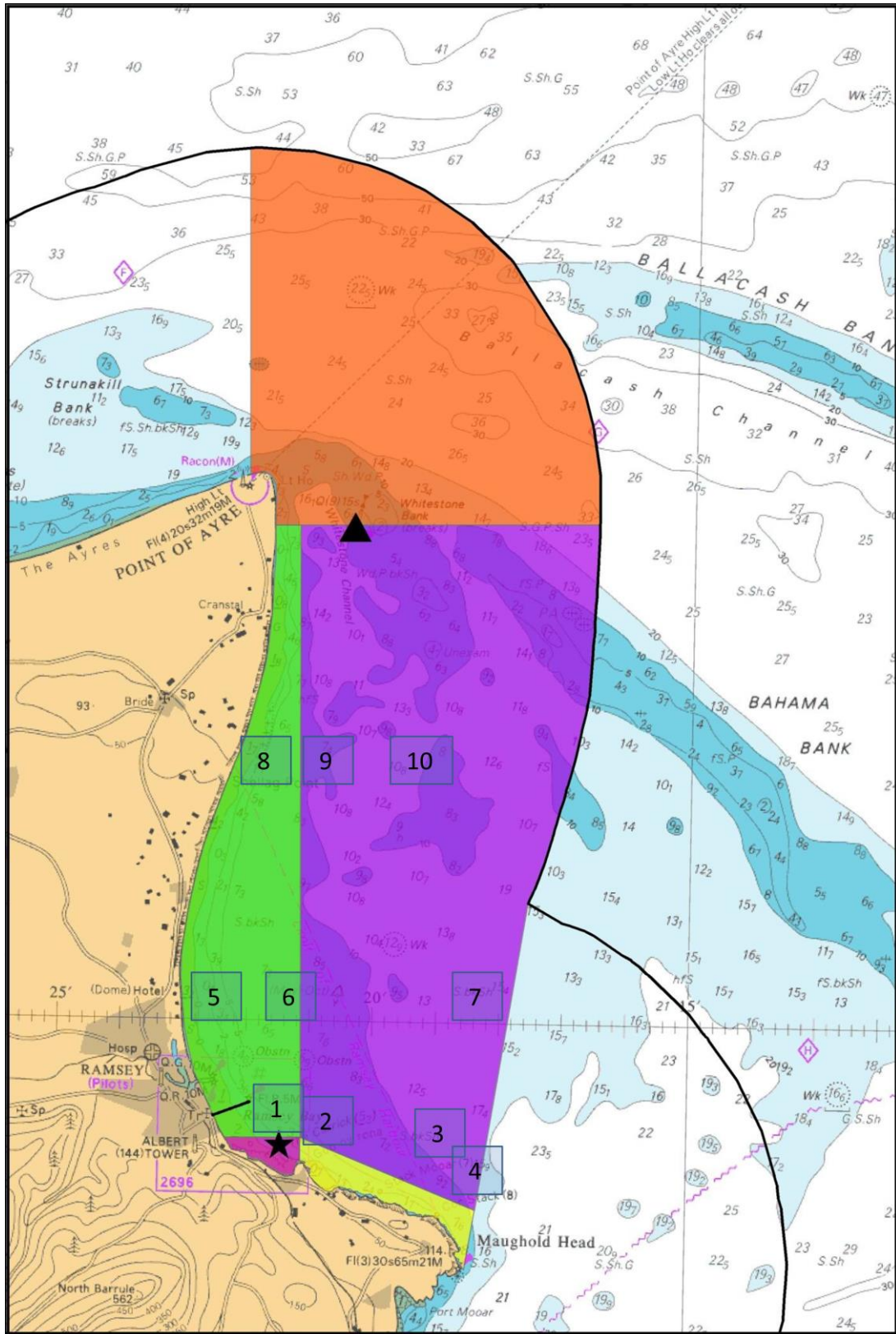


Figure 4. Approximate locations of Van-Veen grabs for particle size analysis (PSA) and faunal analysis recovered from the Marine Nature Reserve

EUNIS Classification

The European Union Nature Identification System (EUNIS) is a pan-European classification system which aims to be able to classify all habitats, terrestrial and marine. The classification system is hierarchical, with level one classification being a general broad-scale classification (e.g. Marine) whilst a level 6 classification would be a full description of species found, communities and habitat structure. Being hierarchical, classifications can be expanded as more information on a particular habitat is realised. The initial aim of the present survey was to classify habitats in Ramsey Bay to EUNIS level 4.

Results

Horse Mussel (*Modiolus modiolus*) Conservation Zone.

The *Modiolus* conservation zone was surveyed from an area to the north of the Point of Ayre extending out to the 3 mile EEZ eastwards of the Isle of Man. Survey transects were 100m apart. A total of six half hour video tows were completed in the *Modiolus* conservation area. The videos were captured after deploying the camera array and allowing the ship to drift with the prevailing currents. (For positions of video deployment and recovery see appendix 1).

Data from the Hypack ground discrimination system (GDS) survey suggests that the majority of the area studied has a substrate comprised of mobile sediments of medium to coarse grade sands and gravels. Evidence from the video surveys show that these sandy areas are often overlain with broken shells (primarily dead *Modiolus modiolus*).

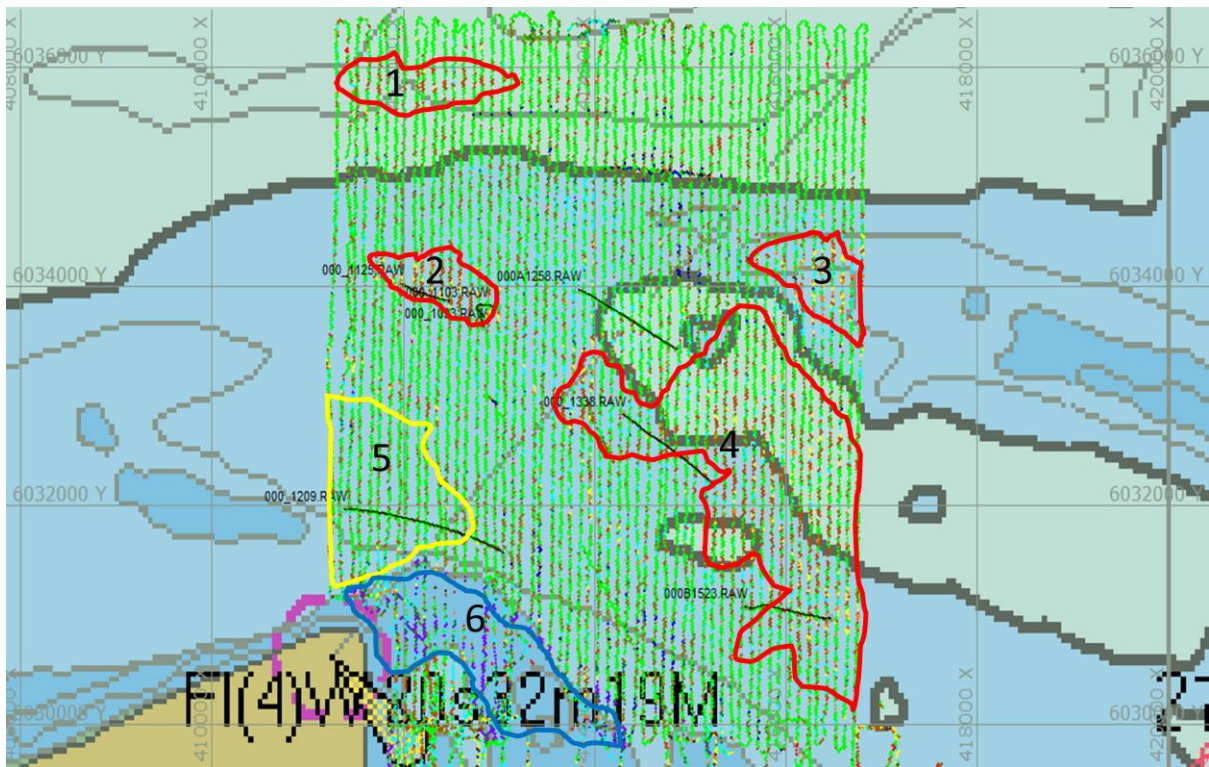


Figure 5. *Modiolus* conservation zone GDS Survey. Red areas represent *Modiolus* reefs identified by video survey and potential *Modiolus* reefs identified by Hypack. Blue zone = scoured zone where mobile sediments have been winnowed leaving exposed bedrock. Yellow zone = cobbled area. Black lines denote paths of video tows.

Features identified by the GDS include several patches which were calibrated to coarse/very coarse sands within the Hypack survey system. Results obtained from the video surveys show these structures to be comprised of *Modiolus* beds overlaying sands (red zones 1-4 in figure 5). The quality of these beds varied across the area surveyed ranging from regions predominantly populated with a healthy *Modiolus* reef system (and associated faunal assemblages of bryozoans, *A. digitatum* etc. Such as zones 2 and 4 in figure 5) to areas where the *Modiolus* beds were primarily composed of dead assemblages or where live *Modiolus* occurs in discrete patches on bare sand

To the south west of the horse mussel conservation area the Hypack GDS identified a zone of cobbles and large boulders; this was later verified by video survey (zone 5 in figure 5). GDS results of the seafloor immediate to the North and East of the point of Ayre (approximate to the Whitestone Bank) were shown to comprise of bedrock. This bedrock area lays in a region of high tidal flow which results in scouring of the seafloor and the subsequent removal of any overlying sediments (zone 6 in Figure 5).

Some of the *Modiolus* reefs captured on video show a high level of species diversity with the reef providing a complex and cryptic habitat for many other faunal species. Other sessile filter feeding organisms such as Deadman's fingers (*Alcyonium digitatum*), the plumose anemone (*Metridium senile*) and the Dahlia anemone (*Urticina felina*) were commonly encountered as were several species of erect bryozoans. Several representatives of the Echinodermata e.g. common sea urchins

(*Echinus esculentus*.) and starfish (*Asteria rubens*, *Crossaster papposus*, *Henricia oculata*)) were also commonly encountered (figures 6-8).

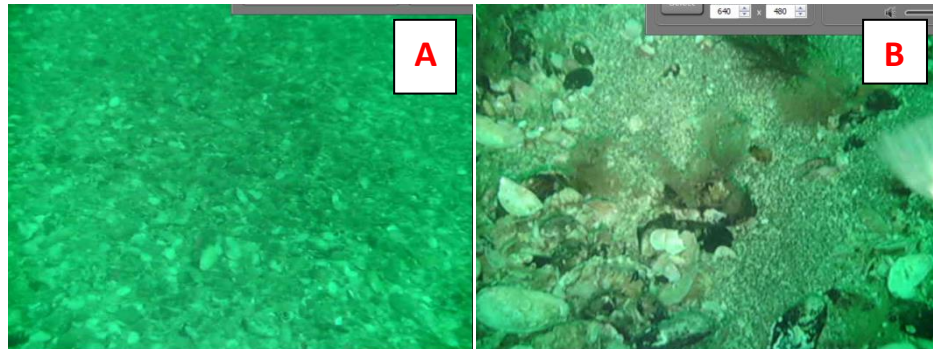


Figure 6 Screen grabs of video footage taken in the *Modiolus* conservation area showing extensive areas of dead shell (A) and localised clumps of live *Modiolus* growing in coarse sands (B).

Video footage captured close to the Point of Ayre shows a more barren habitat composed primarily of a sandy substrate with associated cobbles (no dead shell was encountered in this region). The boulders were often covered with Horned wrack (*Fucus ceranoides*) and a mixture of other brown algae.

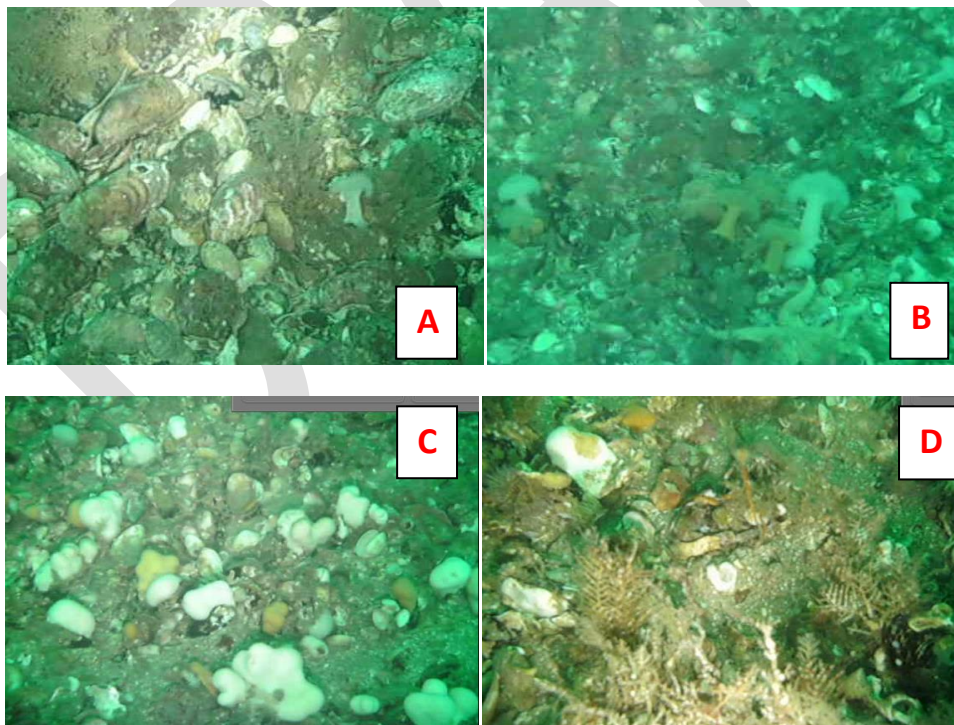


Figure 7. Screen grabs from video footage of the *Modiolus* conservation area showing live *Modiolus* shells (A & D) and associated fauna such as the Plumose anemone (B) Deadman's fingers (C) and erect Bryozoan species (D).

Video surveys taken to the south of the Ballacash Channel show the sediment to be comprised of coarse sands and gravels with dead *Modiolus* shells. Some live *Modiolus* and abundant colonies of *A. digitatum* were encountered in this region but the distribution was rather patchy. A similar substrate and associated fauna was seen from video footage collected midway between the Ballacash Channel and the Bahama Bank (see figure 8).

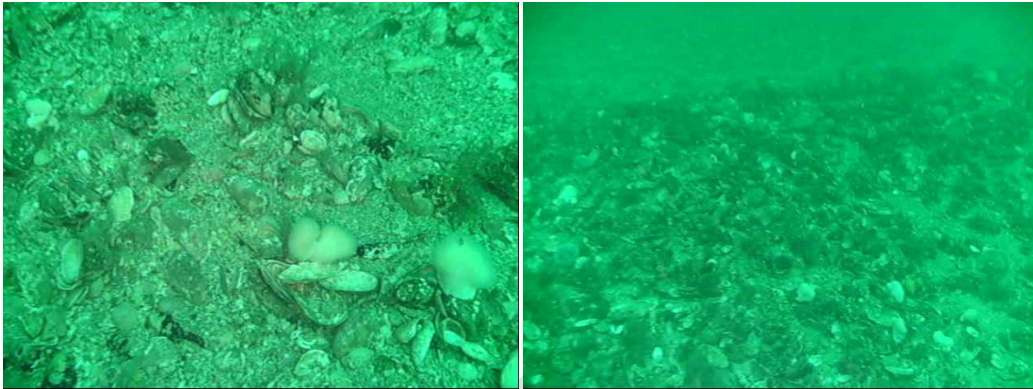


Figure8. Screen grabs from video footage taken from the mid Ballacash channel north of Bahama Bank showing extensive areas of dead *Modiolus* shell.

The GDS surveys of the *Modiolus* conservation zone highlighted the important interaction between bathymetry, tidal flow and sediment structure within the area. Changes in sediment characteristics often followed changes in Bathymetry. Shallow regions such as those found at the Whitestone and Ballacash Banks are subject to strong tidal streams (often in excess of 4knots) and prominent overfalls are often found especially during mid-tides. These tidal streams can also influence the habitat types and biota that occur in such regions. *Modiolus modiolus* is a sessile filter feeding bivalve mollusc which is reliant upon food particles being delivered to them, the strong tidal currents found adjacent to the point of Ayre and the coarse sandy substrate provide an ideal habitat for this species to thrive.

Marine Conservation Zone

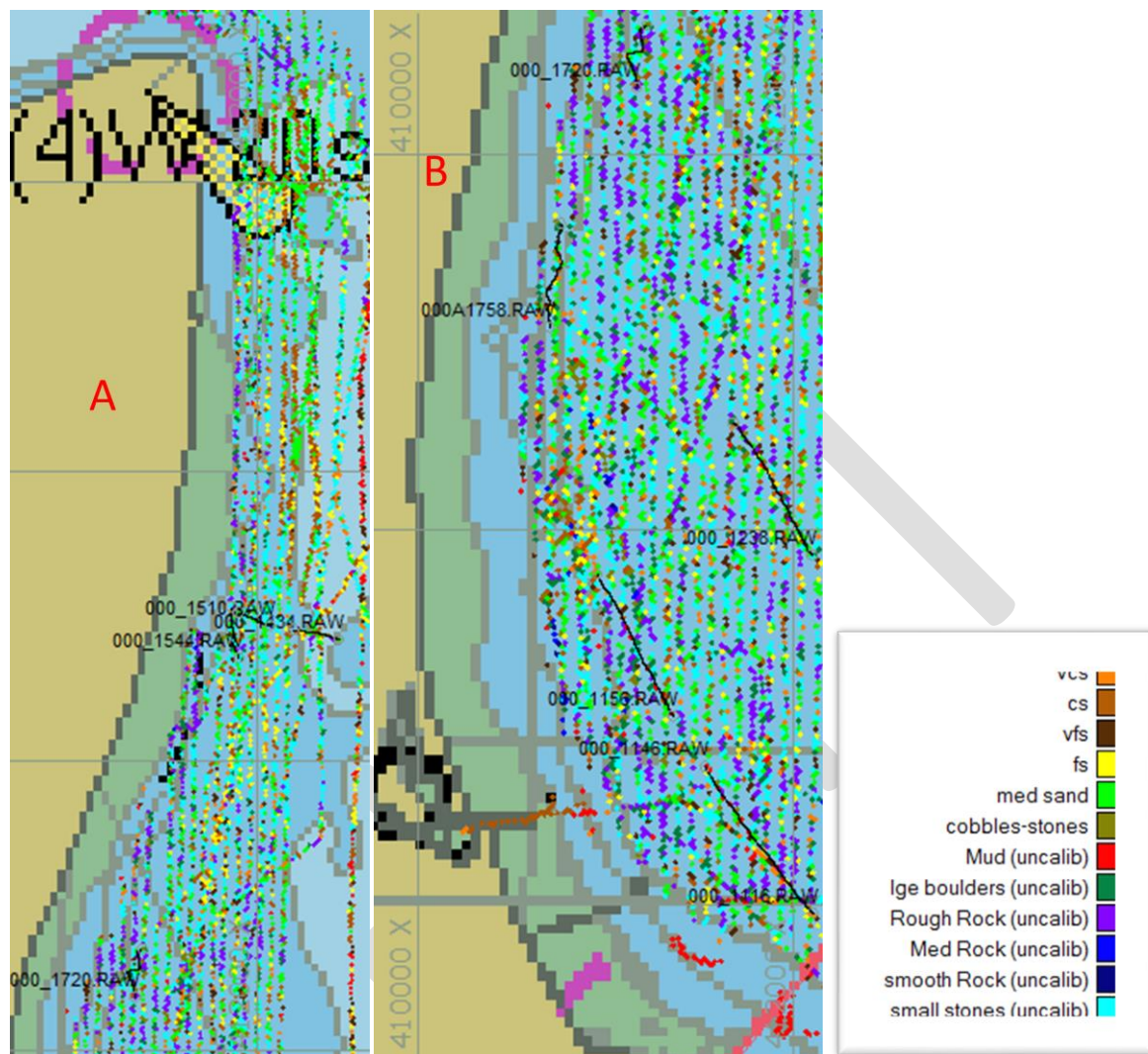


Figure 9. Hypack ground discrimination survey results for the Marine Conservation Area (A= North region, B = south region).

Results obtained from the GDS survey within the marine conservation zone show the substrate to be composed of primarily mobile sediment. To the north of the region adjacent to the Point of Ayre, north of Phurt the sediments consist of medium to coarse sands and small stones. Further south of this region towards the Shellags the sediment again consists of a mixture of fine to coarse sands interspersed with boulders and stones and the occasional rocky outcrop. At this location the sediments exhibit a gradient from fine sands inshore coarsening offshore to a more gravelly, stoney matrix (see figure 9).

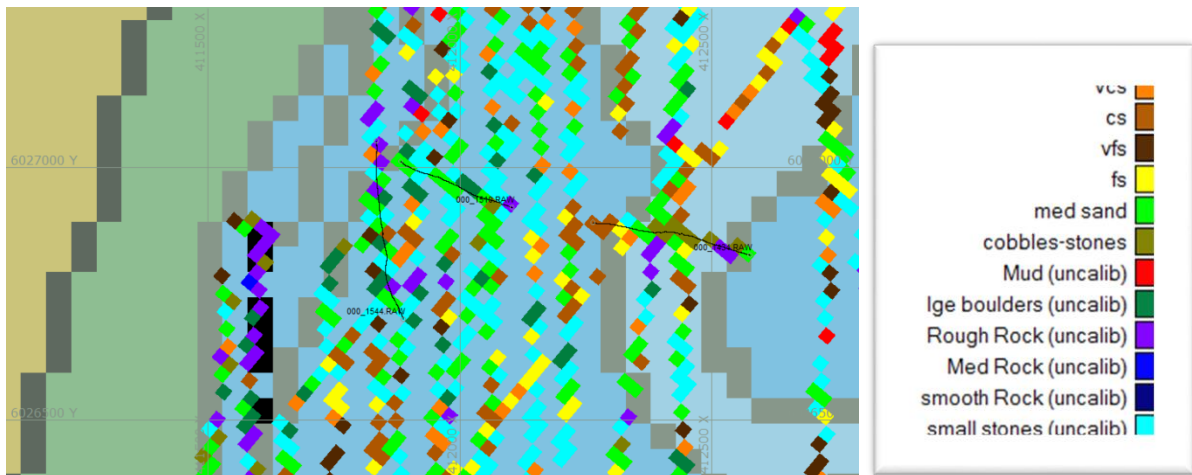


Figure 10. Close up of GDS data collected from the Shellags within the MCZ. A general trend of coarsening of the sediment from offshore (east) to inshore (west) can be seen. (Black lines indicate track of video sledge).

Between the Shellags and The Dog Mills the sediments continue to exhibit a general pattern of coarsening inshore. Frequent rocky outcrops occur in this region as identified by the Hypack GDS survey. The Hypack system also identified regions of rough rock close to the coast, these were later examined by video and by Van-Veen grab and identified as boulder clay deposits overlain by coarse sands. Between The Dog Mills and North Mooragh the sedimentary environment remains similar to that discussed from the Dog Mills to the Shellags with the exception of one region close inshore at North Mooragh where finer sediments (very fine sands, fine sands, muds, etc.) interspersed with boulders were found. South of this point the occurrence of rocky outcrops become much more abundant with sandy hollows mainly comprising of medium sands, small stones and boulders being found between the outcrops of bedrock (see figure 11).

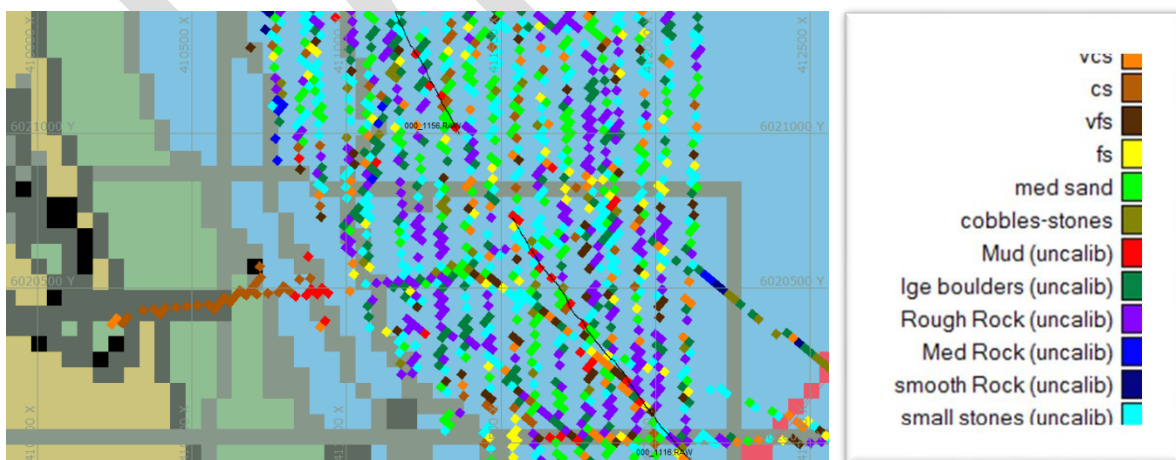


Figure 11. Hypack GDS survey results for south of the Mooragh showing frequent rocky outcrops (purple blocks) interspersed with a mixture of sands, mud and small stones.

Eight video tows were undertaken within the MCZ. Three of these tows were taken in the region of the Shellags where the substrate was seen to be a mixture of coarse sands and gravels occasionally interspersed with rocky outcrops. Dead shell littered this region and kelp (*Laminaria* spp.) was regularly encountered (see figure 12).

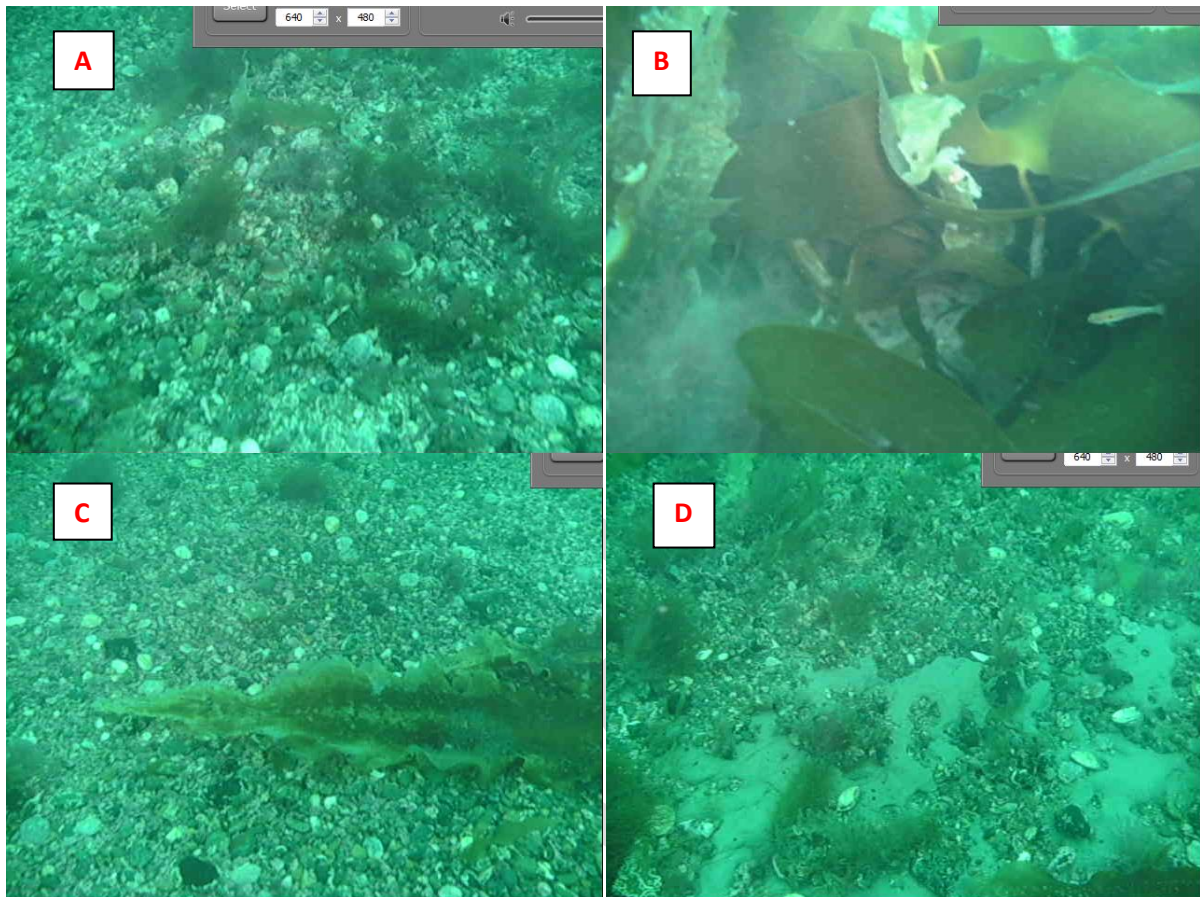


Figure 12. Screen Grabs from the Shellags video survey showing coarse sands and gravels (A&C), with kelp regularly encountered B&C (mostly *Laminaria* sp.). Exposed boulder clay overlain with coarse sands and dead shell (D).

Three grab samples were taken in the vicinity of the Shellags (see table 1 for coordinates). The sediments retrieved showed a mixture of sands, gravels and clay. At one location (station 9, grab 11) a substantial amount of Maerl was also recovered (see figure 13).



Figure 13. Live Maerl and clay collected from the Shellags via the Van-Veen Grab.

Video surveys off the Dog Mills showed the substrate to be composed of mainly mixed sands and gravels. Frequent stands of seaweeds were also encountered in this region which included the Bootlace Weed (*Chorda filum*) and the giant kelp *Laminaria* spp. (see figure 14).



Figure 14. Screen grabs from video survey off the Dog Mills showing a coarse sand to gravelly substrate. Frequent standings of the Bootlace Seaweed (*Chorda filum*) and the kelp (*Laminaria* spp.) were also encountered.

Two further video surveys undertaken in the south of the area , one north of the stone piers at the entrance to Ramsey Harbour and the second to the south of the harbour entrance towards Port Lewaigue showed a very similar substrate type to that off the Dog Mills. In this region the sediment consisted of sands, gravels and small stones with frequent outcrops of bedrock. The exposed bedrock was colonised by large strands of kelp (primarily *Laminaria* spp.).

Voluntary Conservation Area North of Maughold Head

Of the six video surveys undertaken within the voluntary marine conservation zone, the drop down video was the closest video taken to the shore. The drop down camera was deployed to the north of Maughold Brooghs approximately 50m from the shore. The rib was allowed to drift in a westerly direction (see appendix 1 for coordinates of transect). The results showed that the benthos was primarily composed of rocky shore with occasional patches of fine sand. The rocky shore was covered with kelp and associated fauna. The fine sandy areas located at this site were abundant with burrow holes most likely associated with polychaete activity (see figure 15). At the extreme westerly point of this survey the substrate became primarily composed of fine to medium grade sands again with associated polychaete activity and other burrowing organisms, occasional clumps of sea grass (*Zostera marina*) were also encountered to the west of the transect.

The flying video array was deployed in conjunction with the Hypack system at three locations within the voluntary MCZ . The easternmost deployment was undertaken to the northeast of Stack Mooar along the 10m contour line. The Hypack system showed the substrate to be comprised of fine to coarse sands and small stones. Results from the video transect confirmed the Hypack data. These sandy substrates were colonised by patches of low lying algae (see figure 16).

The second video survey was taken closer to the Maughold Brooghs. Results from the Hypack system once again showed the substrate in this region to be comprised primarily of fine to coarse sands with small stones and the occasional outcrop of bedrock. Results from the video survey were in agreement with the Hypack data and showed the presence of low lying algal patches and the occasional patch of *Laminaria* spp. (see figure 17).

A third deployment was made just north of the Quarry on Maughold Brooghs, unfortunately this deployment was made in waters too shallow for the Hypack system to function. Results from the video survey show the sedimentary make-up to consist of fine to coarse sands and gravels with frequent rocky outcrops. The rocky outcrops were colonised by *Laminaria* spp. and tended to be more frequent to the east of the transect. The sandy areas recorded from the western side of the transect showed frequent clumps of seagrass (*Zostera marina*) (see figure 17).

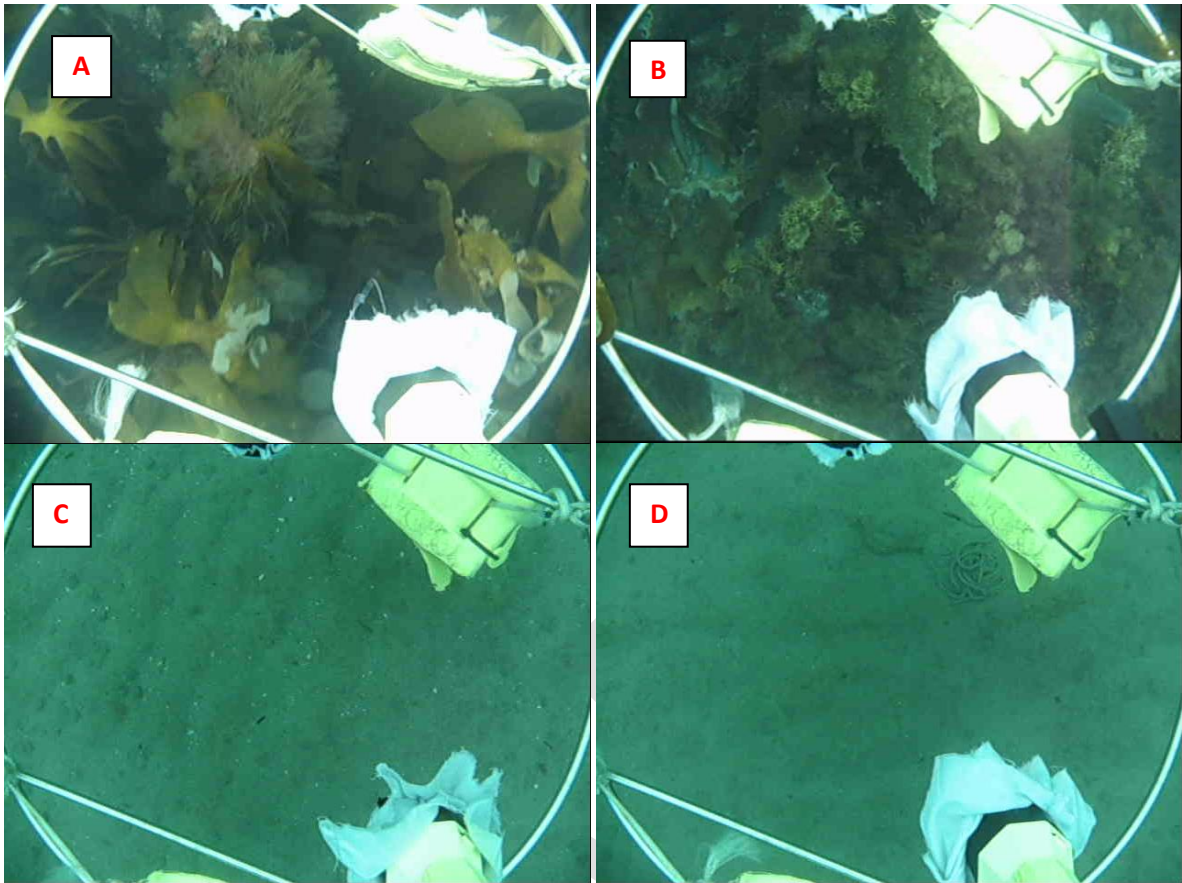


Figure 15. Drop down video screen grabs taken from close inshore north of Maughold Brooghs showing diverse kelp and other algal assemblages (A & B), burrow holes (C) and polychaete casts (D)

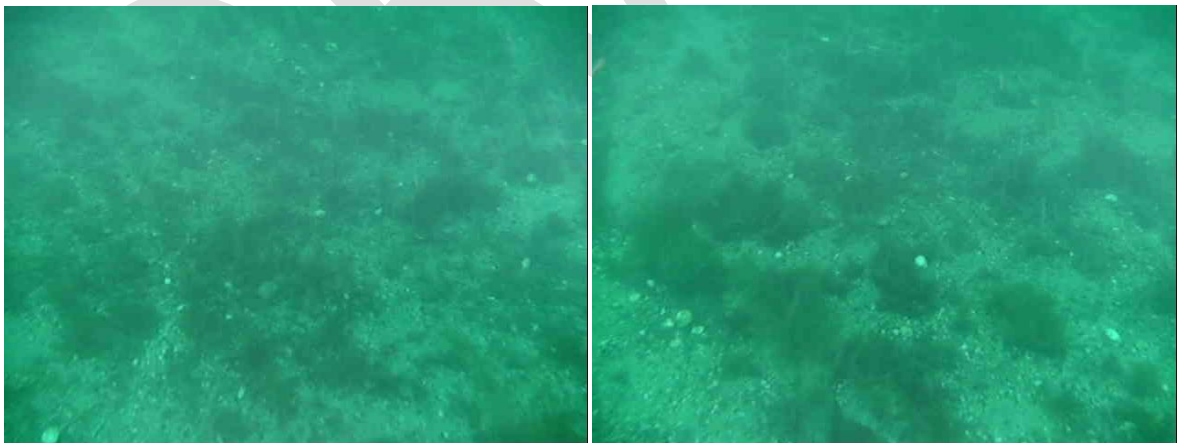


Figure 16. Video screen grabs taken to the North of Maughold Head along the 10m contour line showing clumps of algae overlaying a sandy substrate.



Figure 17. Screen grabs from video surveys North of the Quarry on Maughold Brooghs showing high abundances of Kelp (primarily *Laminaria* spp.) to the eastern side of the transect associated often associated with rocky outcrops (A & B) and fairly extensive areas of seagrass (*Zostera marina*) beds located on sandy substrate to the western end of the transect (C).

Fisheries Management Zone

The Hypack GDS survey of the Fisheries Management Zone (FMZ) was conducted at 500m intervals. The results suggest that the majority of the FMZ benthos is primarily composed of a mixed sandy substrate ranging from very fine sands through to coarse sands and small stones. Very occasionally rocky outcrops were recorded, these tended to be found closer to the shore.

The flying video array was deployed four times within the FMZ. The northernmost video survey was conducted to the far northeast of the FMZ immediately to the south of the *Modiolus* Conservation zone (see Table 3 for coordinates). At this location the sediments can be seen to consist of mixed sands and gravels. Dead Man's fingers (*Alcyonium digitatum*) are abundant across the area. Large quantities of dead shell and the occasional clumps of live *Modiolus* are also present. Sporadically large cobbles/boulders also occur in this region often colonised by plumose anemones (*Metridium senile*) and dead man's fingers (see figure 18).

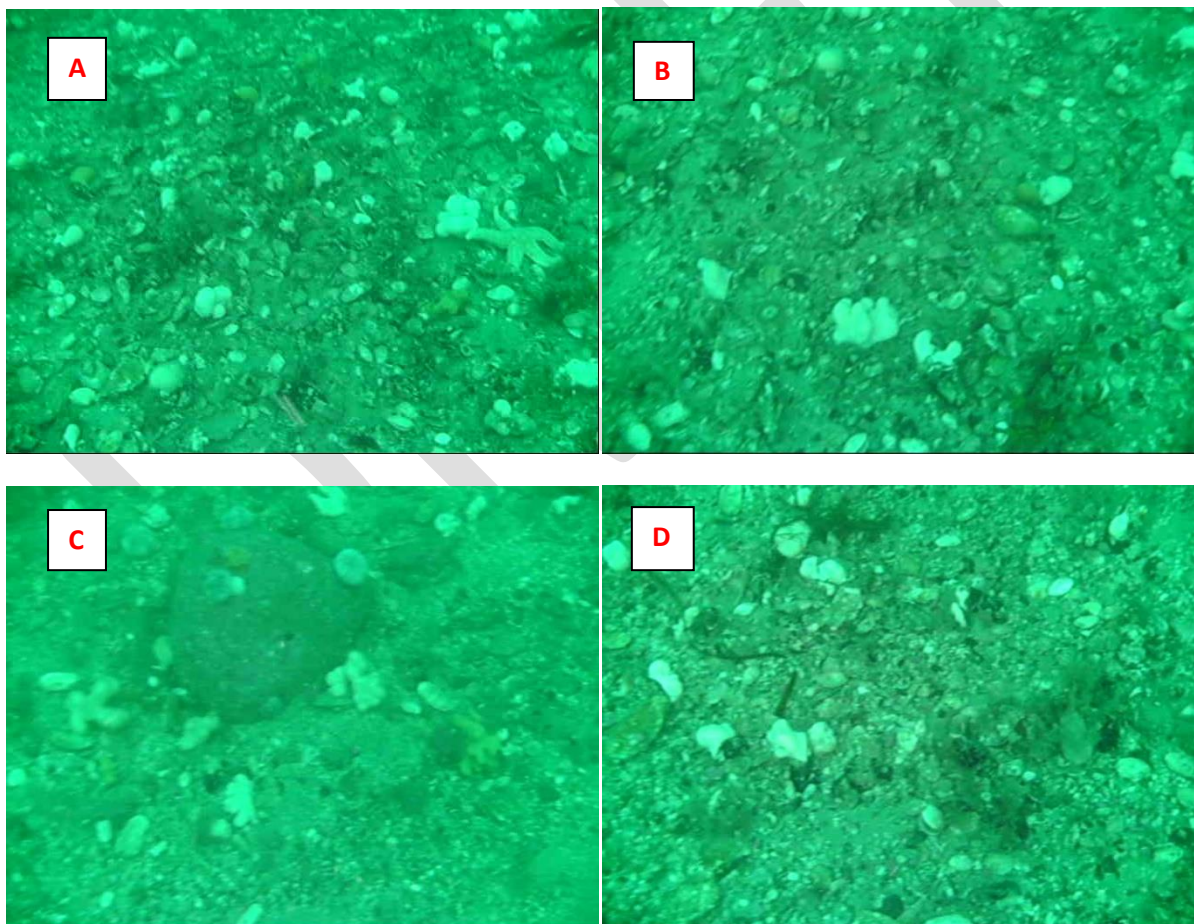


Figure 18. Screen grabs taken from video survey from the northeast of the fisheries management zone showing coarse sands and gravels inhabited by dead man's fingers (A-D), dead shell (B & D)) and cobbles (C).

The second video survey was located to the northwest of the FMZ (see appendix 1 for coordinates). Results from the Hypack GDS survey suggested the sediments at this locality to be comprised of coarse to medium grade sands, cobbles and rocky outcrops. The Hypack results were confirmed by the video survey which showed the substrate to be comprised of medium to coarse sands and small stones, no rocky outcrops were encountered during the video survey. It can be seen from figure 19 that dead and broken shells are also common. Strands of algae are abundant as are the occasional occurrence of *Laminaria* spp.

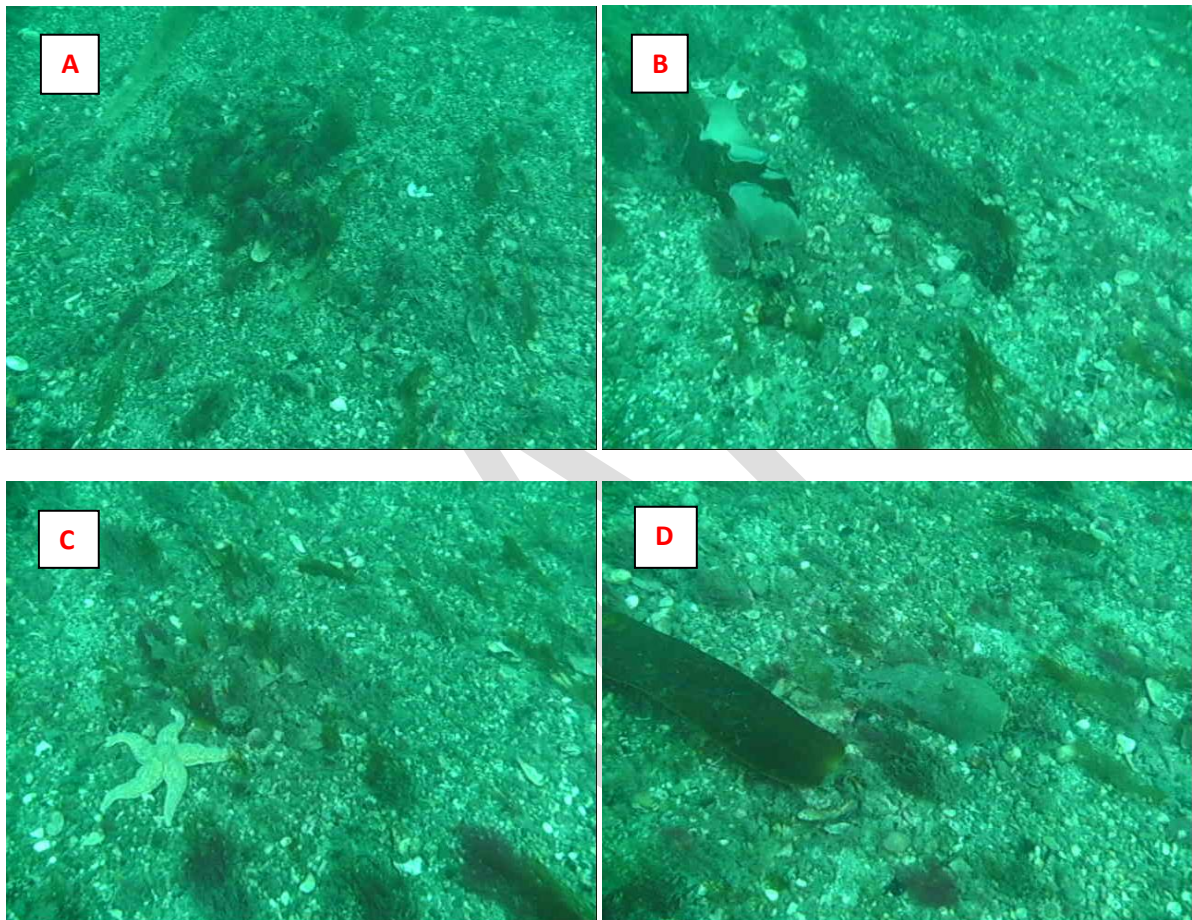


Figure 19. Screen grabs from video survey of the northwestern sector of the FMZ showing coarse to medium grade sands (A-D) colonised by algal mats and occasional *Laminaria* spp. (normally attached to cobbles (B)). Broken shell was also frequently encountered on this video survey (B).

A third video survey was conducted close to the centre of the FMZ east of The Dog Mills and north of the Maughold Brooghs. The results showed that the sediments comprised of fine to medium grade sands with occasional clumps of broken shell present. Polychaete burrows, most likely Peacock worms (*Sabella* sp.) were also abundant (see figure 20). Strands of algae were also encountered in patches as were large regions of barren sands. A few small colonies of Dead man's fingers were also recorded as were queen and king scallops.

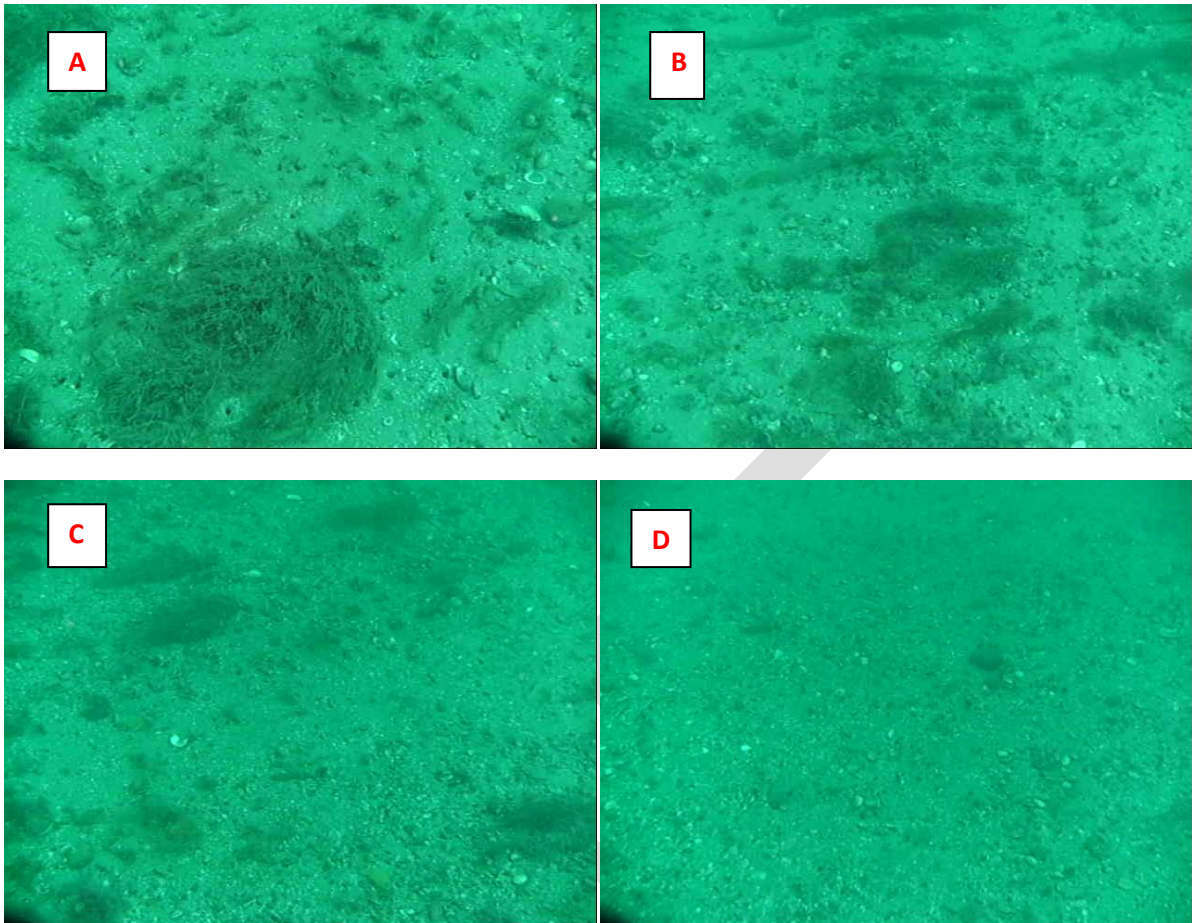


Figure 20. Video survey screen grabs from the central FMZ showing polychaete burrow holes (A) low lying algal patches (B & C) and large areas of barren sandy patches (D).

The final video transect in the FMZ was taken from the south of the region to the east of Ramsey Town and directly north of Stack Mooar (see appendix 1 for coordinates). The Hypack survey showed the substrate in this region to be composed of fine to medium grade sands with cobbles and occasional rocky outcrops. The video survey confirmed the Hypack results and showed the substrate to consist of fine to medium grade sands. Occasional strands of low lying algae and *Laminaria* spp. were also seen (See Figure 21).



Figure 21. Screen grab taken from video survey of the FMZ east of Ramsey Town, North of Stack Moor.

Van-Veen Grab Sample Analysis

Ten Van-Veen grab samples were collected from the Conservation and Fisheries Management Zones. The samples retrieved were split for particle size analysis (PSA) and faunal identification (for locations of grabs see table 1, figure 4).

Sediment Particle Size Analysis

Results from the particle size analysis are shown in table 2 below. It can be seen from the results that stations to the south of the region (stations 1,2,3 & 5) tended to be moderately well sorted and comprised of finer sands and gravels than the stations found offshore and to the north. Stations located in the middle and northern areas of the Bay (stations 4,6,7,8,9 & 10) were poorly or very poorly sorted and tended to be coarser than those to the south. These results are in broad agreement with those of the Hypack GDS survey.

Station Number	Sample Type	Textural Group	Sediment Name
1 – Conservation Zone	Unimodal, moderately well sorted	Slightly gravelly sand	Slightly very fine gravelly fine sand
2 – Fisheries Management Zone	Bimodal, moderately sorted	Slightly gravelly sand	Slightly very fine gravelly sand
3 - Fisheries Management Zone	Bimodal, moderately sorted	Slightly gravelly sand	Slightly very fine gravelly sand
4– Fisheries Management Zone	Polymodal, very poorly sorted	Sandy gravel	Sandy very fine gravel
5– Conservation Zone	Bimodal, moderately sorted	Slightly gravelly sand	Slightly very fine gravelly fine sand
6– Conservation Zone	Polymodal, poorly sorted	Gravelly sand	Very fine gravelly fine sand
7– Fisheries Management Zone	Polymodal, poorly sorted	Gravelly sand	Fine gravelly medium sand
8– Conservation Zone	Polymodal, very poorly sorted	Sandy Gravel	Sandy fine gravel
9– Fisheries Management Zone	Polymodel, very poorly sorted	Sandy Gravel	Sandy fine gravel
10– Fisheries Management Zone	Polymodel, very poorly sorted	Sandy Gravel	Sandy fine gravel

Table 2. PSA results from sediments retrieved from the Van-Veen grab.

Faunal Analysis

Four grab samples were collected from the inshore conservation area and six samples were collected from the FMZ. Analysis of the invertebrate fauna showed that 259 taxonomic entities were recorded from all samples. Highest species diversity was recorded from grabs collected from the north and west of the region (located in the FMZ) whilst lowest species diversity was found in the inshore conservation area. Interestingly, species diversity mirrored the sediment particle size results with highest diversity being recorded in the coarser, poor or very poorly sorted sediments (grab sites 4,6,7,8,9 &10) and lowest biological diversity recorded from moderately well sorted sediments comprised of fine sands and gravels (grab sites 1,2,3 & 5). Results of the benthic invertebrate analysis are given in appendix 2.

EUNIS Classifications

Horse Mussel (*Modiolus modiolus*) Conservation Area

Results from the ground discrimination and video surveys show this region to have several broad habitat types. The results show that a large proportion of this area to be covered with coarse to very coarse sands with an area to the southwest of the surveyed region to have cobbles/boulders present. From the results it is possible to classify the region to EUNIS level 4 (see table 3). An extensive *Modiolus* reef was also recorded to the east of the area and three smaller patches of *Modiolus* reef were also located in this region. Results obtained from the video surveys allow further classification of some regions to EUNIS level 5. The extensive *Modiolus* reef would be classified as *Modiolus modiolus* beds on open coast circa-littoral mixed sediment (A5.622). Extensive areas of coarse sediment and cobbles to the southwest of the survey area would be classified under the EUNIS scheme at level 4; circa-littoral coarse sediment (A5.14).

EUNIS Level	EUNIS Code	EUNIS Name	JNCC Broad Classification Code
4	A5.44	Circa-littoral Mixed Sediments	SS.SMx.CMx
4	A5.62	Sublittoral Mussel Beds on Sediment	SS.SBR.SMus
5	A5.622	<i>Modiolus modiolus</i> beds on open coast circa-littoral mixed sediment	SS.SBR.Smus.ModMx
4	A5.14	Circa-littoral Coarse Sediment	SS.SCS.CCS

Table 3. EUNIS classification of habitats recorded in the *Modiolus* Conservation Zone.

Marine Conservation Zone.

The Marine conservation zone covers an area extending from the edge of the Fisheries Management Zone to the high water mark. The ground discrimination work enabled the sea floor to be mapped down to a depth of approximately 10m, consequently close inshore regions were not surveyed using this system.

From the results obtained the majority of the region would be classified to EUNIS level 4 (see table 4) and in the most part comprised of circa-littoral mixed sediments (A5.44). Rocky outcrops were encountered often colonised by green and brown seaweeds (predominantly *Laminaria* spp.) and associated grazing organisms such as echinoderms. These rocky outcrops could again be classified to EUNIS level 5 as either; *Laminaria digitata* on moderately exposed sublittoral fringe rock (A3.211) or

to level 4; as echinoderms and crustose communities on circalittoral rock (A4.21). Results obtained via the use of the Van Veen grab showed the presence of live maerl at several locations within the CMZ. These maerl habitats can be classified under EUNIS level 4 (A5.51) or to level 5 as; *Phymatholithon calcareum* maerl beds in infralittoral clean gravel or coarse sand (A5.511).

EUNIS Level	EUNIS Code	EUNIS Name	JNCC Broad Classification Code
4	A5.44	Circalittoral mixed sediments	SS.SMx.CMx
4	A4.21	Echinoderms and crustose communities on circalittoral rock	CR.MCR. EcCr
5	A3.211	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe rock	IR.MIR.KR.Ldig
4	A5.51	Maerl	SS.SMp.Mrl
5	A5.511	<i>P. calcareum</i> maerl beds in infralittoral clean gravel or coarse sand.	SS.SMp.Mrl.Pcal

Table 4 EUNIS classification of habitats found within the Marine Conservation Zone

Voluntary Conservation Area (VCA)

The surveys of the voluntary conservation area showed that inshore areas were dominated by a rocky shore habitat with associated kelp communities comprising a mixture of brown, green and red seaweeds. Large stands of *Laminaria* spp. were also encountered. The EUNIS classification for these habitats would be at level 4; kelp and red seaweeds, moderate energy infralittoral rock (A3.21), this classification can be further expanded to level 6; *Laminaria digitata* on moderately exposed sublittoral fringe rock (A3.2111). Slightly offshore from the kelp forests the substrate appeared to be composed primary of fine sands and would be classed to EUNIS level 4 as Infralittoral fine sands (A5.23) and could be further classified to level 5 as infralittoral mobile clean sand with sparse fauna (A5.231) or semi –permanent tube-building amphipods and polychaetes in sublittoral sand (A5.234). Further to the east of the VCA small beds of seagrass were encountered and would be classified to EUNIS level 4 as sublittoral seagrass beds (A5.53) or further classified to level 6 as *Zostera marina* beds on lower shore or infralittoral clean or muddy sands (A5.5331)(see table 5).

EUNIS Level	EUNIS Code	EUNIS Name	JNCC Broad Classification Code
4	A3.21	Kelp and red seaweeds, moderate energy infralittoral rock	IR.MIR.KR
6	A3.2111	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe bedrock	IR.MIR.KR.Ldig
4	A5.23	Infralittoral fine sands	SS.SSa.lFISa
5	A5.231	Infralittoral mobile clean sand with sparse fauna	SS.SSa.lFiSa.lMoSa
5	A5.234	Semi –permanent tube-building amphipods and polychaetes in sublittoral sand	SS.SSa.lFiSa.TbAmPo
4	A5.53	Sublittoral seagrass beds	SS.SMp.SSgr
6	A5.5331	<i>Zostera marina</i> beds on lower shore or infralittoral clean or muddy sand	SS.SMp.SSgr.Zmar

Table 5. EUNIS classification of habitats found within the Voluntary conservation area

Fisheries Management Zone (FMZ)

Surveys of the northern sector of the FMZ showed the substrate to be comprised of mixed sands and gravels with sporadic occurrences of *A. digitatum* and occasional clumps of live *Modiolus modiolus*. This area would be classed under the EUNIS scheme as level 4; Circalittoral coarse sediment (A5.14). The presence of the live *Modiolus modiolus* and associated fauna may enable further classification to level 5.) Scallops were encountered in this region and enable a level 5 classification to be made; Scallops on shell gravel and sand with some sand scour (A5.146).

Further to the south the sediment fabric remained similar to that recorded to the north, at this locality the presence of patches of algae and in particular of *Laminaria* spp. often growing on small cobbles were recorded. A level 5 categorisation can be made in this instance; *Laminaria saccharina* and red seaweeds on infralittoral sediments (A5.521). The presence of macro-algae attached to mobile sediment and cobbles near shore can also be classified to a level 6 coding as; red seaweeds and kelps on tide-swept infralittoral cobbles and pebbles (A5.5211).

The presence of polychaete burrows recorded from the south of the region also gives a level 5 coding; semi-permanent tube-building amphipods and polychaetes in sublittoral sands (A5.234, See table 6).

EUNIS Level	EUNIS Code	EUNIS Name	JNCC Broad Classification Code
4	A5.14	Circalittoral coarse sediment	SS.SCS.CCS
5	A5.146	Scallops on shell gravel and sand with some sand scour	No Classification
5	A5.521	<i>Laminaria saccharina</i> and red seaweeds on infralittoral sediments	SS.SMp.KSwSS.LsacR
6	A5.5211	red seaweeds and kelps on tide-swept infralittoral cobbles and pebbles	SS.SMp.KSwSS.LsacR.CbPb
5	A5.234	Semi –permanent tube-building amphipods and polychaetes in sublittoral sand	SS.SSa.IFiSa.TbAmPo

Table 6. EUNIS classification of habitats found within the Fisheries Management Zone

Summary

The objectives of this survey were to provide a base-line of marine biological data so as to detect changes in the marine nature reserve in the future. Results from the survey have shown the marine nature reserve to have several important habitat types which include kelp swept rocky shores to the south and southwest of the Bay, eelgrass beds, maerl beds, horse mussel reefs and circalittoral sedimentary substrates.

The results show the region to be very biologically diverse with respect to the invertebrate populations found. Over 250 species were recorded from 10 benthic grabs taken from the fine to coarse sandy substrates in the FMZ and conservation zones alone. Future analysis of the horse mussel reef and the associated invertebrate fauna are likely to see the number of species increase.

The survey also had several secondary objectives which have now been completed including a detailed high resolution map of the substrate types within the MCR. The survey has also allowed preliminary EUNIS categorisation of regions within the reserve, however this work is ongoing and it is hoped that further categorisation will be completed as new information becomes available.

DRAFT

Appendix 1.

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Dive Number	Hypack Number	Location	Time in	Time out	Co-ordinates in	Co-ordinates in2	Co-ordinates out	Co-ordinates out3	Depth/m
D1	1006	Point of Ayre	10.05	10.25	54 26.1716	004 20.4880	54 26.2371	004 20.6159	28
D2	1033	Point of Ayre	10.35	11.13	54 26.520	004 20.0255	54 26.6677	004 20.4976	29
D3	1103/1125	Point of Ayre	11.23	11.53	54 26.8251	004 21.3741	54 26.6907	004 20.9512	26
D4	1209	Point of Ayre	12.07	12.38	54 25.6597	004 21.9718	54 25.4520	004 20.3608	22
D5	1258	Point of Ayre	12.56	13.23	54 26.7593	004 19.7056	54 26.4747	004 18.7395	32
D6	1338	Point of Ayre	13.34	13.58	54 26.1678	004 19.3076	54 25.8184	004 18.3831	28
D7	1434	Shellags	14.31	14.57	54 22.8985	004 20.7633	54 22.9335	004 21.0575	11.5
D8	1510	Shellags	15.08	15.33	54 22.9466	004 21.1958	54 22.9952	004 21.4104	10.6

Table 1. Monday 22nd August 2011. Video Survey Co-ordinates and field data

Dive Number	Hypack Number	Location	Time in	Time out	Co-ordinates in	Co-ordinates in2	Co-ordinates out	Co-ordinates out3	Min Depth/m
D1	947	Stack Mooar, Maughold on 10m contour	9.45	10.11	54 18.4185	004 18.4586	54 18.8301	004 19.2562	10
D2	1033	Off Maughold Brooghs	10.30	10.58	54 19.1155	004 19.7433	54 19.5650	004 20.3642	9
D3	1116	Off Port Lewaigue to Piers	11.14	11.44	54 19.1717	004 21.0486	54 19.6054	004 21.6214	6
D4	1156	Stone Piers North	11.53	12.17	54 19.7485	004 21.7826	54 20.1564	004 22.1775	5
D5	1238	Mooragh North	12.35	13.30	54 20.2194	004 21.1133	54 20.5970	004 21.5216	8
D6	1347	Closer in the Maughold Brooghs	13.45	14.12	54 18.4647	004 19.0840	54 18.7060	004 19.5839	8.7
D7	1431	Off the quarry, Maughold Brooghs	14.28	14.56	54 18.6015	004 20.0012	54 18.7250	004 20.4386	5.7
D8	1505	Repeat - off the quarry, Maughold Brooghs	15.03	15.21	54 18.5757	004 19.9538	54 18.5494	004 20.2563	4.5

Table 2. Tuesday 23rd August 2010. Video Survey Co-ordinates and field data.

Dive Number	Hypack Number	Location	Time in	Time out	Co-ordinates in	Co-ordinates in2	Co-ordinates out	Co-ordinates out3	Min Depth/m	Max Depth/m
D1		South of the Ballacash Channel	10.5 0	10.53	54 24.7511	004 16.7351	54 24.8284	004 16.7970	33	33
D1b	No hypack	South of the Ballacash Channel	10.5 3		54 24.8284	004 16.7970	54 24.8114	004 16.7630	30	30
D2		South of the Ballacash Channel	14.0 3	14.33	54 24.2966	004 16.8106	54 24.6089	004 16.5686	22	27
D3		South of the Ballacash Channel	14.4 0	15.04	54 24.2792	004 16.3854	54 24.4720	004 16.1479	24	28
D4		Mid Ballacash Channel north of Bahama bank	15.1 9	15.45	54 25.2266	004 18.0909	54 25.1726	004 17.2216	25	27
D5		Northwest of Ballacash Bank	16.1 0	16.35	54 27.3639	004 19.6430	54 27.3332	004 18.4339	28	32
D6		South of the Shellags (off Glen Uniag?)	17.1 7	17.42	54 21.5532	004 22.0179	54 21.7378	004 21.9742	9	9
D7		Off the Dog Mills	17.5 5	18.19	54 20.8499	004 22.4252	54 21.1588	004 22.3796	7	8

Table 3. Wednesday 24th August 2010. Video Survey Co-ordinates and Field Data.

Dive Number	Hypack Number	Location	Time in	Time out	Co-ordinates in	Co-ordinates in2	Co-ordinates out	Co-ordinates out3	Min Depth/m	Max Depth/m
1		Fisheries Management Zone, North Ramsey Bay, North of Maughold Brooghs	14.13	14.4 3	54 22.4921	004 19.4946	54 22.6140	004 19.2441	13	14
2		FMZ, East of Dogmills, North of Maughold Brooghs	15.00	15.2 3	54 20.7780	004 19.0084	54 20.7228	004 18.6288	12	14.5
3		FMZ. East of Ramsey Town, North of Stack Mooar	15.35	16	54 19.2953	004 19.2953	54 19.1187	004 19.0400	12	12

Table 4. Friday 26th August 2010. Video Survey Co-ordinates and Field Data

Column1	Time	Co-ordinates	Co-ordinates2	Depth	Habitat
Dropdown 1	12.00	54 18.240	004 19.026	4m	Kelp
	12.05	54 18.249	004 19.042	4.5m	Kelp
	12.10	54 18.262	004 19.056	5m	Sand
	12.15	54 18.268	004 19.096	5m	Sand
	12.20	54 18.264	004 19.094	5m	Sand
	12.25	54 18.267	004 19.124	5.5m	Kelp
	12.30	54 18.272	004 19.153	5m	Kelp
	12.35				Kelp
	12.40				Kelp
	12.45	54 18.290	004 19.225	5m	Kelp
Cormorant colony	12.50	54 18.296	004 19.259	5m	Kelp
	12.55	54 18.299	004 19.280	5m	Kelp
	13.00	54 18.314	004 19.354	5m	Dense Kelp
Changed direction					
	13.05	54 18.314	004 18.425	5.5m	Kelp
	13.07	54 18.398	004 19.414	7m	Sand
	13.10	54 18.423	004 19.491	8m	Sand

Table 5. Wednesday 24 August 2010. Drop-down Camera survey off Maughold Head (North). Co-ordinates and Field Data.

N1	Sipuncula	Sipuncula spp. Juv.	-	1	-	-	-	-	-	-	-	-	-
N14	Sipuncula	Golfingia elongata	-	-	-	-	-	-	-	-	3	-	-
N28	Sipuncula	Thysanocardia procera	-	-	-	-	-	-	-	-	1	-	-
N34	Sipuncula	Phascolion strombus	-	-	-	-	-	-	-	-	1	-	-
P50	Annelida	Harmothoe spp. Damaged	-	5	-	-	-	-	-	-	-	1	-
P50	Annelida	Malmgrenia sp. Damaged	-	1	-	-	-	-	-	-	-	-	-
P50@Barnich, R. 2010	Annelida	Malmgrenia darbouxi	-	-	-	-	1	-	1	-	-	-	-
P65	Annelida	Harmothoe impar	-	-	-	-	-	-	-	-	-	2	-
P65@	Annelida	Harmothoe clavigera	-	-	-	-	1	-	-	-	-	-	-
P92	Annelida	Pholoe inornata	-	3	-	-	1	-	-	-	-	-	-
P92@	Annelida	Pholoe baltica	-	2	-	-	2	-	-	-	-	-	-
P104	Annelida	Sigalion mathildae	-	-	2	-	-	-	-	-	-	-	-
P109	Annelida	Sthenelais limicola	5	-	1	-	-	-	-	-	-	-	-
P117	Annelida	Eteone longa/flava (agg.)	-	1	-	-	-	-	-	-	-	1	-
P143	Annelida	Phyllodoce longipes	-	-	-	-	-	-	-	-	1	-	-
P146	Annelida	Phyllodoce rosea	1	-	-	-	-	-	-	-	-	-	-
P155	Annelida	Eulalia mustela	-	1	-	-	-	-	-	-	-	-	-
P163	Annelida	Eumida spp. Damaged	-	2	-	-	1	-	-	-	-	-	1
P259@	Annelida	Glycera gigantea	-	-	-	-	-	-	-	-	-	1	-
P260	Annelida	Glycera lapidum	-	5	-	-	2	-	1	3	1	5	
P268	Annelida	Glycinde nordmanni	-	-	-	-	-	-	-	2	-	-	
P346	Annelida	Syllidae sp. Juv.	-	1	-	-	-	-	-	-	-	-	
P365	Annelida	Syllis armillaris	-	11	-	-	1	-	-	1	1	1	
P380	Annelida	Eusyllis blomstrandii	-	1	-	-	-	-	-	-	-	-	
P387	Annelida	Odontosyllis fulgurans	-	-	-	-	-	-	-	-	4	-	
P406	Annelida	Syllides sp. A	-	-	-	-	1	-	-	-	-	-	

P421	Annelida	Exogone hebes	-	1	-	-	-	-	-	-	-	-	-
P430	Annelida	Sphaerosyllis taylori	-	2	-	1	-	-	-	-	-	2	-
P434	Annelida	Autolytus spp.	-	1	-	-	-	-	-	-	-	-	-
P484	Annelida	Platynereis dumerilii	-	1	-	-	3	-	-	-	-	-	-
P494	Annelida	Nephtys sp. Juv.	-	-	-	-	1	-	-	-	-	-	-
P496	Annelida	Nephtys caeca	-	-	-	-	-	-	-	1	-	-	1
P498	Annelida	Nephtys cirrosa	1	-	1	6	-	-	1	-	-	-	-
P502	Annelida	Nephtys kersivalensis	-	-	-	-	-	-	-	-	-	-	1
P564	Annelida	Marphysa bellii	-	-	-	-	-	-	-	-	-	1	-
P568	Annelida	Nematonereis unicornis	-	6	-	-	2	-	-	2	1	-	-
P579@Oug 2010	Annelida	Lumbrineris cf. cingulata	-	5	-	-	1	1	-	3	2	-	-
P591	Annelida	Drilonereis filum	-	1	-	-	-	-	-	-	-	-	-
P638	Annelida	Protodorvillea kefersteini	-	1	-	-	-	-	1	-	-	-	1
P672	Annelida	Scoloplos (scoloplos) armiger	1	2	-	2	-	-	-	-	-	-	-
P695	Annelida	Paradonidae damaged	-	1	-	-	-	-	-	-	-	-	-
P699	Annelida	Paradoneis lyra	-	-	-	-	-	-	-	-	-	5	-
P718	Annelida	Poecilochaetus serpens	-	-	-	-	-	-	-	1	-	-	-
P722	Annelida	Aonides oxycephala	-	1	-	-	-	-	-	-	-	1	1
P723	Annelida	Aonides paucibranchiata	-	22	-	-	1	-	11	10	14	13	-
P733	Annelida	Laonice bahusiensis	-	2	-	-	-	-	-	-	-	-	-
P750	Annelida	Polydora caeca	-	-	-	-	-	-	-	-	-	1	-
P765	Annelida	Prionospio fallax	-	-	-	-	-	-	-	1	-	-	-
P794	Annelida	Spiophanes bombyx	4	-	3	8	1	7	5	-	-	-	1
P796	Annelida	Spiophanes kroyeri	-	-	-	-	-	-	-	1	-	-	-
P805	Annelida	Magelona filiformis	6	-	2	10	-	13	-	-	-	-	-

P807@	Annelida	Magelona johnstoni	16	-	2	1	-	25	-	-	-	-
P822	Annelida	Cirratulidae sp. Juv.	-	-	-	-	-	-	-	-	1	-
P824	Annelida	Aphelochaeta marioni	-	2	-	-	-	-	-	-	3	3
P829	Annelida	Caulleriella alata	-	5	-	-	-	-	-	1	1	11
P831	Annelida	Chaetozone zetlandica	-	18	-	1	-	-	1	1	5	7
P834	Annelida	Chaetozone setosa	-	-	-	-	-	-	1	1	-	-
P834@	Annelida	Chaetozone christiei	13	-	4	2	1	15	-	-	-	-
P836	Annelida	Cirratulus cirratus	-	-	-	-	-	-	-	1	-	-
P839	Annelida	Cirriformia tentaculata	-	-	-	-	-	-	-	-	7	4
P846	Annelida	Tharyx killariensis	-	-	-	-	-	-	-	1	1	1
P919	Annelida	Mediomastus fragilis	-	13	-	-	-	-	-	1	1	1
P958	Annelida	Clymenura johnstoni	1	-	-	-	-	-	1	1	-	-
P964	Annelida	Euclymene oerstedii	16	-	2	-	-	2	1	-	-	-
P971	Annelida	Praxillella affinis	-	3	3	-	4	-	1	1	-	3
P1014	Annelida	Ophelina acuminata	-	-	-	-	1	-	-	1	-	-
P1022	Annelida	Asclerocheilus intermedius	-	-	-	-	-	-	1	-	-	-
P1026	Annelida	Scalibregma celticum	-	1	-	-	1	-	-	-	-	-
P1027	Annelida	Scalibregma inflatum	-	3	-	-	-	-	-	-	-	1
P1093	Annelida	Galathowenia oculata	26	-	10	-	-	1	-	-	-	-
P1098	Annelida	Owenia fusiformis	1	1	2	4	4	5	-	-	-	-
P1107	Annelida	Pectinaria (Lagis) koreni	-	-	-	-	-	-	-	1	-	-
P1133	Annelida	Ampharete acutifrons	-	-	-	-	-	-	-	1	-	-
P1175	Annelida	Terebellides stroemi	-	-	-	-	1	-	-	-	-	-
P1210	Annelida	Nicolea venustula	-	-	-	-	1	-	-	1	-	-

P1217	Annelida	Pista cristata	-	1	-	-	3	-	1	3	8	-
P1235	Annelida	Polycirrus spp.	-	1	-	-	1	-	4	1	2	1
P1252	Annelida	Streblosoma intestinalis	-	-	-	-	3	-	-	-	-	-
P1267	Annelida	Chone duneri	-	-	-	-	-	-	-	2	-	2
P1271	Annelida	Demonax sp.	-	-	-	-	1	-	-	-	-	-
P1280	Annelida	Euchone rubrocincta	-	-	-	-	-	-	-	1	-	-
P1334	Annelida	Hydroides norvegica	-	2	-	-	1	-	-	-	-	-
P1340	Annelida	Pomatoceros lamarcki	-	1	-	-	-	-	-	-	-	-
P1341	Annelida	Pomatoceros triqueter	-	2	-	-	-	-	-	2	1	6
P1362	Annelida	Spirorbidae spp.	-	74	-	-	-	-	-	-	-	P
P1372	Annelida	Janua pagenstecheri	-	-	-	-	-	-	-	-	P	-
Q15	Chelicerata	Achelia echinata	-	6	-	-	-	-	-	-	-	-
Q5	Chelicerata	Nymphon brevistre	-	2	-	-	-	-	-	-	-	-
R2412	Crustacea	Ostracoda sp. Indet	-	1	-	-	1	-	-	-	1	-
S25	Crustacea	Mysidacea spp.	-	-	-	-	-	-	1	-	-	-
S102	Crustacea	Apherusa bispinosa	-	-	-	-	-	-	-	-	-	2
S131	Crustacea	Periculodes longimanus	-	-	1	-	-	-	-	-	-	-
S138	Crustacea	Synchelidium maculatum	1	-	-	-	-	-	-	-	-	-
S158	Crustacea	Amphilochus manudens	-	1	-	-	-	-	-	-	-	1
S248	Crustacea	Urothoe elegans	-	-	1	-	18	-	9	2	-	5
S249	Crustacea	Urothoe marina	-	-	-	-	2	-	5	-	-	1
S254	Crustacea	Harpinia antennaria	-	-	-	-	1	-	-	-	-	-
S296	Crustacea	Hippomedon denticulatus	-	-	-	1	-	-	-	-	-	-
S321	Crustacea	Orchomene nanus	-	1	-	-	-	-	-	-	-	1
S328	Crustacea	Scopelocheirus	-	-	-	-	-	-	1	-	-	-

		hopei											
S380	Crustacea	Iphimedia minuta	-	-	-	-	-	-	1	-	-	-	-
S413	Crustacea	Atylus vedlomensis	-	-	-	1	-	-	-	-	-	-	-
S415	Crustacea	Dexamine spinosa	-	11	-	-	4	-	10	-	2	3	
S423	Crustacea	Ampelisca spp. Damaged	-	-	-	-	1	-	-	1	-	-	
S427	Crustacea	Ampelisca brevicornis	4	-	1	2	-	5	-	-	-	-	
S429	Crustacea	Ampelisca diadema	-	-	-	-	-	-	-	6	-	-	
S438	Crustacea	Ampelisca spinipes	-	1	-	-	3	-	-	-	-	-	
S440	Crustacea	Ampelisca tenuicornis	-	-	1	-	-	-	-	-	-	-	
S442	Crustacea	Ampelisca typica	-	-	-	-	1	-	1	3	-	-	
S451	Crustacea	Bathyporeia spp. Damaged	-	-	-	-	-	1	-	-	-	-	
S454	Crustacea	Bathyporeia guilliamsoniana	1	-	5	41	-	36	5	1	1	-	
S455	Crustacea	Bathyporeia nana	-	-	-	3	-	-	-	-	-	-	
S459	Crustacea	Bathyporeia tenuipes	-	-	-	1	1	-	-	-	-	-	
S503	Crustacea	Cheirocratus sp. Female	-	1	-	-	-	-	-	-	1	3	
S506	Crustacea	Cheirocratus sundevallii	-	1	-	-	-	-	-	-	1	-	
S519	Crustacea	Maera othonis	-	3	-	-	1	-	-	-	1	1	
S539	Crustacea	Gammaropsis cornuta	-	-	-	-	-	-	1	-	-	-	
S552	Crustacea	Photis longicaudata	-	-	-	-	-	-	-	-	-	7	
S564	Crustacea	Erichthonius punctatus	-	-	-	-	1	-	2	-	-	-	
S597	Crustacea	Aora gracilis	-	-	-	-	-	-	-	-	-	3	
S610	Crustacea	Corophium bonnellii	-	1	-	-	-	-	-	-	-	-	
S611	Crustacea	Corophium crassicorne	2	-	13	1	10	-	13	1	-	-	
S641	Crustacea	Caprella acanthifera	-	5	-	-	-	-	7	2	1	4	
S657	Crustacea	Phtisica marina	-	23	-	-	3	-	2	-	1	17	

S793	Crustacea	Gnathia sp. Female/juv.	-	-	-	-	-	-	-	-	2	-	-
S796	Crustacea	Gnathia oxyuraea	-	4	-	-	-	-	-	-	-	-	-
S803	Crustacea	Anthura gracilis	-	1	-	-	-	-	-	-	-	-	-
S849	Crustacea	Conilera cylindracea	-	-	-	-	3	-	-	-	2	-	-
S892	Crustacea	Janira maculosa	-	4	-	-	-	-	-	-	-	3	2
S1142	Crustacea	Tanaopsis graciloides	-	-	-	-	1	-	-	-	-	2	-
S1197	Crustacea	Bodotria scorpioides	-	-	-	-	-	-	1	-	-	-	-
S1203	Crustacea	Iphinoe trispinosa	1	-	-	-	-	-	-	-	-	-	-
S1264	Crustacea	Euphausiidae sp Juv.	-	-	-	1	1	-	-	-	-	-	-
S1293	Crustacea	Caridea damaged	-	-	-	-	-	-	-	-	-	3	-
S1368	Crustacea	Processa parva	-	-	2	-	1	-	-	-	-	-	-
S1389	Crustacea	Philoceras sculptus	-	-	-	-	1	-	-	-	-	-	-
S1445	Crustacea	Paguridae spp. Indet.	-	1	-	-	-	-	-	-	-	1	1
S1447	Crustacea	Anapagurus chiroacanthus	-	-	-	-	-	-	-	-	-	1	-
S1472	Crustacea	Galathea intermedia	-	9	-	-	3	-	9	1	4	23	
S1482	Crustacea	Pisidia longicornis	-	2	-	-	3	-	1	-	6	9	
S1504	Crustacea	Ebalia spp. juv.	-	-	-	-	-	-	1	-	-	-	1
S1509	Crustacea	Ebalia tumefacta	-	1	-	-	-	-	-	-	-	-	-
S1532	Crustacea	Macropodia rostrata	-	1	-	-	-	-	-	-	-	-	-
S1536	Crustacea	Eurynome aspera	-	-	-	-	3	-	-	-	-	-	-
S1555	Crustacea	Atelecyclus rotundatus	-	-	-	-	1	-	-	-	-	-	-
S1577	Crustacea	Liocarcinus spp. Juv.	1	-	-	-	1	-	1	-	-	-	1
	Crustacea	Decapoda larvae	-	-	-	-	-	-	-	-	-	-	1
W53	Mollusca	Leptochiton asellus	-	14	-	-	-	-	-	1	1	1	
W54	Mollusca	Leptochiton cancellatus	-	16	-	-	1	-	-	1	5	1	

W75	Mollusca	Callochiton septemvalvis	-	1	-	-	-	-	-	-	-	-	-
W82	Mollusca	Tonicella rubra	-	5	-	-	-	-	-	-	-	3	-
W161	Mollusca	Gibbula tumida	-	3	-	-	-	-	-	-	-	12	6
W163	Mollusca	Gibbula cineraria	-	-	-	-	-	-	-	-	-	1	2
W182	Mollusca	Calliostoma zizyphinum	-	1	-	-	-	-	-	-	-	-	-
W224	Mollusca	Tectura virginea	-	11	-	-	-	-	-	1	9	7	-
W290	Mollusca	Lacuna parva	-	-	-	-	-	-	-	-	1	-	-
W292	Mollusca	Lacuna vincta	-	-	-	2	-	-	-	-	-	-	-
W371	Mollusca	Onoba semicostata	-	-	-	-	-	-	1	-	-	-	-
W430	Mollusca	Aporrhais pespelecani	-	-	-	-	1	-	-	-	-	-	-
W491	Mollusca	Euspira pulchella	-	3	-	-	1	-	1	1	-	-	1
W908	Mollusca	Odostomia sp.	-	-	-	-	-	-	-	-	-	1	-
W1028	Mollusca	Cylichna cylindracea	-	-	2	-	-	-	-	-	-	-	-
W1157	Mollusca	Pleurobranchus membranaceus	-	-	-	-	-	-	-	-	-	1	1
W1243	Mollusca	Nudibranchia spp.	-	1	-	-	-	-	-	-	-	-	-
W1302	Mollusca	Goniodoris nodosa	-	-	-	-	-	-	-	-	-	1	2
W1325	Mollusca	Onchidoris muricata	-	10	-	-	-	-	-	-	-	-	2
W1565	Mollusca	Nucula sp. Juv.	-	1	12	-	3	-	3	2	-	-	-
W1568	Mollusca	Nucula hanleyi	1	3	-	-	11	-	13	2	1	-	-
W1691	Mollusca	Mytilidae sp. Juv.	-	1	-	-	-	-	1	-	-	-	-
W1708	Mollusca	Modiolula phaseolina	-	-	-	-	-	-	-	-	-	1	-
W1721	Mollusca	Musculus discors	-	-	-	-	2	-	-	-	-	-	-
W1773	Mollusca	Aequipecten opercularis	-	-	-	-	-	-	-	-	-	-	2
W1809	Mollusca	Heteranomia squamula	-	1	-	-	-	-	-	-	-	-	-
W1829	Mollusca	Lucinoma borealis	-	-	-	-	-	-	1	-	-	-	-
W1882	Mollusca	Semierycina nitida	-	1	-	-	-	-	-	-	-	-	-
W1906	Mollusca	Kurtiella bidentata	-	-	-	-	2	-	-	-	-	2	-

Y178	Bryozoa	Electra pilosa	-	P	-	P	P	-	P	-	P	P
Y182	Bryozoa	Aspidelectra melolontha	-	P	-	-	-	-	-	-	-	-
Y187	Bryozoa	Flustra foliacea	-	P	-	-	-	-	-	-	-	-
Y211	Bryozoa	Cauloramphus spiniferum	-	-	-	-	-	-	-	-	P	P
Y240	Bryozoa	Bugula spp.	-	P	-	-	P	-	-	-	P	P
Y256	Bryozoa	Bicellariella ciliata	-	-	-	-	P	-	-	-	-	P
Y261	Bryozoa	Beania mirabilis	-	P	-	-	P	-	P	-	-	-
Y276	Bryozoa	Scrupocellaria reptans	-	P	-	-	P	-	P	-	-	P
Y310	Bryozoa	Cribrilina punctata	-	P	-	-	P	-	P	P	-	P
Y337	Bryozoa	Celleporella hyalina	-	P	-	-	P	-	P	-	-	-
Y344	Bryozoa	Chorizopora brongniartii	-	-	-	-	P	-	-	P	-	P
Y364	Bryozoa	Escharella immersa	-	P	-	-	-	-	-	-	P	P
Y467	Bryozoa	Schizomavella sp.	-	-	-	-	-	-	-	P	-	-
Y480	Bryozoa	Microporella ciliata	-	-	-	-	-	-	-	-	-	P
Y483	Bryozoa	Fenestrulina malusii	-	-	-	-	P	-	-	-	P	-
Y498	Bryozoa	Celleporina hassallii?	-	P	-	-	-	-	-	-	-	-
ZA3	Phoronida	Phoronis spp.	-	1	-	-	-	-	-	-	-	4
ZB212	Echinodermata	Echinocyamus pusillus	-	8	-	2	14	-	1	2	-	-
ZB124	Echinodermata	Ophiothrix fragilis	-	1	-	-	-	-	-	-	-	-
ZB148	Echinodermata	Amphiuridae sp juv	-	-	-	1	-	-	-	-	-	-
ZB154	Echinodermata	Amphiura filiformis	1	-	1	-	1	-	-	2	-	-
ZB161	Echinodermata	Amphipholis squamata	-	38	-	-	1	-	3	-	1	2
ZB165	Echinodermata	Ophiuridae sp. Juv.	-	20	-	-	-	-	-	-	-	-
ZB166	Echinodermata	Ophiura sp. Juv.	-	-	-	-	1	-	-	-	-	-

ZB168	Echinodermat a	Ophiura albida	-	-	-	-	-	-	-	6	-	-
ZB193	Echinodermat a	Psammechinus miliaris	-	1	-	-	-	-	-	-	-	-
ZB223	Echinodermat a	Echinocardium cordatum	-	-	-	-	1	1	-	-	-	-
ZB296	Echinodermat a	Leptosynapta inhaerens	-	2	1	-	1	-	-	1	-	-
ZD1	Tunicata	Tunicata sp. colonial	-	1	-	-	1	-	1	1	1	1
ZD88	Tunicata	Ascidia conchilega	-	3	-	-	-	-	-	-	-	-
ZD116	Tunicata	Polycarpa rustica	-	4	-	-	-	-	-	-	-	-
ZD146	Tunicata	Molgula spp. Juv.	-	26	-	-	2	-	2	-	-	16
Total No of Species			25	117	30	29	92	17	69	69	81	76