An investigation of biotope distribution and susceptibility to fishing pressure in Manx territorial waters for the development of management recommendations for conservation

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Declaration and statements

This work has not previously been accepted in substance for any degree and is not being concurrently submitted for any degree.

This dissertation is being submitted in partial fulfilment of the requirement of M.Sc. 'Marine Environmental Protection'.

This dissertation is the result of my own independent work / investigation, except where otherwise stated.

Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

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Abstract

In the Isle of Man, commitments to conservation have necessitated the identification and protection of species and habitats of conservation concern. The aim of the research was to generate a biotope map for the Manx territorial sea and to identify areas of conservation concern in relation to the distribution of fishing effort, whereby management recommendations for conservation could be made. The objectives of the study were as follows: 1) Identify benthic communities based on visual survey data collected in 2008 and to classify the identified communities according to the UK's habitat classification scheme, 2) Produce a biotope map using ArcGIS and identify areas of conservation interest, according to European and UK designations, 3) Determine the extent of fishing effort in biotopes containing commercially targeted species by overlaying fishing effort data on the biotope map in ArcGIS, 4) Provide management recommendations for conservation. Forty distinct communities, 20 biotopes, and 13 broader habitats were identified in Manx waters. Their distributions were mapped and the interpolation method used to produce full coverage maps was deemed appropriate for predicting the distribution of broad habitats, but was not appropriate at the biotope or community level. Four biological features of conservation concern were identified including maerl beds, one *Modiolus* bed, *Sabellaria spinulosa,* and *Edwardsia* sp. In addition, habitats corresponding with nine international and national conservation designations were identified. Analysis of variance revealed significant differences in fishing effort between communities ($F_{20, 99} = 7.553$, $P < 0.01$), biotopes ($F_{11, 128} = 8.045$, $P < 0.01$), and broad habitats ($F_{8, 139} = 6.627$, $P < 0.01$) containing commercially targeted species. Some sensitive biotopes, including habitats supporting maerl and an infralittoral rock habitat, occurred within or in proximity to known fishing grounds. For these and other areas with the potential for interaction between fishing activity and sensitive biotopes, management recommendations were made to mitigate conflicts between conservation and fishing interests.

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1. INTRODUCTION

Interaction with marine habitats and impacts on their integrity are inevitable with respect to the range of human activities supported by the sea, including fishing and aquaculture, aggregate dredging, mineral extraction, and offshore wind energy developments (Douvere & Ehler, 2009). In particular, mobile fishing gear towed across the seabed can directly disrupt benthic habitats and their associated communities. Dredges, rock-hopper trawls, and beam trawls have been identified as causing the greatest disturbance to the seabed (Kaiser et al., 2002). The impacts of human activities on the marine environment have become widely recognized, spurring the development of national and international conservation initiatives which advocate for the protection of priority habitats and species to promote biodiversity and healthy ecosystem function (DEFRA, 2002). Identification and protection of areas where habitats and species of conservation concern occur requires accurate information on their extent and distribution (Connor et al., 2004). Thus, seabed habitat mapping has developed as an important tool for conservation management and spatial planning in the marine environment (Robinson et al., 2007). The Isle of Man has made commitments to conservation initiatives and its queen scallop fishery has received Marine Stewardship Council (MSC) accreditation, both of which require the identification and protection of habitats and species of conservation concern. The aim of this study was to generate a biotope map for the Manx territorial sea to identify the distribution of features of conservation concern and relate this to the distribution of fishing activity, whereby management recommendations for conservation could be made.

The Manx territorial waters have supported an important scallop fishery since the 1930s (Bradshaw et al., 2001). King scallops *Pecten maximus* are extracted using dredges, while dredging or trawling can be implemented to extract queen scallops *Aequipecten opercularis* (C.B Horne, 2011). Additionally, the muddy sediments characteristic of the deeper waters found between the Isle of Man and Ireland supports a fishery for the Norway lobster *Nephrops norvegicus*, which accounts for around 85% of the catch for the whole of the Irish Sea (Mackie, 1990). Both soft and hard substrata habitats are susceptible to damage caused by mobile fishing gear. Particularly vulnerable are sessile epifaunal species, whose removal can result in a reduction of the structural complexity within the habitat (Collie et al., 2000a). Fishing gear may break up hard substrata and biogenic reefs, which causes resuspension of sediments and reduces habitat complexity, thereby limiting the range of organisms for which the habitat is suitable (Kaiser et al., 2002). Damage caused by fishing gear in soft sediment habitats may remove bioturbators from the benthic community, thereby affecting nutrient cycling and oxygenation of the

sediments, which could have ecosystem-wide ramifications (Widdicombe et al., 2004). A meta-analysis carried out by Collie et al. (2000a) revealed that faunal biomass and abundance in biogenic habitats and stable habitats (e.g. gravel and mud) were more negatively affected by fishing activity than in unstable or more dynamic habitats (e.g. sand). A meta-analysis conducted by Kasier et al. (2006) identified a mean 98% initial decrease in species abundance caused by scallop dredging in biogenic habitats. Habitats with biogenic structural components are especially vulnerable to damage, as these support rich biodiversity and have slower rates of recovery than other habitats. Slow-growing sponges and soft-corals, for example, exhibit recovery rates on the order of years. In comparison, opportunistic species which characterize disturbed habitats tend to have short life spans and low biomass, and may exhibit recovery in under one year (Kaiser et al., 2006).

International and national conservation initiatives, including the EC Habitats Directive, the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), and the UK Biodiversity Action Plan, the latter implemented in response to the objectives of the Convention on Biological Diversity, aim to preserve or enhance marine biodiversity to maintain the integrity of marine ecosystems. Each has identified specific priority habitats and species whose protection is required to meet these aims. The importance of an ecosystem-based approach to marine management has become widely recognized and is formally supported by the UK. The principles of ecosystem-based management promote the integration of conservation objectives with the sustainable use of marine resources (DEFRA, 2002). One way in which the ecosystem-based approach has been applied to fisheries management is through the identification and protection of essential fish habitat. This refers not only to the physical habitat known to support targeted species, but also refers to non-target sessile species which occur in the habitat and may contribute to its structural complexity and proper ecological functioning (Holland & Schnier, 2006).

Historically, management of the marine environment in Manx waters has not been ecosystem-based and has focused, instead, on the conservation of scallop species targeted by the fisheries. There are currently five closed areas around the Isle of Man at Port Erin, Douglas Bay, Laxey Bay, Niarbyl, and Ramsey, which have been closed, some only temporarily, to help replenish scallops stocks (Murray, pers. comm.). These closed areas might not incorporate habitats and species of conservation concern, thereby rendering them vulnerable to fishing activity. While the Isle of Man is a UK Crown Dependency with its own government and legislation and is not required to adhere to EU conservation directives or to UK legislation, the Isle of Man is a signatory of the OSPAR convention via the UK and is in the process

of signing up to the Convention on Biological Diversity (Gell, pers. comm.). The identification and conservation of OSPAR and UK Biodiversity Action Plan priority habitats and species in Manx territorial waters is therefore necessary to uphold conservation commitments. In addition, the Manx fishery for *Aequipecten opercularis* was recently granted accreditation by the Marine Stewardship Council. MSC accredited sustainable fisheries should maintain the structure, function, and diversity of the ecosystem on which the fishery depends (Marine Stewardship Council, 2010). An important step towards the ecosystem-based approach to management is the commitment of the Isle of Man Government to the establishment of a marine nature reserve at Ramsey Bay, in which habitats of conservation interest, including maerl beds, *Modiolus modiolus* reefs, and seagrass beds have been identified. Fishers have also recognized this as an important area for juvenile scallops. A no-take "conservation zone" and a "fisheries management zone" have both been proposed for the area to address the conservation of sensitive habitats, while benefitting the scallop fisheries (Gell & Hanley, 2010). While the reserve will afford protection for sensitive habitats in one area of the seabed, the identification and conservation of sensitive habitats and species in the whole of the territorial sea will be necessary to promote sustainable use of the marine environment in Manx waters.

Seabed habitat mapping has developed as an important tool for conservation management and spatial planning in the marine environment (Robinson et al., 2007). The classification of identified marine communities and their habitats, or "biotopes", allows for the distribution of distinct types to be identified. Further, the distribution of biotopes of conservation concern can be mapped in relation to fishing activity, and the extent of fishing disturbance in each biotope can be determined. The aim of this research was to produce a biotope map for the Manx territorial sea and to identify the distribution of sensitive biotopes in relation to the distribution of fishing effort, whereby management recommendations could be made to mitigate potential conflicts in areas of both conservation and fishing interest. It was hypothesized that all biotopes containing species of commercial importance are equally susceptible to damage by fishing activity. In order to make management recommendations that are effective for meeting conservation objectives, it is important to know whether or not sensitive biotopes are equally susceptible to fishing activities as other biotopes and the extent to which different biotopes are affected by fishing disturbance. With this information, spatial management can be implemented to preserve sensitive areas and areas with pristine habitat. In addition, an appropriate level of fishing activity within a given habitat can be assessed with respect to the extent to which that particular habitat is affected.

To achieve the study's aim, the research was focused on meeting the following objectives:

1) To identify and categorize benthic communities around the Isle of Man by compiling the available biological survey data and by using procedures in the PRIMER v6 software package (Clarke &Warwick, 2001, Clarke & Gorley, 2006) to identify distinct communities types and characteristic species, whereby communities could be classified according to the Marine Habitat Classification for Britain and Ireland Version 04.05 (Connor et al., 2004).

2) To produce a biotope map for the Manx territorial sea, using a geographical information system (ArcGIS), and to identify areas with biotopes of conservation interest, according to European and UK designations.

3) To examine biotope distribution and identify the extent to which biotopes containing commercially targeted species are subjected to fishing disturbance, by overlaying three years of fishing effort data on the biotope map generated using ArcGIS.

4) To provide management recommendations for conservation to the Isle of Man Government.

2. METHODS

2.1 Habitat Survey

In 2008, visual surveys were conducted to document the distributions of the benthic marine habitats which occur within the 12 nautical mile territorial limit of the Isle of Man and the faunal communities associated with these habitats. In addition the surveys were carried out to aid in stock assessment of fished species and to improve the understanding of the distribution of benthic organisms in relation to measured environmental parameters (Murray et al., 2009).

As described by Hinz et al. (2010), still images and video footage were collected via the RV Prince Madog at 154 stations mostly spaced 5 km apart within the 12 nautical mile territorial limit of the Isle of Man. At each station, a sledge which housed a video camera and a stills camera was towed at approximately 0.5 knots for 15 minutes and a 10 megapixel image was taken every 10 seconds, corresponding with 0.194 m^2 (0.54 m x 0.36 m) of the seabed. Around ninety still images were collected for each tow. For 119 stations, sediment grain size, temperature, salinity, chlorophyll fluorescence and concentration of chlorophyll in the sediment were ascertained (Murray et al., 2009). See Murray et al. (2009) for further details regarding the habitat surveys.

2.2 Photo Analysis

Analysis of approximately 50 still images collected at each station was carried out in order to identify the faunal communities which occurred at each of the survey sites. For every image, benthic flora and fauna were identified to the lowest possible taxonomic level and their abundances were quantified. The abundances of algae and some unidentified hydroids were recorded in terms of coverage, otherwise counts of individuals were made to record the abundance of taxa. Observations of the nature of the substratum were also recorded for each image, including the coarseness, the occurrence of features of interest, such as maerl beds or *Modiolus* beds, and the presence of shell or other characterizing features of the substratum.

2.3 Community Data Analysis

Treatment of the community data prior to statistical analysis involved the removal of each taxon that had a maximum abundance of one individual per station and an occurrence at three stations or less. The rarity of these taxa suggested that they would not be important for identifying distinct community types. Organisms that were recorded by percentage cover were also excluded from the community dataset prior to analysis, as measures of coverage could not be compared with the abundance recorded for the other taxa. Abundances were standardized to the number of individuals per m^2, according to the number of images analyzed for each station. This was achieved by dividing each taxon's abundance at a station by the area analyzed at that station; area analyzed was the product of the number of images analyzed and the area covered by each image (0.194 m^2).

The PRIMER v6 software package was used to carry out the community data analyses (Clarke & Gorley, 2006). While the most dominant taxa are undoubtedly important for identifying community types, and thus important for matching communities to those associated with defined biotopes, the consistent occurrence of species at lower abundances in a community are also important for characterizing it. Prior to analysis, the standardized community data were square root transformed to down-weight the influence of the most dominant taxa and to allow for the taxa which occurred at intermediate abundances to contribute more to group similarity (Clarke & Warwick, 2001). A resemblance matrix was generated depicting the Bray-Curtis similarities between stations, based on pair-wise comparisons between the community compositions at each station.

The SIMPROF procedure was implemented via Cluster Analysis to identify significant groupings of stations based on similarities in community composition. Significant groups were identified at a significance level of 5%. Subsequently, the SIMPER procedure was used to identify which taxa contributed up to 90% of the similarity among each of the identified groups of stations. One of the outputs of the SIMPER analysis is similarity/standard deviation (Sim/SD). For each group that was identified, the taxa with a high Sim/SD "typified" that group of stations, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001).

2.4 Biotope classification

The communities identified by the SIMPROF procedure were then classified to the biotope or sub-biotope level, where possible, using the Marine Habitat Classification for Britain and Ireland Version 04.05 (Connor et al. 2004). This hierarchical classification scheme is available on the Joint Nature Conservation Committee website and corresponds with the European Nature Information System (EUNIS) habitat classification developed by the European Environment Agency, which allows for consistency in habitat classification at larger geographic scales (Joint Nature Conservation Committee, n.d.b).

The Marine Habitat Classification for Britain and Ireland was developed with both a "top-down" and "bottom-up" approach. Of six levels (environment, broad habitat, main habitat, biotope complex, biotope, sub-biotope), the highest, broadest levels of the classification divide marine habitats based on broad physical differences in substratum (sediment vs. rock) and the marine biological zone in which they occur (littoral vs. sublittoral). Further differentiation of habitats at lower levels is based on more specific aspects of the physical environment including depth, wave exposure, substratum, and occurrence in the infralittoral or circalittoral zones, which subdivide the sublittoral zone. The bottom-up aspect of the classification is based on the consistent occurrence of similar biological communities under a given set of physical conditions. Thus, in habitats with similar physical conditions, biotopes and sub-biotopes are distinguished based on differences in community composition (Connor et al., 2004).

At every level of the hierarchy, a habitat is accompanied by a physical description which includes the range of each physical parameter that applies to the habitat, including salinity, depth, strength of tidal stream, and wave exposure, as well as a description of the substratum. Where applicable, a biological description of the habitat is also presented with measures of abundance, contribution to similarity of

the community, and frequency of characterizing species. Each habitat is also accompanied by a description of the general nature of the habitat and the associated community (Connor et al., 2004).

2.4.1 "Top-down" habitat classification

For each community identified using the SIMPROF procedure, there was a list of 229 potential biotope and sub-biotope matches, which corresponded with infralittoral rock (and other hard substrata), circalittoral rock (and other hard substrata), and sublittoral sediment habitats (Connor et al., 2004). As the broadest levels of the hierarchical classification scheme are based on the physical habitat, the habitats in which the SIMPROF communities occurred were compared with the broad habitat types, based on major physical differences, and then with the higher level habitat types nested within the broad habitats, based on more detailed descriptions of the substratum and the marine biological zone (infralittoral vs. circalittoral). In this way, the range of potential habitat matches was narrowed down so that only the biotopes with the most appropriate physical characteristics were compared with the SIMPROF communities. The physical data used to compare the habitats in which the communities occurred with those defined in the classification scheme included estimates of the sediment size categories from the survey images and the mean and median grain sizes derived from sediment particle size analysis. Depths of the survey stations corresponding with the community groups were estimated using an admiralty chart, which was also used for comparison with habitat types. A detailed methodology for the comparison of the habitat descriptions with the habitats identified for the SIMPROF communities is provided in Appendix 7.1.

2.4.2 Classification to the biotope or sub-biotope level

2.4.2.1 Comparison with core biotope records

Once the broader habitats were narrowed down to those which included biotopes with the most appropriate physical characteristics, the community data were utilized to classify the identified communities to the biotope or sub-biotope level, where possible. In order to make objective comparisons between the Isle of Man communities and the communities which characterized the defined biotopes, the biological comparative tables which accompany the habitat classification scheme on the Joint Nature Conservation Committee (JNCC) website were used. The biological data presented in these tables represent the core records used to characterize each biotope, and only species which occur in more than 20% of the records for a given biotope or sub-biotope are included (Connor et al., 2004).

These data were collated with the Isle of Man community data and a resemblance matrix was generated using PRIMER v6, which depicted the Bray-Curtis similarities between the Isle of Man community groups and each of the 229 potential biotope and sub-biotope matches. The similarities were based on the presence/absence of taxa, as species abundance was recorded as percentage prevalence in the comparative tables, which was not comparable with abundance recorded for the Isle of Man communities. A detailed methodology for the collation of the two datasets is presented in Appendix 7.1.

2.4.2.2 Comparison with biotope descriptions

Biotopes which occurred in the narrowed down list of potential habitat matches for a given SIMPROF community group were compared with the group in order of the highest Bray-Curtis similarity to the lowest. The fit of a given biotope to the Isle of Man community was determined through comparisons with the more detailed descriptions of the substratum and other physical conditions provided for each biotope, as well as comparisons with the community composition described for each. A detailed methodology for the comparison of the SIMPROF community groups with the biotope descriptions is presented in Appendix 7.1.

The communities were classified to the biotope or sub-biotope level, where possible, based primarily on the description of the substratum and depth band, and secondarily on community fit. A list of the top biotope matches for each community group was generated and the most fitting biotope was selected as the representative. Hybrid classifications were assigned to communities when two distinct habitats occurred within the only station represented by a group, and when two biotope types were described as potential complements of each other (e.g. one was an epibiotic overlay of the other). Where an appropriate match could not be made at the biotope or sub-biotope level, the community was classified as the most fitting biotope complex or habitat type. Particularly for predominately sandy habitats, broad classifications were necessary as many sandy biotopes were distinguished by their infauna, for which the data were unavailable. Additionally, information on wave exposure and strength of tidal stream were lacking, which were particularly important for distinguishing circalittoral or infralittoral rock habitats at lower habitat levels. A broader habitat classification was also identified for each community group. In some cases, the broader habitat classification was represented by a hybrid. A hybrid classification was necessary when there was overlap in the range of sediment sizes and types described for biotopes nested within different habitat types and there was a lack of sufficient physical data to distinguish between them for the most appropriate match.

2.5 Mapping and interpolation

The distribution of the stations, communities, biotopes, and broad habitats were mapped using the geographical information system, ArcGIS. The area of the seabed within the 12 nautical mile limit of the Manx territorial sea was converted into a grid of 0.25 km^2 cells. The area covered by each community group, biotope, and broader habitat was interpolated by joining each of the 0.25 km^2cells, or points on the grid, to the closest survey station located on the grid. As each survey station corresponded with a particular community group, biotope, and broad habitat, the points joined to each station were represented by the same classifications. Thus, both point maps and continuous maps of the communities and the corresponding habitats were produced, allowing for the distribution of biotopes and habitats of conservation concern to be identified.

2.6 Fishing effort in identified communities, biotopes, and broader habitats

To identify the extent to which identified community types were susceptible to fishing disturbance, satellite Vessel Monitoring System (VMS) data collected for UK and Manx fleets fishing in the Manx territorial sea from 2008-2010 were used to determine fishing effort. Using ArcGIS, the number of VMS records km^{-2}corresponding with fishing activity in any given 0.25 km^2 cell on the grid of the seabed was summed across the three years of fishing effort. The VMS records for cells which occurred within the Port Erin closed area were excluded from the analysis, as the fishing effort in this area had not yet been calculated from the VMS records.

Using ArcGIS, buffers that were 2 km in radius were drawn around each of the survey stations. The values of fishing effort corresponding with the cells falling within the buffer zones were joined to the respective station to represent fishing effort for that station. A 2 km buffer was chosen to ensure the points joined to each station were spatially distinct from each other, although there was overlap for some stations that were surveyed at a higher spatial resolution. For each community, biotope, and broad habitat, all of the fishing effort records falling within the buffer zones of the stations corresponding with the group (community, biotope, broad habitat) were used to determine the mean fishing effort for that group.

Differences in the fishing effort among communities, biotopes, and broad habitats were identified using analysis of variance (ANOVA). As the mean fishing effort at each station in a group was used as a replicate, only groups represented by three or more stations were included in the analyses. The mean

fishing effort at each station corresponded with the mean of the fishing effort records falling within the 2 km buffer around the station. These data are presented in Appendix 7.2**.** The data were transformed, where necessary, to satisfy the test's assumptions of homogeneity of variance and normally distributed data. Where data passed the Levene's test for homogeneity of variance, the Least Significant Difference (LSD) test was used to identify pairs with significantly different mean fishing effort. Transformed data that failed Levene's test for homogeneity of variance were also compared using an ANOVA, however the Dunnett's T3 test was used to make pairwise comparisons to identify significant differences between groups. Dunnett's T3 test can be used in cases where homogeneity of variance cannot be assumed. ANOVA was used instead of the non-parametric equivalent so that a single post-hoc test could be employed, rather than carrying out a high number of Mann-Whitney U tests, which would raise the probability of making a type I error (Peres-Neto, 1999).

In order to determine whether or not fishing was an explanatory variable for variation in biological composition within an identified community, biotope, or broad habitat, the RELATE procedure in the PRIMER v6 software package was employed to test for a significant correlation between the biological data and the fishing effort data. The community data originally used to identify significant community groups were used again in this analysis. The data were square root transformed and a resemblance matrix was generated based on the Bray-Curtis similarities between stations. The fishing effort data, represented by the mean fishing effort for each station, were log(x+1) transformed prior to analysis to approximate normal distribution. A resemblance matrix was generated based on Euclidean distance, thus a transformation was carried out first as the Euclidean distance calculation is more effective where the environmental variables are approximately normal (Clarke & Gorley, 2006). For each community, biotope, and broad habitat, RELATE was used to determine whether the patterns in the fishing effort data could explain the patterns in the biological data. Where RELATE was significant, the fishing effort for each station in that group was ranked corresponding with low, medium, and high fishing effort. A SIMPER analysis was carried out to discern the differences in community composition in stations that were characterized by high fishing effort in comparison with those which had low fishing effort within a particular group, to help understand the influence of fishing activity on particular communities. Multidimensional scaling (MDS) plots were generated for groups in which fishing activity was related to the group's biological variation.

2.7 Extent of fishing activity in identified communities, biotopes, and broader habitats

The proportion of the seabed allocated to each community, biotope, and broad habitat was determined based on the interpolation of the distribution of each group, or the number of 0.25 km^2 cells joined to the stations within a particular group. The proportion of the area covered by each group that was fished and the proportion that was undisturbed by fishing activity was determined using the number of VMS records km^{-2} that corresponded with each of the cells joined to the stations in a group. Using ArcGIS, natural breaks in the fishing effort data, measured as the number of VMS records km^{-2}, were identified and these were used to categorize the data into low, medium and high fishing intensity. The extent of fishing activity within each group was then determined based on the proportion of the area covered by the group that was subjected to no fishing, low, medium, or high fishing intensity.

2.8 Spatial resolution analysis

Fifteen stations that were sampled at a higher spatial resolution during the 2008 habitat surveys, at Targets, Port Erin, Laxey, Ramsey, and East Douglas, were included in the photo and community analysis. Three stations sampled less than 5 km apart were analyzed from each area, corresponding with fifty still images for each station. Analysis of these images was conducted by one person, whereas analysis of the stations surveyed on the 5 km grid was conducted by multiple analysts. To determine whether or not interpolation between stations sampled at 5 km apart was appropriate for predicting the distribution of community and habitat types, comparisons of the community types, biotopes, and broad habitat types identified among the group of three stations and between the group and the nearest station sampled on the 5 km grid were made. MDS plots were generated using PRIMER v6 (Clarke &Warwick, 2001, Clarke & Gorley, 2006) to allow for visual interpretation of the biological similarity among the three stations and the nearest station sampled on the 5 km grid. The MDS plots were generated based on the Bray-Curtis similarities between the community compositions at each station, following a square-root transformation of the standardized community data.

3. RESULTS

3.1 Photo analysis

Since 2008, 7,325 still images from 150 of the surveyed stations have been analyzed. The distribution of the analyzed stations is depicted in Figure 1.

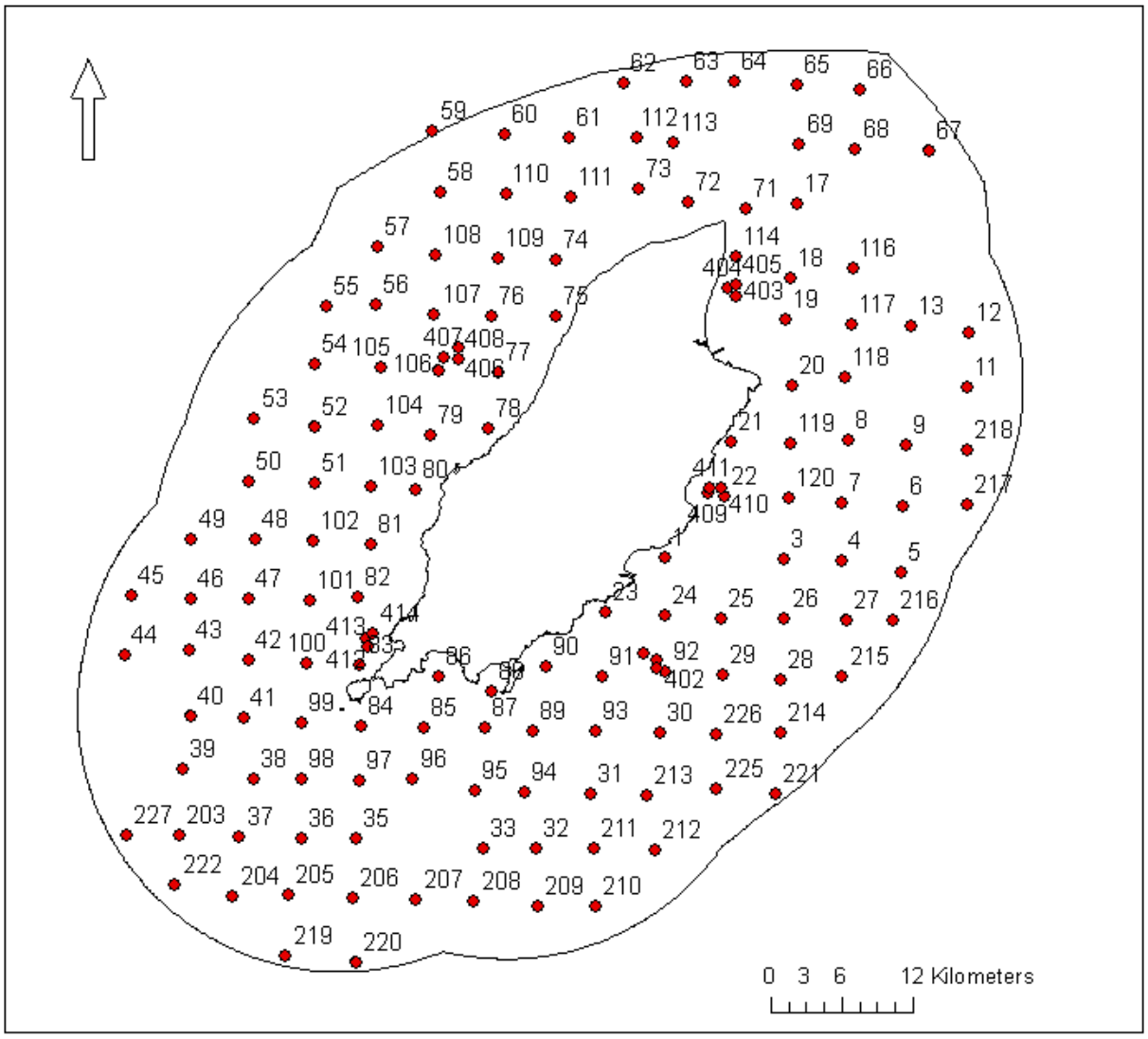

Figure 1. Stations surveyed in 2008 within the 12 nautical mile territorial limit of the Isle of Man for the identification of benthic habitats and associated faunal assemblages in Manx waters. Map was generated using ArcGIS.

3.2 Community analysis

A total of 145 of the taxa identified during the photo analysis were included in the community analysis. At a significance level of 5%, forty significant biological groupings were identified by the SIMPROF procedure. The distribution of these groups was mapped using ArcGIS (Figures 2 and 3). The taxa which contributed to the similarity of each of these groups were identified using the output from a SIMPER analysis. The SIMPER output for groups with five or more stations are presented in Table 1. For groups that were represented by only one station, the community composition was determined by looking at the raw abundance data derived from the photo analysis. A comprehensive description of the identified communities, the habitats in which they occurred, and biotope and broad habitat classifications is presented in Appendix 7.3.

Figure 2. The distribution of survey stations corresponding with forty significant biological groups (α=5) identified using the SIMPROF procedure on community data that was collected in 2008 during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man. Each group, or community, is represented by a unique letter code. Map was generated using ArcGIS.

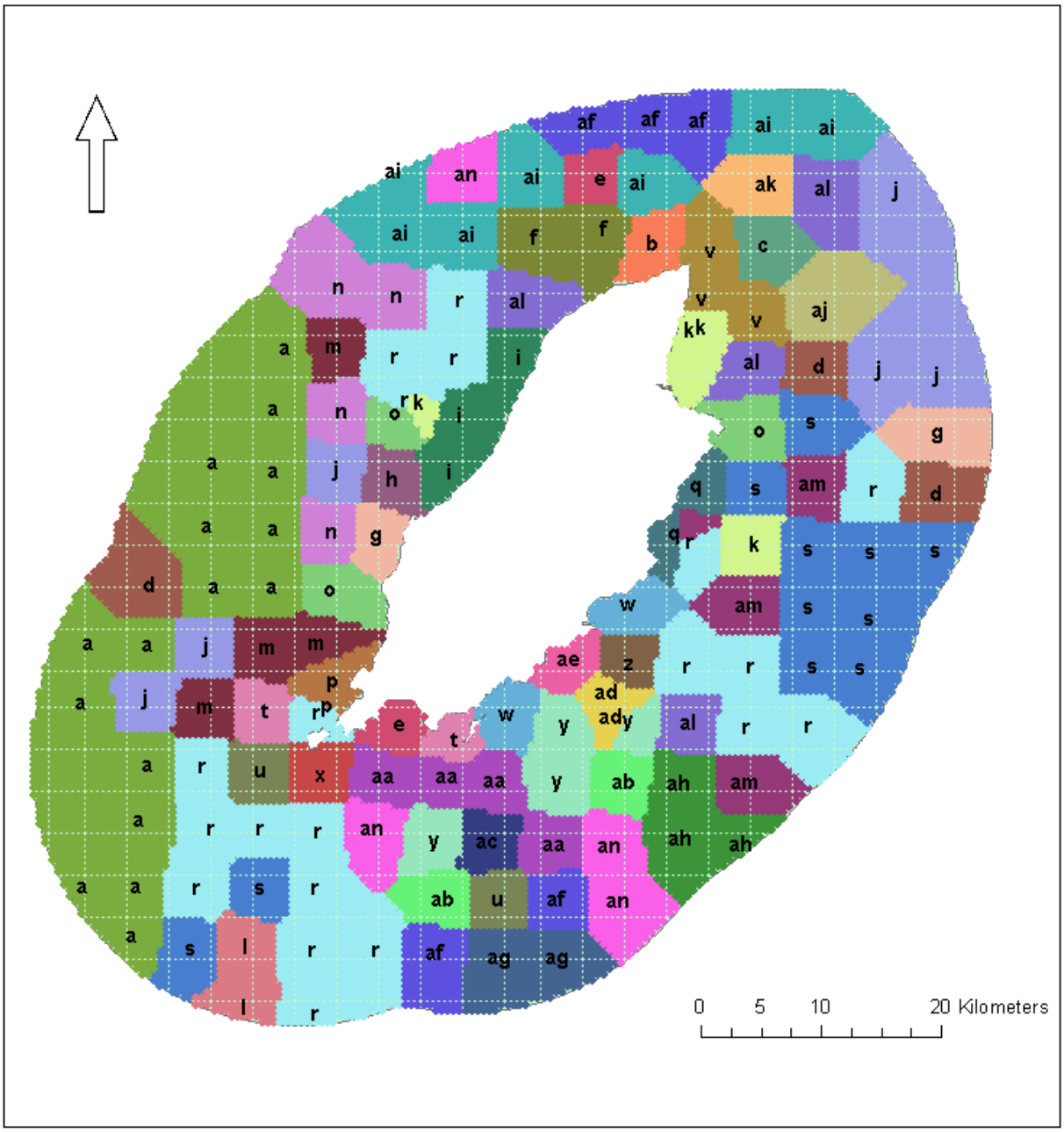

Figure 3. The distribution of forty significant biological groups (α=5) identified using the SIMPROF procedure on community data that was collected in 2008 during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man. Each group, or community, is represented by a unique letter code. The area covered by each group was interpolated by first dividing the seabed within the 12 nautical mile territorial limit into 0.25 km^2 cells and then joining each 0.25 km^2 cell to the nearest survey station. Each 0.25 km^2 cell corresponds with the community group identified for the nearest survey station. Group letter codes correspond with the distribution of the survey stations on the map. Map was generated using ArcGIS.

Table 1. SIMPER output for significant community groups represented by five or more stations which were identified using the biological data collected during visual habitat surveys conducted in Manx territorial waters in 2008. The number of stations in each group is displayed in parentheses. Taxa which contributed to 90% (cumulative) of the similarity of the group are displayed. A high similarity/standard deviation (Sim/SD) indicates that the taxon "typified" the group (Clarke & Warwick, 2001).

***Group r* (21)**
Average similarity: 43.45

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Ophiura albida	2.24	8.68	1.92	19.98	19.98
Aequipecten opercularis	1.61	7.31	2.77	16.82	36.80
Alcyonium digitatum	1.16	4.19	1.21	9.65	46.45
Pseudosuberites sulphureus	0.96	3.21	1.30	7.39	53.85
Pagurus spp.	0.57	2.89	1.76	6.66	60.50
Pecten maximus	0.57	2.49	1.59	5.73	66.23
Cerianthus lloydii	1.02	2.38	0.61	5.49	71.72
Asterias rubens	0.48	1.83	1.13	4.22	75.94
Nemertesia antennina	0.37	1.05	0.72	2.43	78.37
Ebalia sp.	0.41	1.02	0.80	2.34	80.71
Porifera unid.	0.47	0.98	0.59	2.26	82.97
Gibbula sp.	0.43	0.85	0.57	1.96	84.93
Ophiura ophiura	0.27	0.68	0.56	1.57	86.50
Calliostoma zizyphinum	0.24	0.64	0.65	1.47	87.97
Palliolum tigerinum	0.28	0.54	0.48	1.25	89.22
Bivalvia unid.	0.20	0.49	0.57	1.13	90.35

***Group* a (16)**
Average similarity: 24.81

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Nephrops norvegicus	0.42	11.98	0.99	48.28	48.28
Caridea unid.	0.29	4.86	0.50	19.59	67.86
Sagartia troglodytes	1.9	4.15	0.33	16.73	84.59
Crangon sp.	0.21	1.53	0.32	6.18	90.77

***Group s* (11)**
Average similarity: 40.73

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Aequipecten opercularis	0.95	9.31	2.09	22.86	22.86
Pagurus spp.	0.81	8.41	4.17	20.64	43.50
Pseudosuberites sulphureus	0.57	4.66	1.58	11.44	54.94
Alcyonium digitatum	0.40	3.02	0.88	7.42	62.37
Adamsia carciniopados	0.37	2.66	0.85	6.54	68.91
Ophiura albida	0.46	2.64	0.88	6.49	75.40
Asterias rubens	0.25	1.76	0.73	4.32	79.72
Bivalvia unid.	0.28	1.28	0.57	3.14	82.86
Nemertesia antennina	0.25	1.16	0.58	2.85	85.70
Anemone unid.	0.16	0.69	0.45	1.70	87.40
Inachus sp.	0.14	0.63	0.47	1.54	88.94
Cerianthus lloydii	0.28	0.62	0.31	1.53	90.48

Table 1 continued.

***Group ai* (7)**
Average similarity: 45.28

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Alcyonium digitatum	2.31	7.02	1.62	15.50	15.50
Gibbula sp.	1.71	6.32	1.72	13.96	29.46
Nemertesia antennina	1.30	4.09	1.11	9.03	38.49
Pagurus spp.	0.94	4.03	2.66	8.91	47.40
Porifera unid.	1.01	2.99	2.95	6.61	54.01
Calliostoma zizyphinum	0.74	2.93	3.37	6.48	60.49
Asterias rubens	0.66	2.44	1.38	5.39	65.88
Aequipecten opercularis	0.66	2.08	1.38	4.59	70.46
Ebalia sp.	0.70	1.96	0.88	4.34	74.80
Urticina spp.	0.65	1.23	0.81	2.71	77.51
Flustra foliacea	0.70	1.03	0.49	2.28	79.79
Alcyonidium diaphanum	0.71	0.95	0.45	2.10	81.89
Inachus sp.	0.32	0.93	0.87	2.05	83.94
Cerianthus lloydii	0.43	0.91	0.61	2.00	85.95
Echinus esculentus	0.38	0.86	0.86	1.90	87.85
Polyplacophora unid.	0.54	0.84	0.54	1.86	89.71
Boreotrophon truncatus	0.25	0.59	0.58	1.29	91.00

***Group j* (6)**
Average similarity: 23.44

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Pagurus spp.	0.98	8.10	2.23	34.58	34.58
Ophiura ophiura	0.80	4.91	0.74	20.95	55.53
Sagartia elegans	0.38	2.76	0.77	11.79	67.32
Cellaria patches	0.26	1.82	0.76	7.77	75.09
Nemertesia antennina	0.37	1.58	0.47	6.75	81.84
Bivalvia unid.	0.24	1.39	0.48	5.92	87.76
Nemertesia ramosa	0.20	0.69	0.48	2.93	90.70

***Group k* (5)**
Average similarity: 39.34

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Clavelina lepadiformis	4.25	11.76	1.21	29.89	29.89
Cerianthus lloydii	2.50	10.12	1.02	25.72	55.62
Asterias rubens	0.64	2.22	1.10	5.65	61.27
Anemone unid.	0.42	1.87	1.08	4.76	66.03
Leptasterias muelleri	0.37	1.82	1.13	4.62	70.65
Pisces unid.	0.35	1.67	1.12	4.26	74.90
Gibbula sp.	0.46	1.47	1.14	3.75	78.65
Gobiidae unid.	0.37	1.40	0.62	3.56	82.21
Alcyonidium diaphanum	0.72	1.23	0.32	3.13	85.34
Ophiura albida	0.26	0.79	0.62	2.01	87.34
Calliostoma zizyphinum	0.36	0.71	0.62	1.81	89.15
Bivalvia unid.	0.22	0.65	0.61	1.65	90.80

Table 1 continued.

Group af **(5)**					
Average similarity: 53.83					
Species	**Av.Abund**	**Av.Sim**	**Sim/SD**	**Contrib%**	**Cum.%**
Porifera unid.	3.98	6.16	2.01	11.44	11.44
Gibbula sp.	2.63	5.90	4.41	10.96	22.40
Calliostoma zizyphinum	1.95	3.98	6.01	7.39	29.79
Antedon bifida	1.95	3.64	1.36	6.77	36.56
Ebalia sp.	1.33	3.25	5.32	6.04	42.60
Pagurus spp.	1.31	2.85	6.82	5.30	47.90
Anemone unid.	1.10	2.22	3.84	4.12	52.02
Alcyonium digitatum	3.28	2.21	1.66	4.10	56.12
Nassarius sp.	1.32	2.14	1.13	3.98	60.10
Galathea sp.	1.49	1.97	1.14	3.65	63.75
Caridea unid.	0.99	1.96	3.23	3.63	67.39
Echinus esculentus	0.64	1.30	3.77	2.41	69.80
Sagartia elegans	0.63	1.15	1.07	2.14	71.93
Urticina spp.	0.89	1.12	0.83	2.08	74.01
Buccinum undatum	0.71	1.00	1.01	1.85	75.86
Crossaster papposus	0.48	0.88	1.11	1.63	77.49
Sagartia troglodytes	0.44	0.85	7.98	1.58	79.07
Gastropod unid.	0.65	0.82	1.07	1.53	80.60
Inachus sp.	0.45	0.77	1.12	1.42	82.02
Sabellidae unid.	0.43	0.73	0.99	1.35	83.37
Asterias rubens	0.52	0.70	0.88	1.30	84.67
Ascidian unid.	0.43	0.66	1.10	1.23	85.90
Ocenebra erinacea	0.36	0.66	1.16	1.22	87.12
Glycymeris glycymeris	0.70	0.57	0.46	1.06	88.18
Hyas sp.	0.57	0.56	0.58	1.04	89.22
Boreotrophon truncatus	0.48	0.55	0.62	1.02	90.24

3.3 Biotope classification

The classification of the communities identified using the SIMPROF procedure resulted in the identification of 20 biotopes/habitats, and 13 broader habitats in the Manx territorial waters. Some community groups were subdivided and classified separately based on broad differences in the habitat types in which the community occurred. The classifications for each of the 40 identified communities are presented in Table 2, along with physical characteristics and qualifications of the fit for the selected biotope or habitat type. More detailed comments on the fit for each biotope classification to the identified communities are included in Appendix 7.4. Presented in Tables 3 and 4 are the habitat descriptions which correspond with each biotope or broader habitat code, respectively. The biotopes and broader habitats are referred to by the number labels which are also presented in Tables 3 and 4 beyond this section of the text. The distribution of the identified biotopes is depicted in Figures 4 and 5, and the distribution of the broader habitats is depicted in Figures 6 and 7. The distributions of the different types of substrata on which the communities occurred are presented in Figure 8.

Table 2. Biotope and broad habitat classifications with corresponding EUNIS codes for forty significant benthic community groups identified in Manx territorial waters, based on biological data collected during visual habitat surveys conducted in 2008. The stations corresponding with each group, or sub-group, are listed, along with a description of the substratum characterizing the stations, the estimated depth range, the Bray-Curtis similarity of the group with the core biological records for the defined biotope, and a qualification of the fit of the community to the listed classification. Numbers in parentheses correspond with the number of stations.

Group	Stations	Substratum	Depth (m)	Biotope classification (2004 EUNIS code)	Bray-Curtis similarity	Biotope fit	Broad classification (2004 EUNIS code)
a	39, 40, 44, 45, 46, 48, 50, 51, 52, 53, 54, 55, 102, 203, 222, 227 (16)	Mud/fine sand	≥ 50	**SS.SMu.CFiMu.BlyrAchi (A5.363)**	8%	Good	SS.SMu (A5.3)
aa	31, 85, 87, 89	Mixed stone (3), Mixed gravel (1)	20-50	**SS.SMx.CMx.FluHyd (A5.444)**	40%	Reasonable	SS.SMx.CMx/CR (A5.44/A4)
ab	30, 33	Mixed gravel	30-60	**SS.SCS.CCS.Nmix/SS.SCS.CCS.MedLumVen (A5.134/A5.132)**	28.57 % (Nmix) 18.18% (MedLum)	Good physical, reasonable biological	SS.SCS.CCS (A5.13)
ac	94	Mixed stone	35-60	**SS.SMx.CMx.FluHyd (A5.444)**	38.46%	Reasonable physical, poor biological	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
ad	400, 401, 402	Mixed gravel	30-40	**SS.SCS.CCS.Nmix/SS.SCS.CCS.MedLumVen (A5.134/A5.132)**	25.53% (Nmix) 9.52% (MedLum)	Good physical, reasonable biological	SS.SCS.CCS (A5.13)
ae	23	*Modiolus* bed/mixed maerl	10-30	**SS.SBR.SMus.ModCvar/SS.SMp.Mrl.Pcal.Nmix (A5.624/A5.5112)**	43.18 % (Mod) 29.85 % (Maerl)	Reasonable (*Modiolus*) Good biological, reasonable physical (Maerl)	SS.SBR.SMus/SS.SMp.Mrl (A5.62/A5.51)

Table 2 continued.

Group	Stations	Substratum	Depth (m)	Biotope classification (2004 EUNIS code)	Bray-Curtis similarity	Biotope fit	Broad classification (2004 EUNIS code)
af	62, 63, 64, 208, 211	Mixed stone (4), Mixed gravel (1)	20-65	**CR.HCR.XFa.SpNemAdia (A4.135)**	34%	Reasonable	SS.SMx.CMx/CR (A5.44/A4)
ah	221, 225, 226	Mixed stone (2), Mixed gravel (1)	30-60	**SS.SMx.CMx.ClloMx.Nem (A5.4411)**	32.88%	Reasonable	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
ai-1	59, 61, 65, 66, 110, 113	Mixed stone	20-50	**SS.SMx.CMx.FluHyd (A5.444)**	36.36%	Reasonable biological, good physical	SS.SMx.CMx (A5.44)
ai-2	58	Mixed gravel	20-50	**SS.SMx.CMx.ClloMx (A5.441)**	30.14%	Reasonable	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
aj	116	Sand	5-30	**SS.SSa (A5.2)**	N/A	Good	SS.SSa (A5.2)
ak	69	Mixed gravel	20-50	**SS.SMx.CMx.OphMx (A5.445)**	27.45%	Good physical, reasonable biological	SS.SMx.CMx (A5.44)
al	19, 29, 68, 74	Mixed sand (2), Mixed gravel (2)	10-60	**SS.SMx.CMx.OphMx (A5.445)**	36.73%	Reasonable	SS.SMx.CMx (A5.44)
am-1	3, 8, 214	Mixed gravel (2), Mixed stone (1)	5-40	**SS.SMx.CMx.OphMx (A5.445)**	25.45%	Reasonable	SS.SMx.CMx (A5.44)
am-2	410	Mixed maerl	5-40	**SS.SMp.Mrl.Pcal.Nmix (A5.5112)**	22.58%	Reasonable	SS.SMp.Mrl (A5.51)
an	60, 96, 212, 213	Mixed gravel (2), Mixed stone (2)	30-50	**SS.SMx.CMx.OphMx (A5.445)**	24.32%	Reasonable	SS.SMx.CMx (A5.44)
b	72	Mixed sand	20-35	**SS.SSa.IFiSa.ScupHyd (A5.232)**	16.67%	Reasonable	SS.SMx.CMx (A5.44)
c	17	Sand	5-30	**SS.SSa (A5.2)**	N/A	Good	SS.SSa (A5.2)
d-1	49	Mud/fine sand	40-70	**SS.SMu.CFiMu.BlyrAchi (A5.363)**	0.00%	Good physical, reasonable biological	SS.SMu.CFiMu (A5.36)
d-2	117, 218	Sand	5-30	**SS.SSa (A5.2)**	N/A	Good	SS.SSa (A5.2)

Table 2 continued.

Group	Stations	Substratum	Depth (m)	Biotope classification (2004 EUNIS code)	Bray-Curtis similarity	Biotope fit	Broad classification (2004 EUNIS code)
e-1	86	Rock	5-25	**IR (A3)**	N/A	Good	IR (A3)
e-2	112	Mixed sand	20-40	**SS.SSa.IFiSa.ScupHyd (A5.232)**	32.26%	Reasonable physical, good biological	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
f	73, 111	Mixed stone	20-50	**SS.SMx.CMx.FluHyd (A5.444)**	30%	Reasonable	SS.SMx.CMx (A5.44)
g	11, 80	Mixed sand	10-30	**SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)**	N/A	Reasonable	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
h	79	Mixed stone	15-30	**SS.SMp.KSwSS.LsacR.CbPb (A5.211)**	6.90%	Reasonable	SS.SMp.KSwSS (A5.52)
i	75, 77, 78	Mixed gravel (2), Mixed stone (1)	5-30	**SS.SMp.KSwSS.LsacR.Gv (A5.212)**	20.51%	Reasonable	SS.SMp.KSwSS (A5.52)
j-1	12, 13, 43, 47, 104	Sand/Muddy sand (3), Mixed sand (2)	20-80	**SS.SMu.CSaMu.VirOphPmax (A5.354)**	47.89%	Reasonable	SS.SSa.CMuSa/SS.SMu.CSaMu (A5.26/A5.35)
j-2	67	Mixed sand	20-80	**SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)**	N/A	Reasonable	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
k-1	403, 404, 405	Mixed maerl	5-15	**SS.SMp.Mrl.Pcal (A5.511)**	32.65%	Reasonable	SS.SMp.Mrl (A5.51)
k-2	120	Mixed sand	20-30	**SS.SCS.CCS.Nmix (A5.134)**	29.17%	Good physical, poor biological	SS.SCS.CCS (A5.13)
k-3	408	Mixed gravel	15-40	**SS.SMx.CMx.ClloMx.Nem (A5.4411)**	40.74%	Reasonable	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
l	205, 219	Sand/*Sabellaria*	50-100	**SS.SSa (A5.2)**	N/A	Reasonable	SS.SSa (A5.2)
m-1	42, 82, 101	Mixed sand	30-50	**SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)**	N/A	Reasonable	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
m-2	56	Sand	30-50	**SS.SSa (A5.2)**	N/A	Good	SS.SSa (A5.2)
n-1	57, 103, 108	Mixed sand	20-60	**SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)**	N/A	Reasonable	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
n-2	105	Sand/Muddy sand	20-60	**SS.SSa (A5.2)**	N/A	Good	SS.SSa (A5.2)

Table 2 continued.

Group	Stations	Substratum	Depth (m)	Biotope classification (2004 EUNIS code)	Bray-Curtis similarity	Biotope fit	Broad classification (2004 EUNIS code)
o	20, 81, 106	Mixed sand	15-40	**SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)**	N/A	Reasonable	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
q-1	21	Mixed sand	5-25	**SS.SSa (A5.2)**	N/A	Good	SS.SSa (A5.2)
q-2	409, 411	Mixed maerl	5-25	**SS.SMp.Mrl.Pcal.Nmix (A5.5112)**	25.64%	Good biological, reasonable physical	SS.SMp.Mrl (A5.51)
r-1	9, 25, 26, 28, 35, 38, 41, 76, 83, 97, 98, 109, 206, 207, 215, 220, 406, 407 (18)	Mixed gravel (12), Mixed sand (6)	25-100	**SS.SMx.CMx.ClloMx.Nem (A5.4411)**	28.28%	Good biological, reasonable physical	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
r-2	22	Mixed maerl	20-30	**SS.SMp.Mrl.Pcal.Nmix (A5.5112)**	26.26%	Good	SS.SMp.Mrl (A5.51)
r-3	37, 107	Sand, Mixed sand	25-100	**SS.SSa (A5.2)**	N/A	Reasonable	SS.SSa (A5.2)
s-1	4, 5, 6, 7, 27, 36, 119, 216	Mixed sand	20-80	**SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)**	N/A	Reasonable	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
s-2	118, 204, 217	Sand/Muddy sand	20-80 m	**SS.SSa (A5.2)**	N/A	Reasonable	SS.SSa (A5.2)
t-1	88	Rock	10-30	**CR.MCR.EcCr.CarSp.PenPcom (A4.2122)**	48%	Poor physical, reasonable biological	CR (A4)
t-2	100	Mixed gravel	35-60	**SS.SMx.CMx.ClloMx.Nem (A5.4411)**	44.44%	Good physical, poor biological	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
u	32, 99	Mixed stone, Mixed gravel	35-65	**SS.SMx.CMx.ClloMx.Nem (A5.4411)**	39.02%	Reasonable physical, poor biological	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)
v-1	18, 114	Mixed maerl	5-30	**SS.SMp.Mrl.Pcal.Nmix (A5.5112)**	34.29%	Reasonable	SS.SMp.Mrl (A5.51)
v-2	71	Mixed stone	5-30	**SS.SMx.CMx.FluHyd (A5.444)**	40.00%	Reasonable	SS.SMx.CMx (A5.44)

Table 2 continued.

Group	Stations	Substratum	Depth (m)	Biotope classification (2004 EUNIS code)	Bray-Curtis similarity	Biotope fit	Broad classification (2004 EUNIS code)
w	1, 90	Mixed maerl	10-30	**SS.SMp.Mrl.Pcal (A5.511)**	26.67%	Reasonable	SS.SMp.Mrl (A5.51)
x	84	Mixed stone	30-50	**CR.MCR.EcCr.FaAlCr.Pom (A4.2145)**	41.03%	Poor physical, reasonable biological	CR (A4)
y	91, 92, 93, 95	Mixed gravel	30-50	**SS.SCS.CCS.Nmix/SS.SCS.CCS.MedLumVen (A5.134/A5.132)**	27.45% (Nmix) 13.04% (MedLum)	Good physical, reasonable biological	SS.SCS.CCS (A5.13)
z	24	Mixed maerl	30-40	**SS.SMp.Mrl.Pcal (A5.511)**	34.29%	Reasonable	SS.SMp.Mrl (A5.51)

Table 3. Presented are the community descriptions which correspond with the biotope or habitat codes assigned to the benthic communities identified around the Isle of Man, according to the Marine Habitat Classification for Britain and Ireland Version 04.05 (Connor et al., 2004). Classifications were based on data collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008

Biotope label	Biotope Code	Biotope Description
1	CR.HCR.XFa.SpNemAdia	Sparse sponges, *Nemertesia* spp. and *Alcyonidium diaphanum* on circalittoral mixed substrata
2	CR.MCR.EcCr.CarSp.PenPcom	*Caryophyllia smithii* and sponges with *Pentapora foliacea*, *Porella compressa* and crustose communities on wave-exposed circalittoral rock
3	CR.MCR.EcCr.FaAlCr.Pom	Faunal and algal crusts with *Pomatoceros triqueter* and sparse *Alcyonium digitatum* on exposed to moderately wave-exposed circalittoral rock
4	IR	Infralittoral rock (and other hard substrata)
5	SS.SBR.SMus.ModCvar/ SS.SMp.Mrl.Pcal.Nmix	*Modiolus modiolus* beds with *Chlamys varia*, sponges, hydroids and bryozoans on slightly tide-swept very sheltered circalittoral mixed substrata/*Phymatolithon calcareum* maerl beds with *Neopentadactyla mixta* and other echinoderms in deeper infralittoral clean gravel or coarse sand
6	SS.SCS.CCS/SS.SMx.CMx	Circalittoral coarse sediment/Circalittoral mixed sediment
7	SS.SCS.CCS.Nmix	*Neopentadactyla mixta* in circalittoral shell gravel or coarse sand
8	SS.SCS.CCS.Nmix/ SS.SCS.CCS.MedLumVen	*Neopentadactyla mixta* in circalittoral shell gravel or coarse sand/*Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel
9	SS.SMp.KSwSS.LsacR.CbPb	Red seaweeds and kelps on tide-swept mobile infralittoral cobbles and pebbles
10	SS.SMp.KSwSS.LsacR.Gv	*Laminaria saccharina* and robust red algae on infralittoral gravel and pebbles
11	SS.SMp.Mrl.Pcal	*Phymatolithon calcareum* maerl beds in infralittoral clean gravel or coarse sand
12	SS.SMp.Mrl.Pcal.Nmix	*Phymatolithon calcareum* maerl beds with *Neopentadactyla mixta* and other echinoderms in deeper infralittoral clean gravel or coarse sand
13	SS.SMu.CFiMu.BlyrAchi	*Brissopsis lyrifera* and *Amphiura chiajei* in circalittoral mud
14	SS.SMu.CSaMu.VirOphPmax	*Virgularia mirabilis* and *Ophiura* spp. with *Pecten maximus* on circalittoral sandy or shelly mud
15	SS.SMx.CMx.ClloMx	*Cerianthus lloydii* and other burrowing anemones in circalittoral muddy mixed sediment
16	SS.SMx.CMx.ClloMx.Nem	*Cerianthus lloydii* with *Nemertesia* spp. and other hydroids in circalittoral muddy mixed sediment
17	SS.SMx.CMx.FluHyd	*Flustra foliacea* and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment
18	SS.SMx.CMx.OphMx	*Ophiothrix fragilis* and/or *Ophiocomina nigra* brittlestar beds on sublittoral mixed sediment
19	SS.SSa	Sublittoral sands and muddy sands
20	SS.SSa.IFiSa.ScupHyd	*Sertularia cupressina* and *Hydrallmania falcata* on tide-swept sublittoral sand with cobbles or pebbles.

Table 4. Presented are the descriptions which correspond with the habitat codes assigned to the habitats in which benthic communities identified around the Isle of Man occurred, according to the Marine Habitat Classification for Britain and Ireland Version 04.05 (Connor et al., 2004). Classifications were based on data collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008.

Broad label	Broad Code	Broad Description
1	CR	Circalittoral rock (and other hard substrata)
2	IR	Infralittoral rock (and other hard substrata)
3	SS.SBR.SMus/SS.SMp.Mrl	Sublittoral mussel beds (on sublittoral sediment)/Maerl beds
4	SS.SCS.CCS	Circalittoral coarse sediment
5	SS.SCS.CCS/SS.SMx.CMx	Circalittoral coarse sediment/Circalittoral mixed sediment
6	SS.SMp.KSwSS	Kelp and seaweed communities on sublittoral sediment
7	SS.SMp.Mrl	Maerl beds
8	SS.SMu	Sublittoral mud
9	SS.SMu.CFiMu	Circalittoral fine mud
10	SS.SMx.CMx	Circalittoral mixed sediment
11	SS.SMx.CMx/CR	Circalittoral mixed sediment/Circalittoral rock (and other hard substrata)
12	SS.SSa	Sublittoral sands and muddy sands
13	SS.SSa.CMuSa/SS.SMu.CSaMu	Circalittoral muddy sand/Circalittoral sandy mud

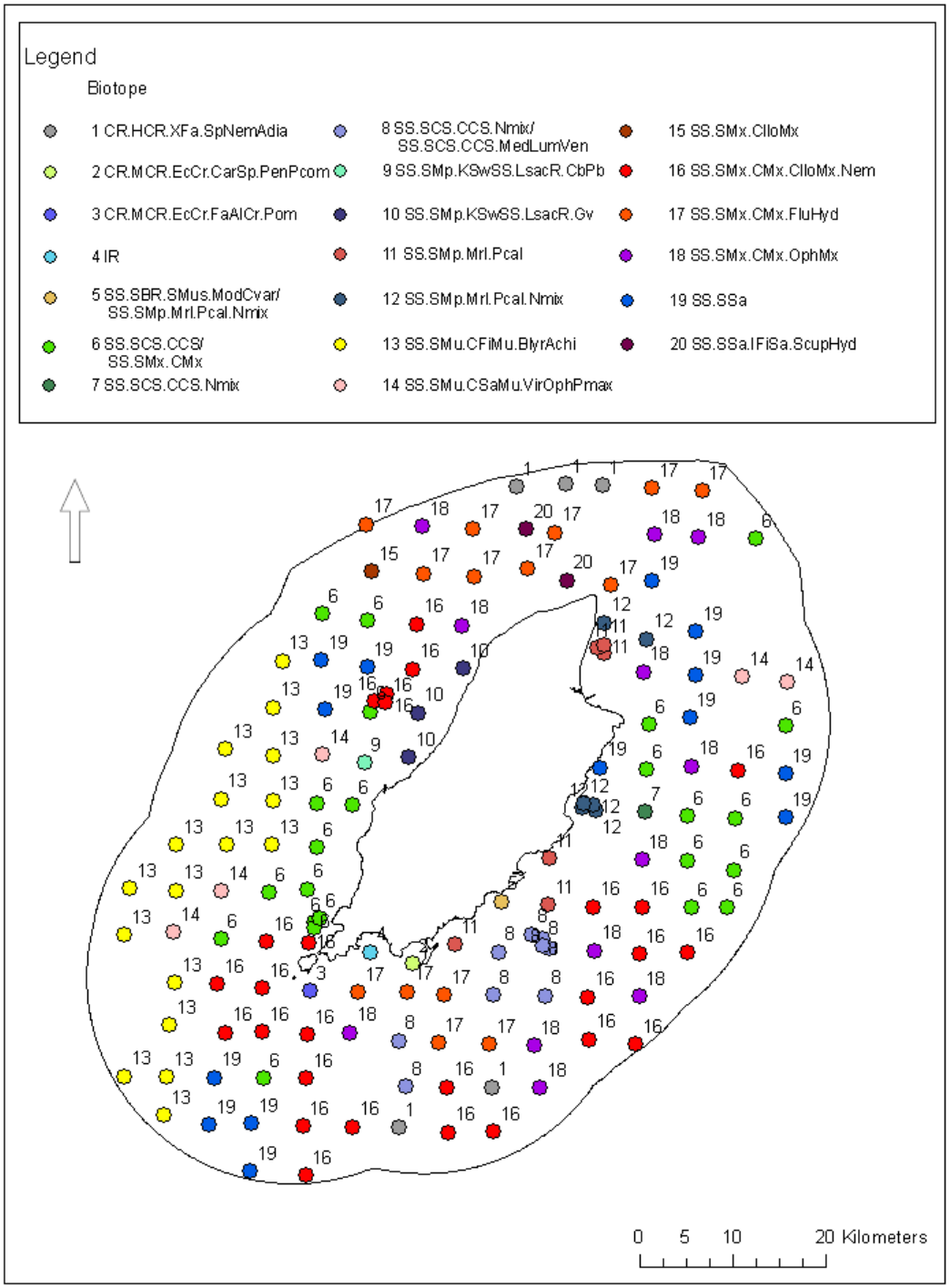

Figure 4. Distribution of biotopes, or the lowest applicable habitat classification, corresponding with the significant community groupings identified in benthic habitats around the Isle of Man, based on data collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Classifications were based on the Marine Habitat Classification for Britain and Ireland Version 04.05 (Connor et al., 2004). Map was generated using ArcGIS.

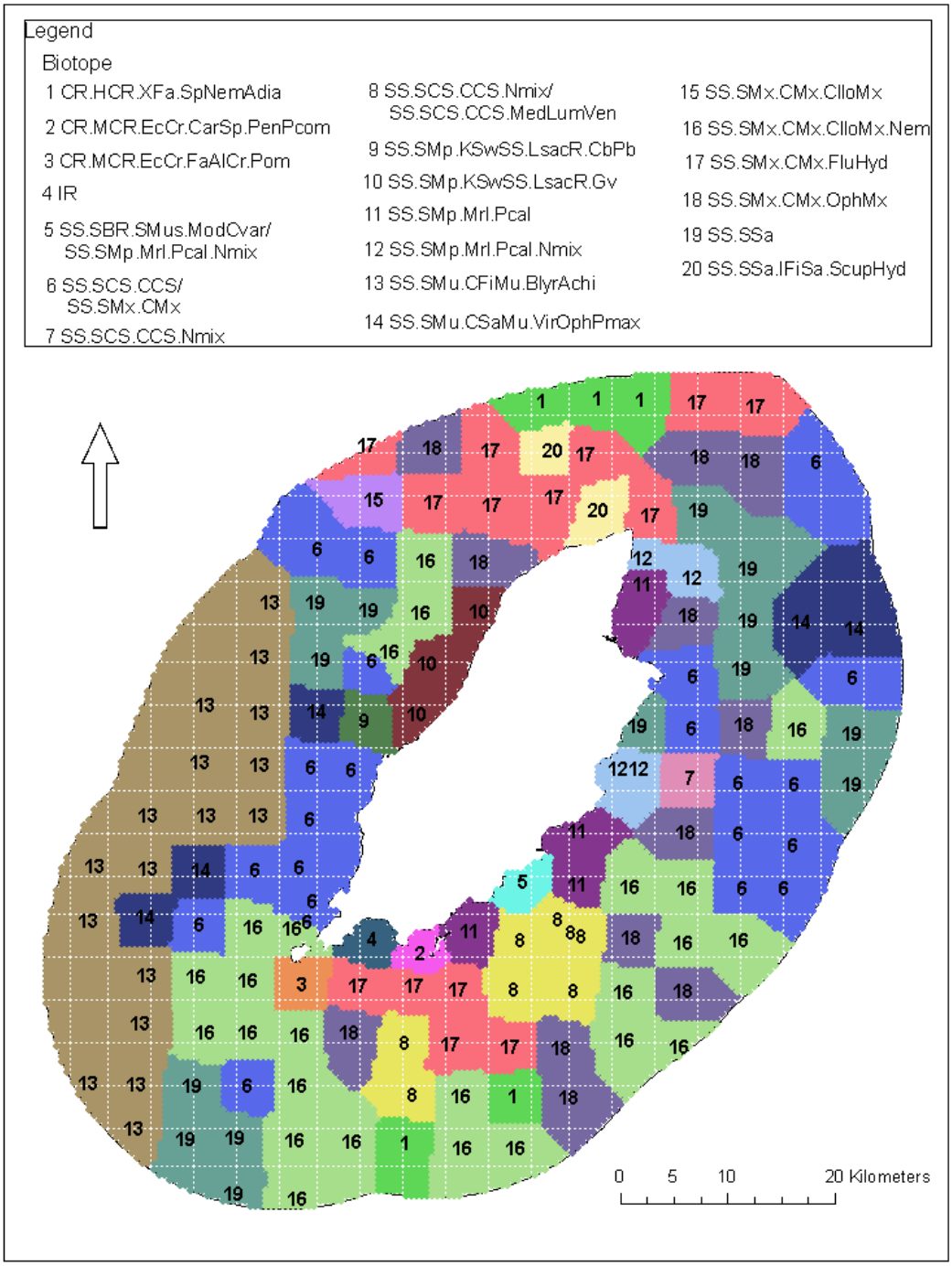

Figure 5. Distribution of biotopes, or the lowest applicable habitat classification, corresponding with the significant community groupings identified in benthic habitats around the Isle of Man, based on data collected during visual habitat surveys conducted within the 12 nautical mile territorial limit in 2008. Classifications were based on the Marine Habitat Classification for Britain and Ireland Version 04.05 (Connor et al., 2004). The area covered by each group was interpolated by first dividing the seabed within the 12 nautical mile territorial limit into 0.25 km^2 cells and then joining each 0.25km^2 cell to the nearest survey station. Biotope number labels correspond with the location of the survey stations. Map was generated using ArcGIS.

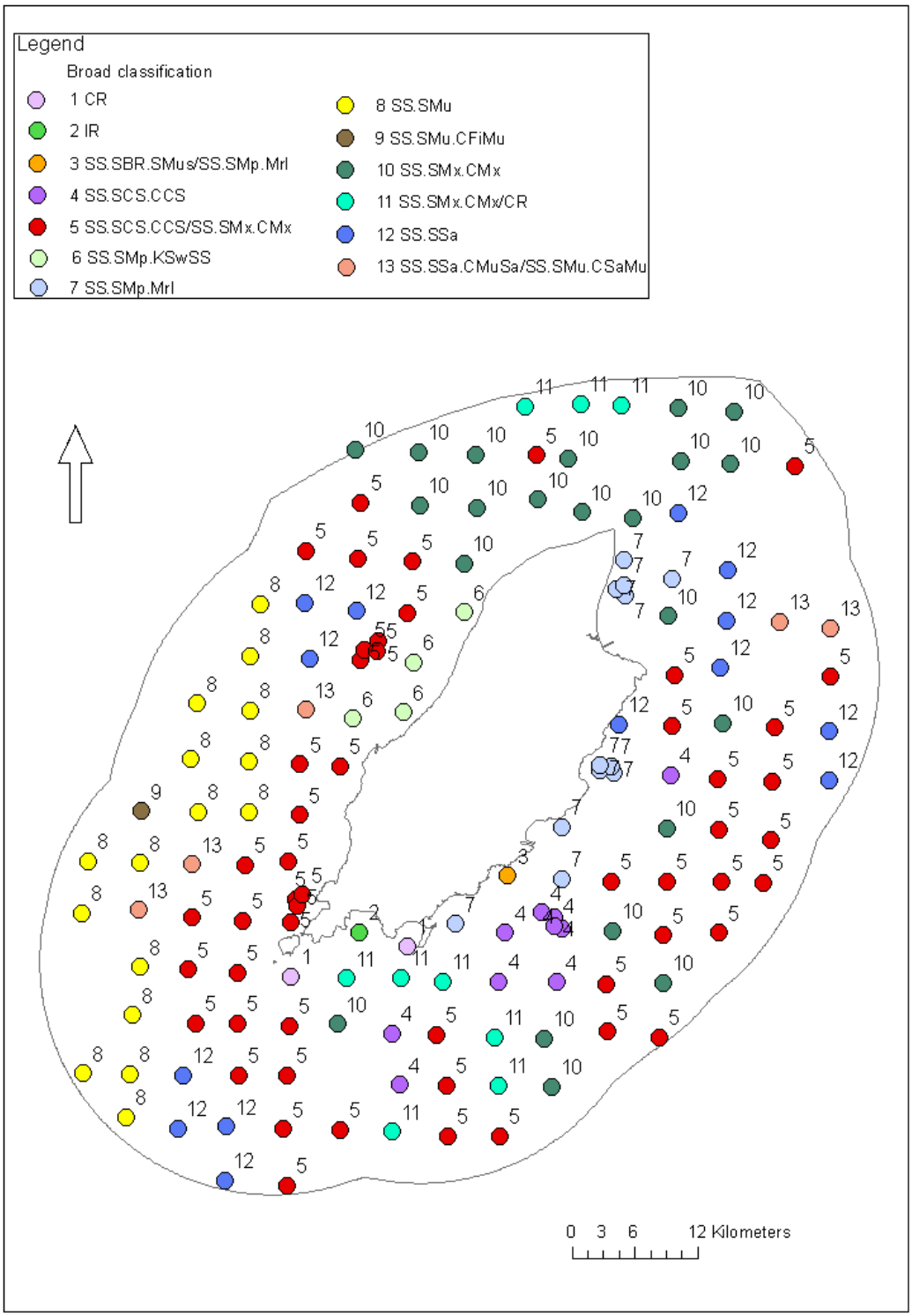

Figure 6. Distribution of broader habitat classifications corresponding with significant community groupings identified in benthic habitats around the Isle of Man based on data collected during visual habitat surveys conducted within the 12 nautical mile territorial limit in 2008. Classifications were based on the Marine Habitat Classification for Britain and Ireland Version 04.05 (Connor et al., 2004). Map was generated using ArcGIS.

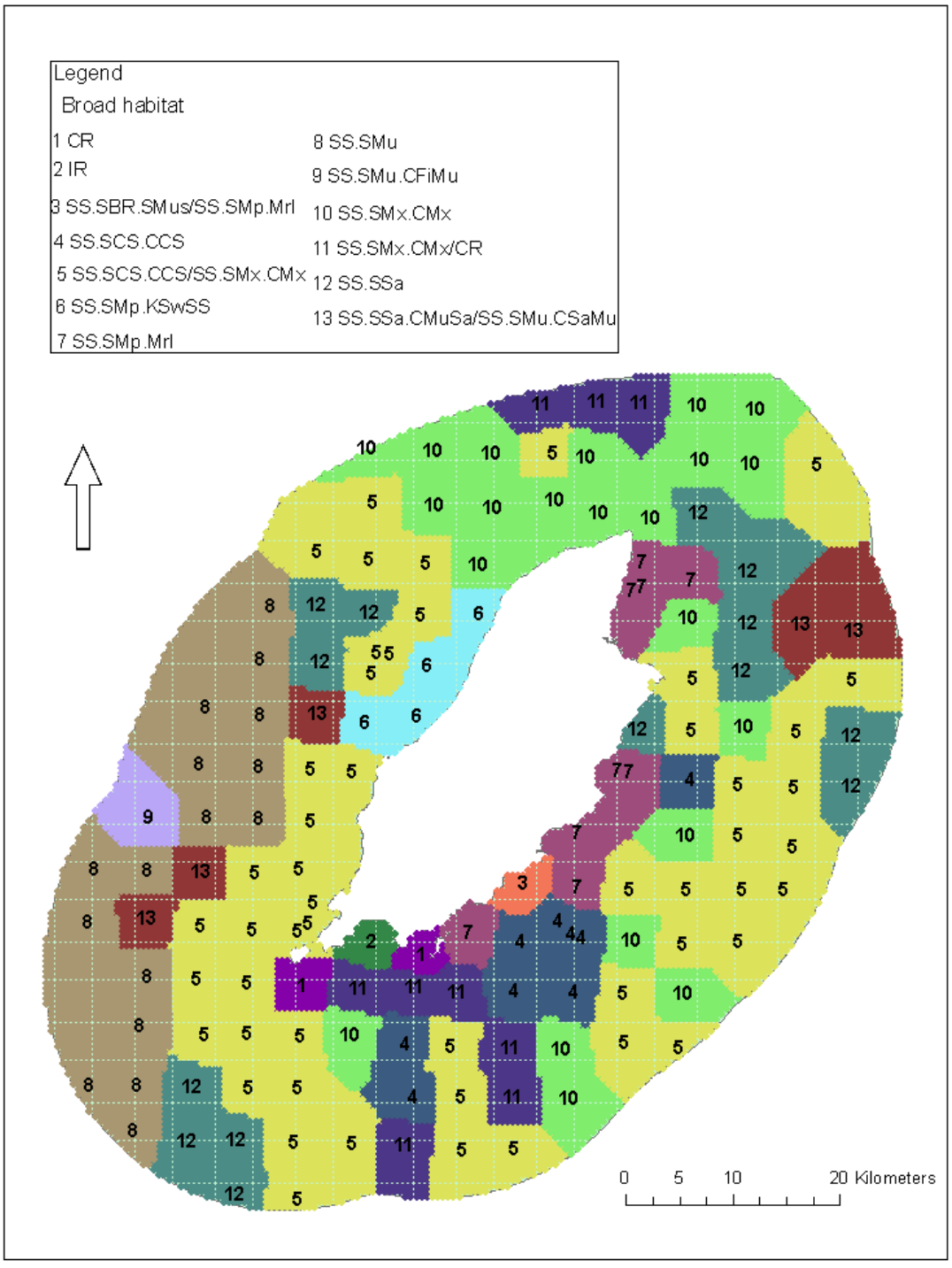

Figure 7. Distribution of broader habitat classifications corresponding with significant community groupings identified in benthic habitats around the Isle of Man based on data collected during visual habitat surveys conducted within the 12 nautical mile territorial limit in 2008. Classifications were based on the Marine Habitat Classification for Britain and Ireland Version 04.05 (Connor et al., 2004). The area covered by each group was interpolated by first dividing the seabed within the 12 nautical mile territorial limit into 0.25 km^2 cells and then joining each 0.25km^2 cell to the nearest survey station. Broader habitat number labels correspond with the location of the survey stations. Map was generated using ArcGIS.

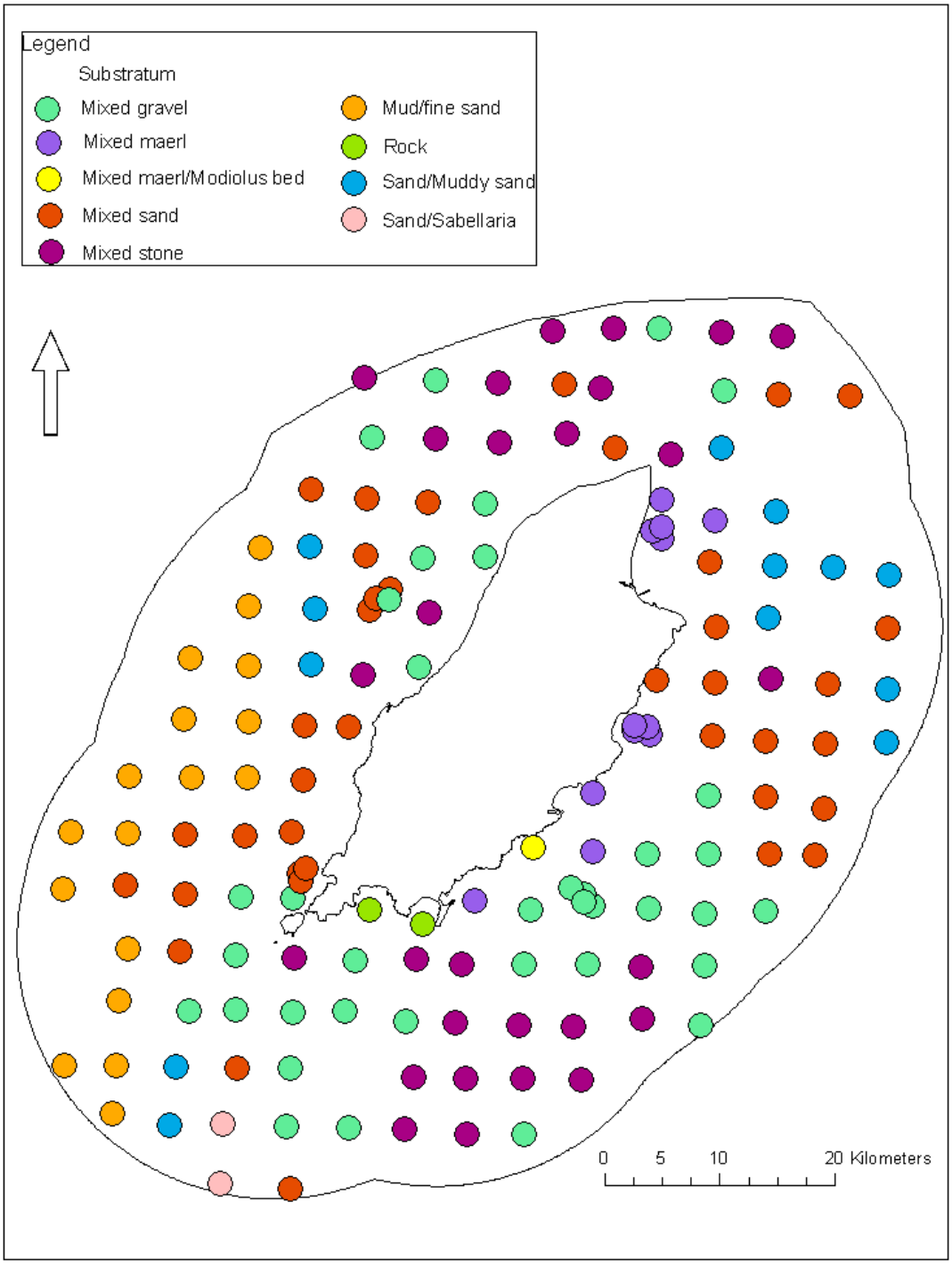

Figure 8. Distribution of different types of substrata in the Manx territorial sea as determined through image analysis and sediment particle size analysis derived from data that was collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Biogenic features of the substratum, including maerl beds, *Modiolus* beds, and *Sabellaria spinulosa* are indicated. Mixed sand: predominately sandy with notable shell or stone on the surface. Mixed gravel: predominately stone and/or shell gravel. Mixed stone: higher prevalence of pebbles, cobbles, and/or boulders. Rock: predominately bedrock and/or boulders. Mixed maerl: maerl with mixed sediments and/or shell. Map was generated using ArcGIS.

3.4 Features of conservation concern

Four main features of conservation concern were identified in the Manx territorial waters. Three of these features were maerl, formed by coralline algae, horse mussels *Modiolus modiolus*, and the ross worm *Sabellaria spinulosa,* each of which are capable of forming beds or biogenic reefs, which increase habitat structural complexity. The anemone *Edwardsia* sp. was also identified in some of the communities around the Isle of Man. In addition, biotope and habitat classifications corresponding with EU and UK conservation designations were identified.

3.4.1 *Edwardsia* sp.

The burrowing anemone *Edwardsia timida* is listed as a UK BAP priority species. While the occurrence of this particular species around the Isle of Man is uncertain based on photo analysis alone, individuals of the genus *Edwardsia* were recorded and were widely distributed around the island (Figure 9).

3.4.2 Maerl

Maerl beds, which develop as a result of the fragmentation of coralline red algae, are designated UK biodiversity action plan priority habitats and OSPAR priority habitats (Birkett et al., 1998). Two of the maerl forming species, *Phymatholithon calcareum* and *Liothothamnium coralloides,* are listed under Annex V of the EC Habitats Directive and are also listed as UK biodiversity action plan priority species. Thirteen stations located along the east coast of the island were classified as maerl habitats and, in accordance with the most appropriate biotope classification, the maerl forming species at these stations was identified as *Phymatholithon calcareum*. Stations 403, 404, 405 at the Ramsey Bay had high amounts of live maerl (Plate 1). Station 1 was also characterized by a high amount of live maerl, which was thick on the sediment surface. In other stations, broken maerl and/or dead maerl seemed to occur in higher proportions than at Ramsey and station 1. Station 18 in particular was characterized by predominately dead maerl. The distribution of stations with maerl is depicted in Figure 10.

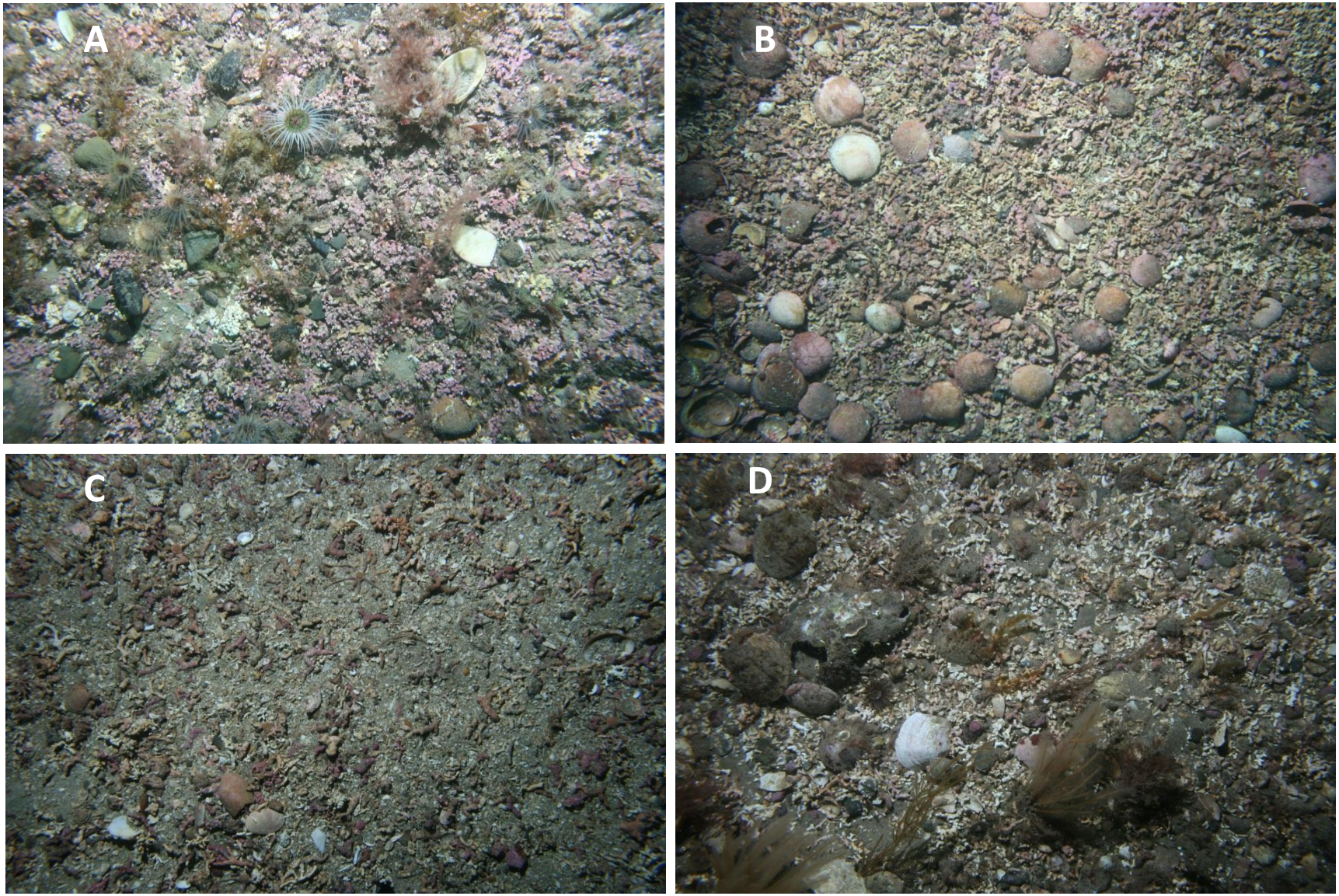

Plate 1. Examples of maerl habitats found in the Manx territorial sea. Images were captured during a visual habitat survey conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Maerl in good condition; A) Station 404, Ramsey Bay, B) Station 1. Habitat with almost equal amounts of live and dead maerl; C) Station 22. Mostly dead maerl; D) Station 18.

3.4.3 *Modiolus modiolus*

Modiolus beds are designated as UK BAP habitats and OSPAR priority habitats, and correspond with the listing of biogenic reefs under Annex I of the EC Habitats Directive. One *Modiolus modiolus* bed in good status was identified at station 23 south of Douglas (Plate 2). *Modiolus* was recorded at other stations, but did not occur in high enough abundance to form dense beds (Figure 11). *Modiolus* was recorded at station 71, which corresponds with a *Modiolus* bed documented during previous work off the Point of Ayre (Hinz et al., 2008). Photos which have not yet been analyzed for station 211 off the southeast coast indicated the occurrence of *Modiolus* in this area, which, along with the rocky substratum, appeared to support high numbers of the soft coral *Alcyonium digitatum.*

Plate 2. *Modiolus modiolus* bed located at survey station 23. Image was captured during a visual habitat survey conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008.

3.4.4 *Sabellaria spinulosa*

Sabellaria spinulosa reefs are designated as OSPAR priority habitats and are listed under Annex I of the EC Habitats Directive. *Sabellaria* reefs on sublittoral rock are listed as UK BAP habitats. Habitats supporting high numbers of *Sabellaria spinulosa* were found to the south of the island at stations 205 and 219 on sandy substrata (Figure 12). Aggregations of *Sabellaria* tubes occurred in clumps scattered over the sediment surface at these stations, rather than forming a dense reef (Plate 3). *Sabellaria* was also found in low numbers to the southeast of the island at station 221.

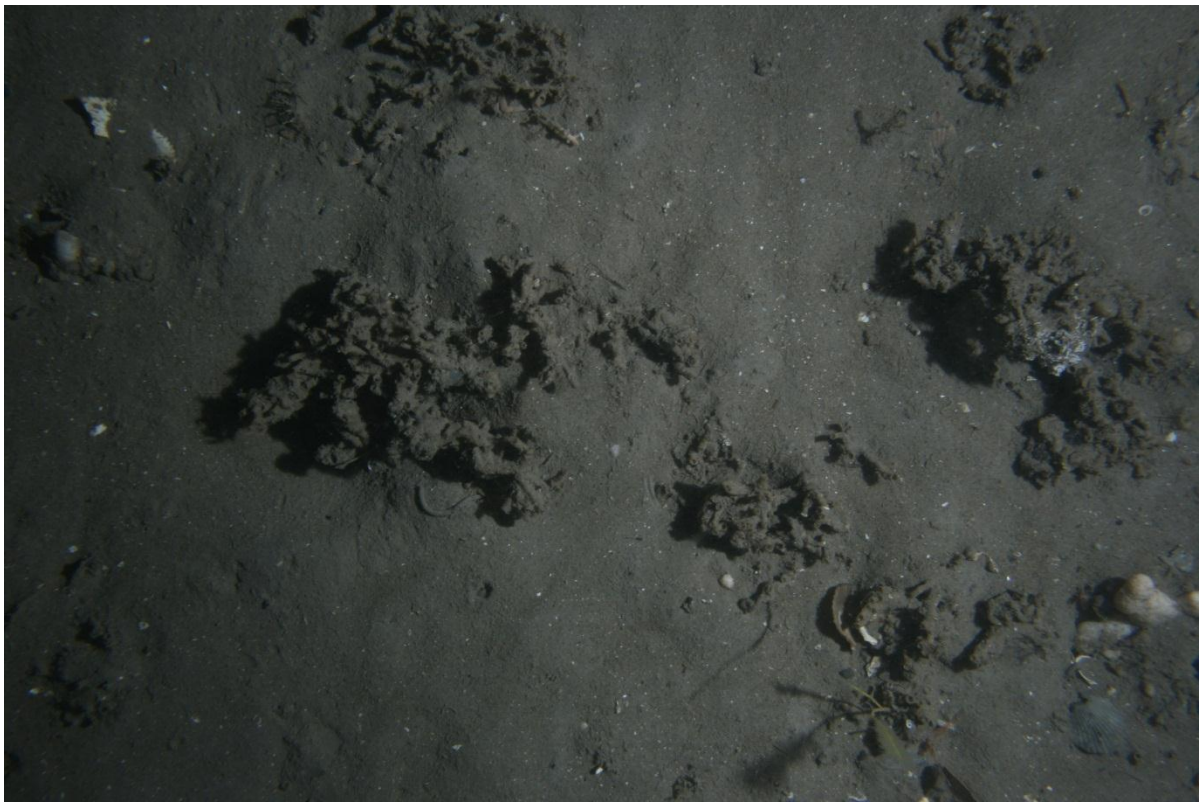

Plate 3. Clumps of *Sabellaria spinulosa* tubes located at survey station 205. Image was captured during a visual habitat survey conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008.

3.4.5 Habitat conservation designations

Conservation designations corresponding with each biotope and broad habitat classification are presented in Tables 5 and 6, according to the correlation table accompanying the habitat classification on the JNCC website (Joint Nature Conservation Committee, 2010a). Comments regarding the applicability of the designation to the Isle of Man are also included.

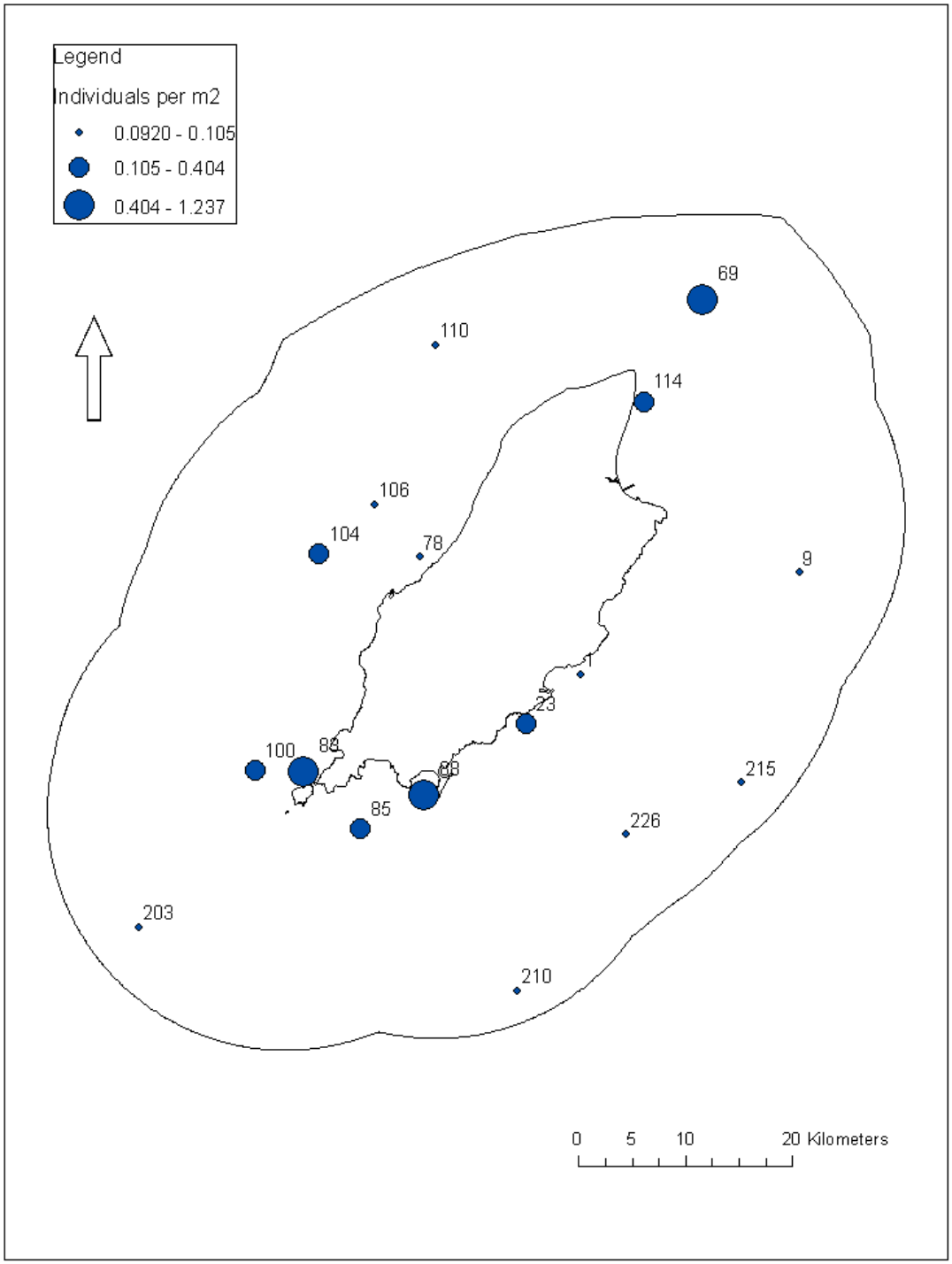

Figure 9. The distribution of stations where the anemone *Edwardsia* sp. was present and relative abundance of the taxon at each station. These stations were surveyed as part of a visual habitat survey conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Map was generated using ArcGIS.

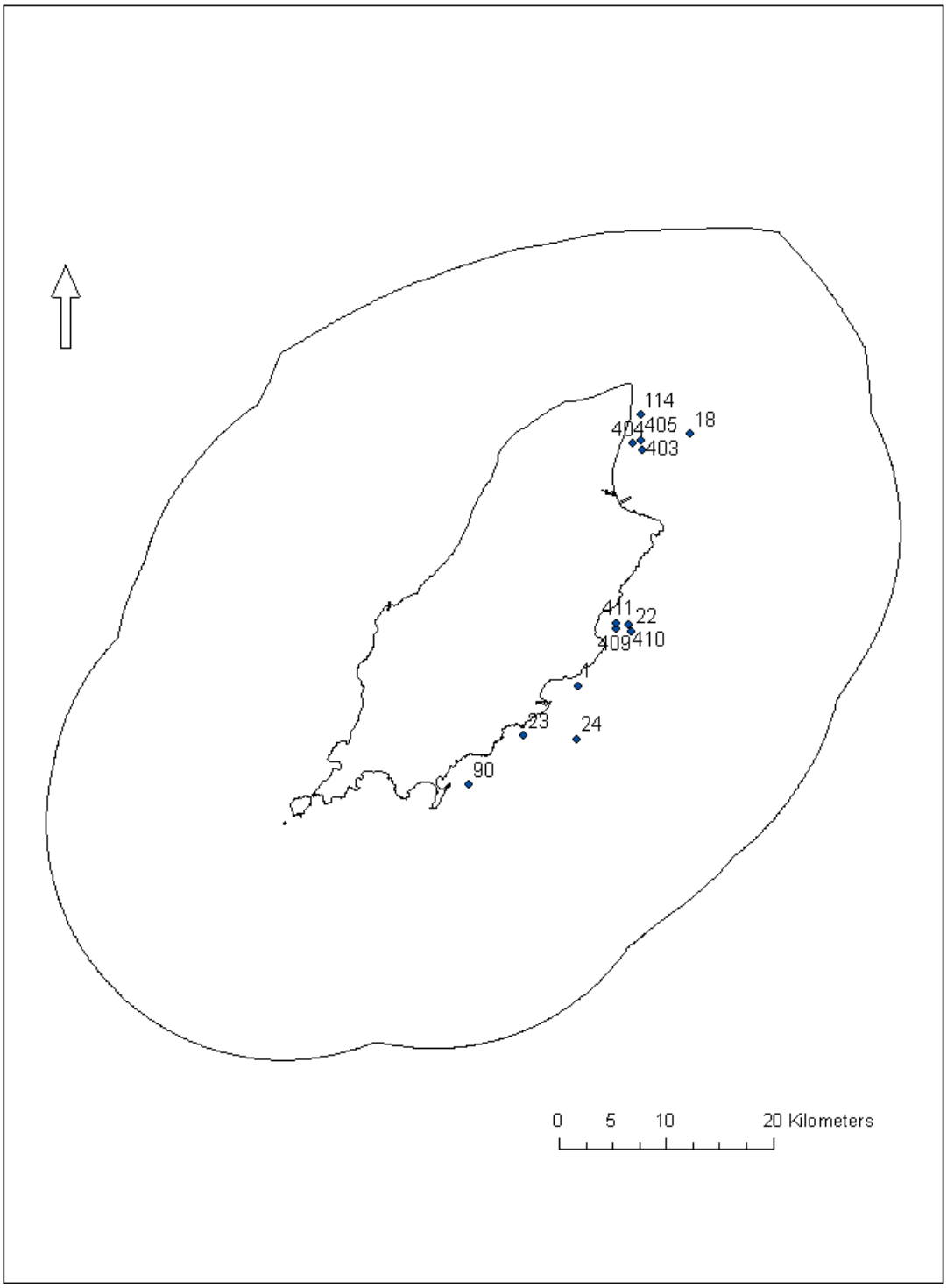

Figure 10. The distribution of stations characterized by the presence of maerl. These stations were surveyed as part of a visual habitat survey conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Map was generated using ArcGIS.

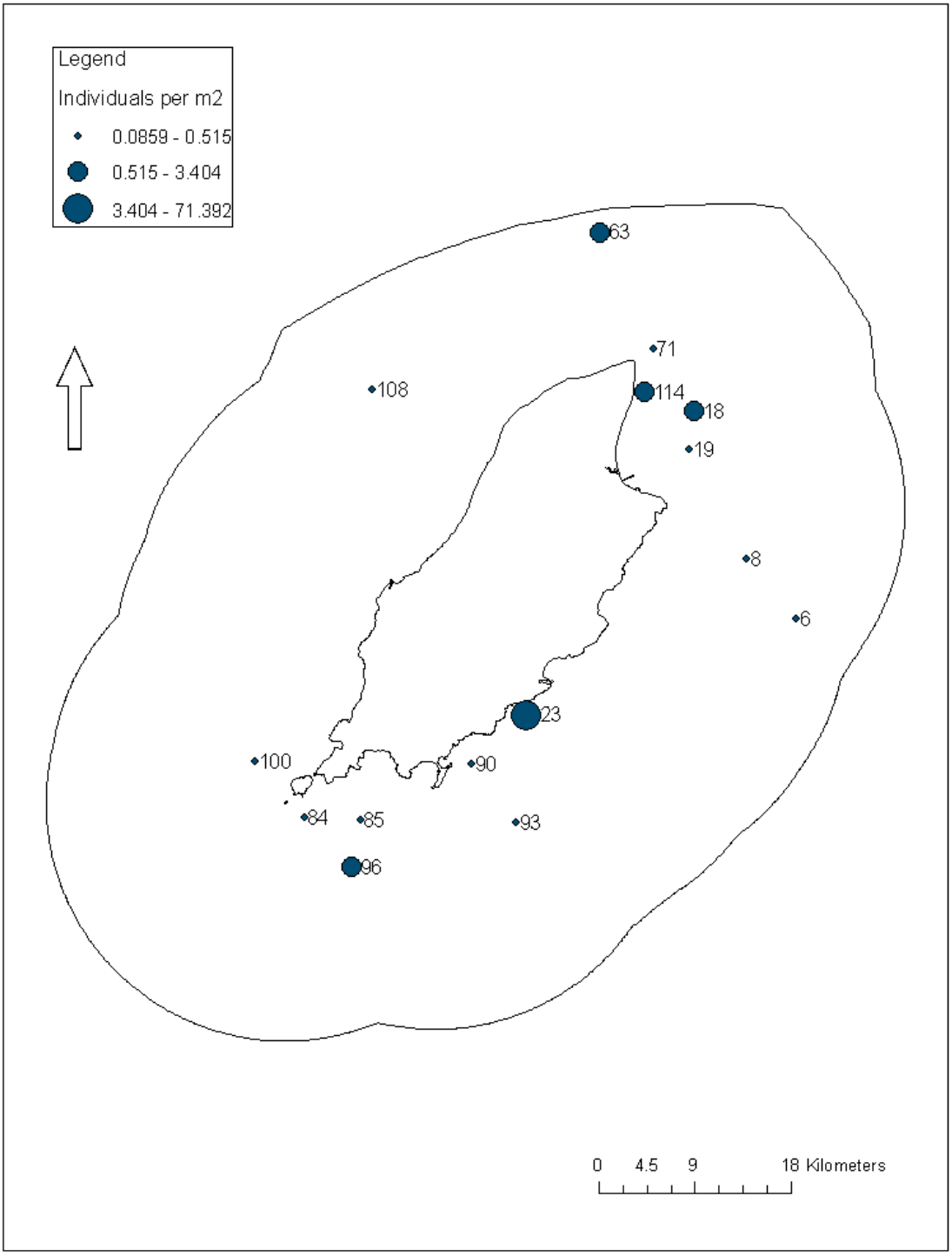

Figure 11. The distribution of stations where the horse mussel *Modiolus modiolus* was present and relative abundance of the species at each station. These stations were surveyed as part of a visual habitat survey conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Map was generated using ArcGIS.

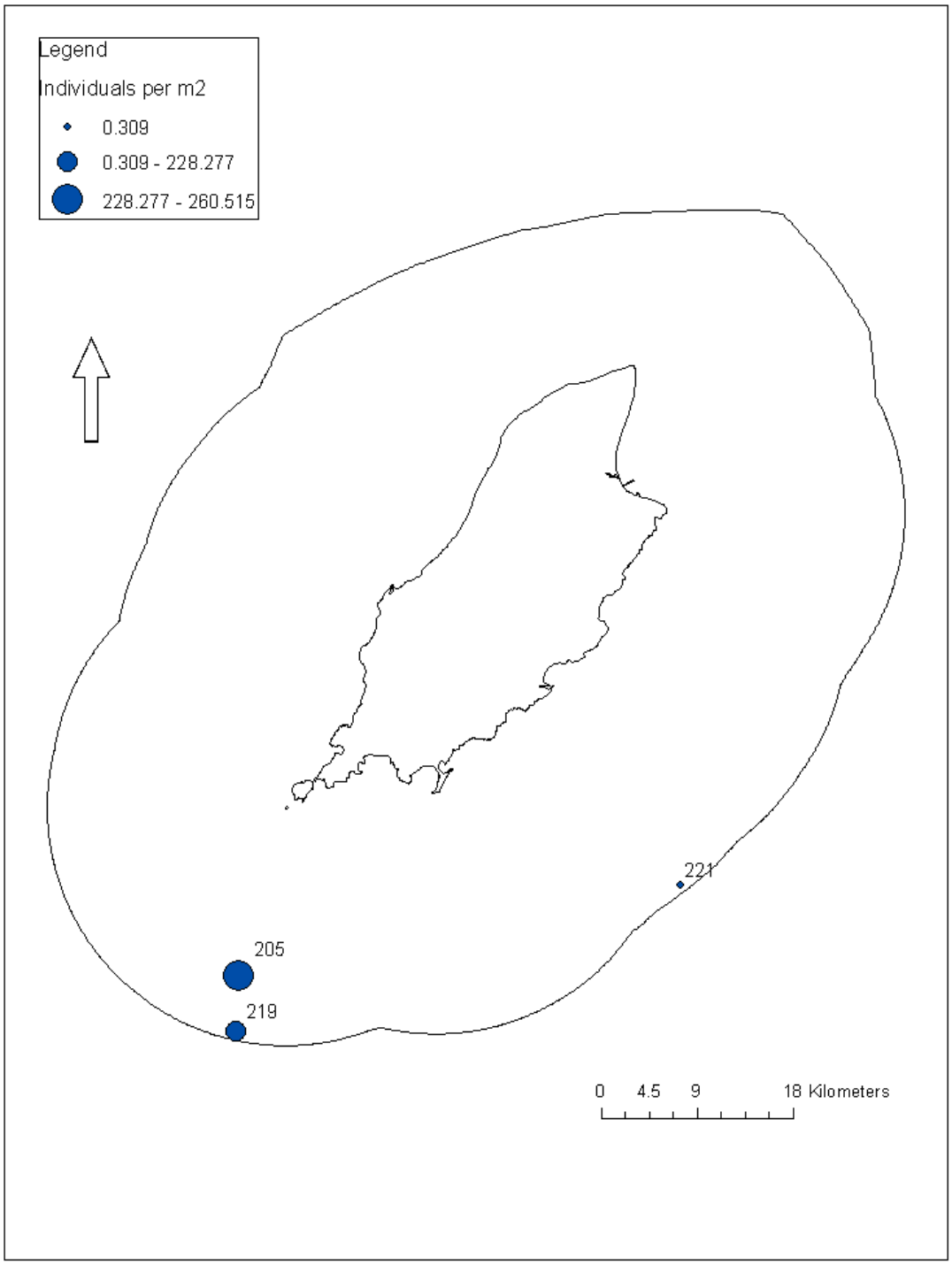

Figure 12. The distribution of stations where the ross worm *Sabellaria spinulosa* was present and relative abundance of the species at each station. These stations were surveyed as part of a visual habitat survey conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Map was generated using ArcGIS.

Table 5. Conservation designations corresponding with each biotope classification defined for the benthic communities identified around the Isle of Man are presented according to the correlation table accompanying the the Marine Habitat Classification for Britain and Ireland Version 04.05 on the JNCC website (Joint Nature Conservation Committee, 2010a). Comments regarding the applicability of the designation to the Isle of Man are also presented. Annex I habitat "Sandbanks which are slightly covered by sea water all the time" may be applicable to sandy habitats which occur at <20 m depth.

Biotope	UK BAP Habitat	Annex I Habitat	OSPAR Priority habitat	Applicability to Isle of Man
CR.HCR.XFa.SpNemAdia	-	Reefs	-	Rocky reef seemed most applicable to stations 208 and 211.
CR.MCR.EcCr.CarSp.PenPcom	-	Reefs	-	Applicable
CR.MCR.EcCr.FaAlCr.Pom	-	Reefs	-	Applicable
IR	-	Reefs	-	Applicable
SS.SBR.SMus.ModCvar/ SS.SMp.Mrl.Pcal.Nmix	Horse mussel beds/Maerl beds	Reefs (*Modiolus*) Sandbanks which are slightly covered by sea water all the time (Maerl)	*Modiolus modiolus* beds/ Maerl beds	-"Beds" applicable, "Reefs" potentially applicable. -"Sandbanks" potentially applicable as station 23 was close to the appropriate depth, however the substratum at station 23 was likely too coarse to be considered a sandbank.
SS.SCS.CCS/SS.SMx.CMx	Subtidal sands and gravels (SS.SCS.CCS)	Sandbanks which are slightly covered by sea water all the time (SS.SCS.CCS)	-	-Sands and gravels applicable -"Sandbanks" potentially applicable, but most stations characterized by these biotope complexes occurred at depths greater than 20 m.
SS.SCS.CCS.Nmix	Subtidal sands and gravels	Sandbanks which are slightly covered by sea water all the time (SS.SCS.CCS)	-	-Sands and gravels applicable -"Sand banks" potentially applicable, but the station represented by this classification occurred at a depth greater than 20 m.

Table 5 continued.

Biotope	UK BAP Habitat	Annex I Habitat	OSPAR Priority habitat	Applicability to Isle of Man
SS.SCS.CCS.Nmix/ SS.SCS.CCS.MedLumVen	Subtidal sands and gravels	Sandbanks which are slightly covered by sea water all the time (SS.SCS.CCS)	-	-Sands and gravels applicable -"Sandbanks" unlikely as stations represented by this classification occurred at depths greater than 20 m and were characterized by gravelly substrata.
SS.SMp.KSwSS.LsacR.CbPb	May occur in "tide-swept channels"	-	-	Potentially applicable
SS.SMp.KSwSS.LsacR.Gv	-	-	-	-
SS.SMp.Mrl.Pcal	Maerl beds	Sandbanks that are slightly covered by seawater all the time	Maerl beds	-Maerl applicable, though not all maerl habitats exhibited thick beds -"Sandbanks" unlikely as the substrata which occurred at the stations represented by this biotope had coarse components, including stones and shells, and may not be characteristic of sandbanks.
SS.SMp.Mrl.Pcal.Nmix	Maerl beds	Sandbanks that are slightly covered by seawater all the time	Maerl beds	-Maerl applicable, though not all maerl habitats exhibited thick beds "Sandbanks" is potentially applicable to stations 22, 409, 410, and 411. The substrata at the other stations represented by this biotope may have been too coarse.
SS.SMu.CFiMu.BlyrAchi	Mud habitats in deep water	-	-	Applicable
SS.SMu.CSaMu.VirOphPmax	Mud habitats in deep water	-	-	Applicable
SS.SMx.CMx.ClloMx	-	-	-	-

Table 5 continued.

Biotope	UK BAP Habitat	Annex I Habitat	OSPAR Priority habitat	Applicability to Isle of Man
SS.SMx.CMx.FluHyd	-	-	-	-
SS.SMx.CMx.OphMx	-	-	-	-
SS.SSa	Subtidal sands and gravels	Sandbanks which are slightly covered by sea water all the time (for sub-types within this broad habitat)	-	-Sands and gravels applicable -"Sandbanks" potentially applicable as some stations that were characterized by sand occurred at depths < 20 m.
SS.SSa.IFiSa.ScupHyd	Subtidal sands and gravels	Sandbanks which are slightly covered by sea water all the time (for sub-types within the biotope complex SS.SSa.IFiSa.ScupHyd)	-	-Sands and gravels applicable -"Sandbanks" potentially applicable to station 72, as this station occurred at < 20 m. "Sandbanks" is unlikely for station 112 as this station occurred deeper than 20 m and had both shells and stones on the sediment surface, which might not be characteristic of a sandbank habitat.

Table 6. Conservation designations corresponding with each broader habitat classification defined for the benthic communities identified around the Isle of Man are presented according to the correlation table accompanying the the Marine Habitat Classification for Britain and Ireland Version 04.05 on the JNCC website (Joint Nature Conservation Committee, 2010a). Comments regarding the applicability of the designation to the Isle of Man are also presented. Annex I habitat "Sandbanks which are slightly covered by sea water all the time" may be applicable to sand habitats which occur at <20 m depth.

Broad habitat	UK BAP Habitat	Annex I Habitat	OSPAR Priority habitat	Applicability to Isle of Man
CR	-	Reefs	-	Applicable
IR	-	Reefs	-	Applicable
SS.SBR.SMus/SS.SMp.Mrl	Maerl beds	Reefs/Sandbanks which are slightly covered by sea water all the time	Maerl beds	-"Beds" applicable, "Reefs" potentially applicable -"Sandbanks" potentially applicable as station 23 was close to the appropriate depth, however the substratum at station 23 was likely too coarse to be considered a sandbank.
SS.SCS.CCS	Subtidal sands and gravels	Sandbanks which are slightly covered by sea water all the time	-	-Sands and gravels applicable -"Sandbanks" unlikely as most stations characterized by this biotope complex occurred at depths greater than 20 m and on substrata that were too coarse to be considered a sandbank
SS.SCS.CCS/SS.SMx.CMx	Subtidal sands and gravels (SS.SCS.CCS)	Sandbanks which are slightly covered by sea water all the time (SS.SCS.CCS)	-	-Sands and gravels applicable -"Sandbanks" potentially applicable, but most stations characterized by these biotope complexes occurred at depths greater than 20 m and on substrata that may have been too coarse to be considered a sandbank
SS.SMp.KSwSS	-	-	-	-

Table 6 continued.

Broad habitat	UK BAP Habitat	Annex I Habitat	OSPAR Priority habitat	Applicability to Isle of Man
SS.SMp.Mrl	Maerl beds	Sandbanks which are slightly covered by sea water all the time	Maerl beds	-Maerl applicable, though not all maerl habitats exhibited thick beds -"Sandbanks" potentially applicable to some stations characterized by this broad habitat. Most applicable to stations 22, 409, 410, and 411.
SS.SMu	-	-	-	-
SS.SMu.CFiMu	Mud habitats in deep water	-	-	Applicable
SS.SMx.CMx	-	-	-	-
SS.SMx.CMx/CR	-	Reefs (CR)	-	Applicable
SS.SSa	Subtidal sands and gravels	Sandbanks which are slightly covered by sea water all the time	-	-Sands and gravels applicable -"Sandbanks" potentially applicable as some stations that were characterized by sand occurred at depths <20 m.
SS.SSa.CMuSa/SS.SMu.CSaMu	Subtidal sands and gravels/Mud habitats in deep water	Sandbanks which are slightly covered by sea water all the time (SS.SSa.CMuSa)	-	-Sands and gravels potentially applicable -"Sandbanks" unlikely as stations characterized by these biotope complexes occurred at depths greater than 20 m.

3.5 Fishing effort in identified communities, biotopes, and broad habitats

Summaries of the descriptive statistics for fishing effort records falling within 2 km buffer zones around the stations in each community group, biotope, and broader habitat are presented in Tables 7, 8, and 9, respectively. The data are presented graphically for ease of interpretation in Figures 13 and 14 for communities, in Figures 15 and 16 for biotopes, and Figures 17 and 18 for broader habitats.

The maximum fishing effort was recorded for Group r, biotope 16, and broad habitat 5, which were each represented by the highest number of stations. The mean fishing effort in these groups was higher than most, but had a high degree of associated variance. Group p, biotope 4, and broad habitats 2 and 9 exhibited the highest mean fishing effort and each of these groups was represented by only one or two stations. The lowest mean fishing effort was recorded for Group aj, biotope 20, and broad habitat 6, which were represented by only one, two, and four stations, respectively.

Table 7. Summary of the descriptive statistics for fishing effort records falling within 2 km buffer zones around the survey stations corresponding with each of 40 benthic community groups identified in the Manx territorial sea. Community data were collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Fishing effort was measured as the total number of Vessel Monitoring System (VMS) records km^{-2} documented for the years 2008-2010. SE represents the standard error of the mean.

Group	No. Stations	Minimum	1st Quartile	Median	Mean	SE	3rd Quartile	Maximum	Variance
a	16	1.591	24.590	41.060	39.790	0.662	54.990	84.990	351.615
aa	4	0	0.318	0.637	3.697	0.657	1.273	50.290	88.489
ab	2	2.228	6.366	14.640	20.870	1.676	34.700	59.520	283.814
ac	1	0	0.637	0.955	0.980	0.062	1.273	1.910	0.194
ad	3	0.318	1.273	3.183	5.916	1.011	8.594	29.280	41.942
ae	1	0	1.353	6.207	14.430	2.508	23.790	50.930	264.155
af	5	0.637	4.138	6.684	15.090	1.285	17.830	100.900	413.080
ag	2	2.546	11.460	15.920	15.700	0.674	20.690	36.290	47.290
ah	3	6.684	20.050	27.690	26.120	0.663	32.230	42.650	59.846
ai	7	0	1.591	14.960	23.150	1.544	31.190	120.300	755.796
aj	1	0	0	0	0.069	0.024	0.000	0.637	0.030
ak	1	0	0	0.318	0.363	0.082	0.637	3.820	0.339
al	4	0	0.637	5.570	18.760	2.076	23.000	125.400	844.709
am	4	4.775	19.890	27.370	30.940	1.267	39.950	75.440	255.174
an	4	0	2.228	6.684	8.806	0.619	12.570	54.110	76.150
b	1	0	0	0.318	0.300	0.045	0.637	1.237	0.103
c	1	0	0	0	0.141	0.022	0.318	0.318	0.025
d	3	0	2.865	13.690	23.320	1.851	45.520	75.760	517.507
e	2	0	0.637	2.546	35.690	5.359	51.410	178.600	2958.002
f	2	0	0	0.318	0.262	0.024	0.318	0.955	0.058
g	2	0.318	1.273	6.366	9.054	0.973	13.690	50.930	93.729
h	1	0	0	0.318	1.398	0.450	0.955	15.600	10.307
i	3	0	0	0	1.276	0.478	0.000	38.520	31.486
j	6	0	0.318	2.546	9.566	0.788	13.690	57.930	189.246
k	5	0	14.560	27.370	27.190	1.499	39.390	66.210	242.514
l	2	0.318	2.546	3.820	4.562	0.337	5.730	14.640	9.898

Table 7 continued.

Group	No. Stations	Minimum	1st Quartile	Median	Mean	SE	3rd Quartile	Maximum	Variance
m	4	1.273	13.210	34.380	33.350	1.486	49.970	80.530	437.028
n	4	0	8.594	18.460	23.480	1.238	35.170	71.300	312.812
o	3	1.591	42.970	54.110	78.310	4.600	88.970	235.200	3194.669
p	2	3.183	73.689	84.511	89.903	5.674	107.111	150.242	1030.254
q	3	10.500	22.440	29.440	32.230	1.895	37.880	74.480	222.623
r	21	2.547	29.921	65.254	77.139	2.254	110.772	661.766	4913.603
s	11	0	4.456	12.100	13.980	0.591	17.190	93.580	192.034
t	2	0	0.637	18.300	42.840	5.308	83.480	147.100	2592.481
u	2	0	5.491	15.120	42.060	5.100	65.730	184.300	2653.399
v	3	0	0.318	0.955	6.010	0.967	4.934	54.110	133.810
w	2	0	0.637	8.117	10.280	1.135	14.720	45.840	113.425
x	1	0	0.318	0.637	2.534	0.687	1.910	28.010	24.086
y	4	0	0.637	1.273	7.638	0.804	8.594	38.520	132.481
z	1	0	0.955	1.591	2.578	0.412	2.706	13.690	8.662

Table 8. Summary of the descriptive statistics for fishing effort records falling within 2 km buffer zones around the stations corresponding with each of 20 biotopes identified in the Manx territorial sea. Biotope classifications were based on data collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Fishing effort was measured as the total number of Vessel Monitoring System (VMS) records km^{-2} documented for the years 2008-2010. SE represents the standard error of the mean.

Biotope	No. Stations	Minimum	1st Quartile	Median	Mean	SE	3rd Quartile	Maximum	Variance
1	5	0.637	4.138	6.684	15.090	1.285	17.830	100.900	413.080
2	1	0	0.318	0.478	2.602	0.908	1.671	24.190	32.983
3	1	0	0.318	0.637	2.534	0.687	1.910	28.010	24.086
4	1	0	19.740	51.880	71.010	8.301	126.100	178.600	3514.089
5	1	0	1.353	6.207	14.430	2.508	23.790	50.930	264.155
6	22	0	7.003	16.870	30.001	1.132	42.335	235.231	1322.810
7	1	6.684	15.760	24.510	24.800	1.524	32.310	46.150	118.484
8	9	0	0.955	4.138	11.280	0.765	17.350	59.520	203.082
9	1	0	0	0.318	1.398	0.450	0.955	15.600	10.307
10	3	0	0	0	1.276	0.478	0.000	38.520	31.486
11	6	0	1.114	7.321	14.160	1.176	22.440	66.210	264.014
12	6	0	1.910	24.830	30.630	2.197	54.110	96.130	839.556
13	17	1.591	25.460	41.700	40.460	0.634	55.390	84.990	343.362
14	5	0	0.955	3.501	11.420	0.897	21.330	57.930	205.375
15	1	0.955	10.190	18.140	19.640	1.797	26.580	49.970	164.624
16	27	0	20.531	42.335	64.871	1.924	98.994	661.766	4497.466
17	14	0	0.318	0.637	10.680	0.848	9.868	120.300	483.753
18	12	0	1.591	9.868	16.750	0.870	23.240	125.400	451.548
19	14	0	1.273	6.684	17.650	1.189	18.940	184.300	960.103
20	2	0	0	0.637	0.683	0.070	0.955	2.865	0.509

Table 9. Summary of the descriptive statistics for fishing effort records falling within 2 km buffer zones around the stations corresponding with each of 13 habitats identified in the Manx territorial sea. Habitat classifications were based on data collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Fishing effort was measured as the total number of Vessel Monitoring System (VMS) records km^{-2} documented for the years 2008-2010. SE represents the standard error of the mean.

Broad	No. Stations	Minimum	1st Quartile	Median	Mean	SE	3rd Quartile	Maximum	Variance
1	2	0	0.318	0.637	2.564	0.551	0.318	28.011	27.675
2	1	0	19.735	51.885	71.008	8.301	126.051	178.572	3514.089
3	1	0	1.353	6.207	14.430	2.508	23.794	50.930	264.155
4	10	0	1.273	6.207	13.017	0.730	22.759	59.524	212.384
5	52	0	11.141	27.056	46.177	1.161	62.946	661.766	3237.895
6	4	0	0	0	1.309	0.369	0.318	38.516	25.689
7	12	0	1.273	12.096	22.012	1.287	39.152	96.130	604.686
8	16	1.592	24.589	41.062	39.794	0.662	54.988	84.989	351.615
9	1	34.696	43.927	50.293	50.980	1.386	57.137	75.758	98.036
10	22	0	0.318	4.456	15.389	0.706	21.645	125.414	531.197
11	9	0	0.637	3.501	9.956	0.810	9.231	100.904	298.510
12	14	0	1.273	6.685	17.647	1.189	18.939	184.301	960.103
13	5	0	0.955	3.501	11.423	0.897	21.327	57.932	205.375

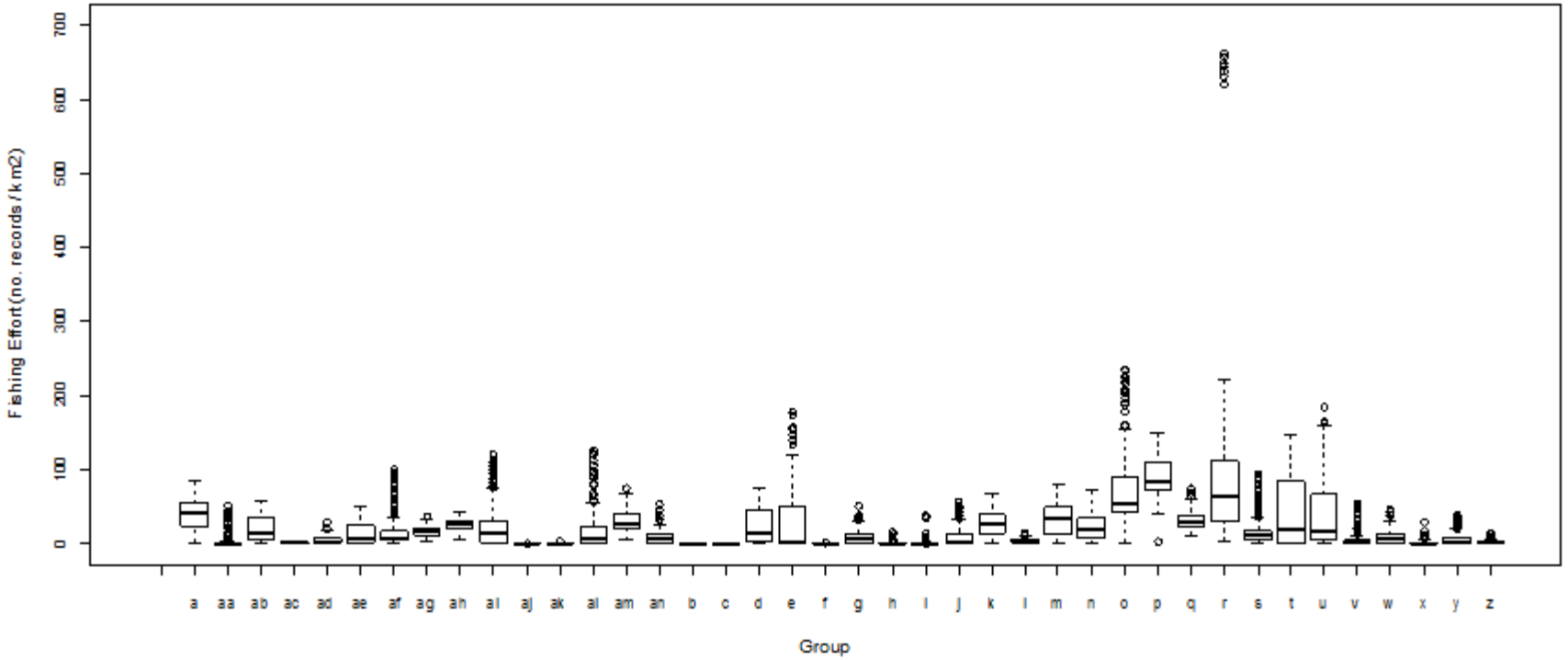

Figure 13. Boxplots depicting the range of fishing effort corresponding with the stations characterized by 40 benthic community groups identified in Manx territorial waters. Fishing effort represents all of the fishing effort records falling within 2 km buffer zones around the stations represented by each group. Community data were collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Fishing effort was measured as the total number of Vessel Monitoring System (VMS) records km^{-2} documented for the years 2008-2010.

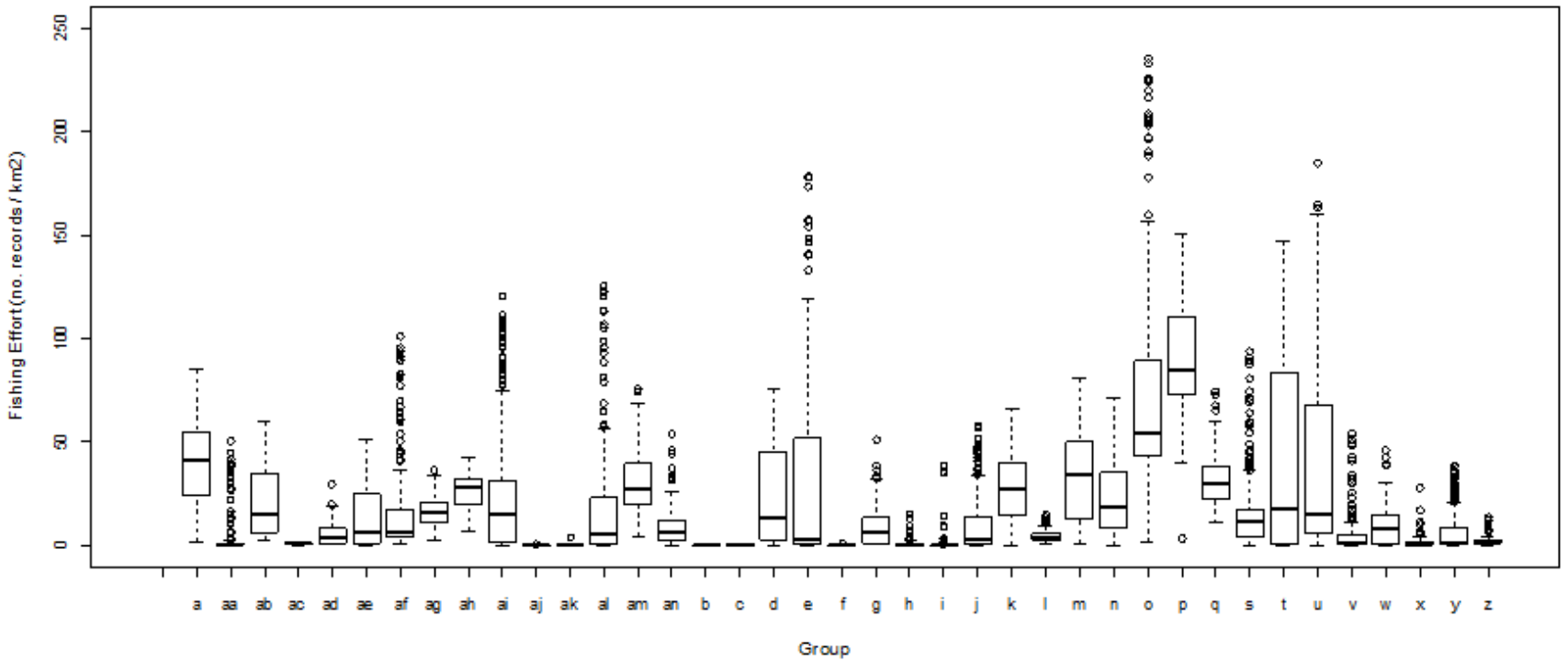

Figure 14. Boxplots depicting the range of fishing effort corresponding with the stations characterized by 39 benthic community groups identified in Manx territorial waters (community Group r was removed to allow for better visual interpretation of the data). Fishing effort represents all of the fishing effort records falling within 2 km buffer zones around the stations represented by each group. Community data were collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Fishing effort was measured as the total number of Vessel Monitoring System (VMS) records km^{-2} documented for the years 2008-2010.

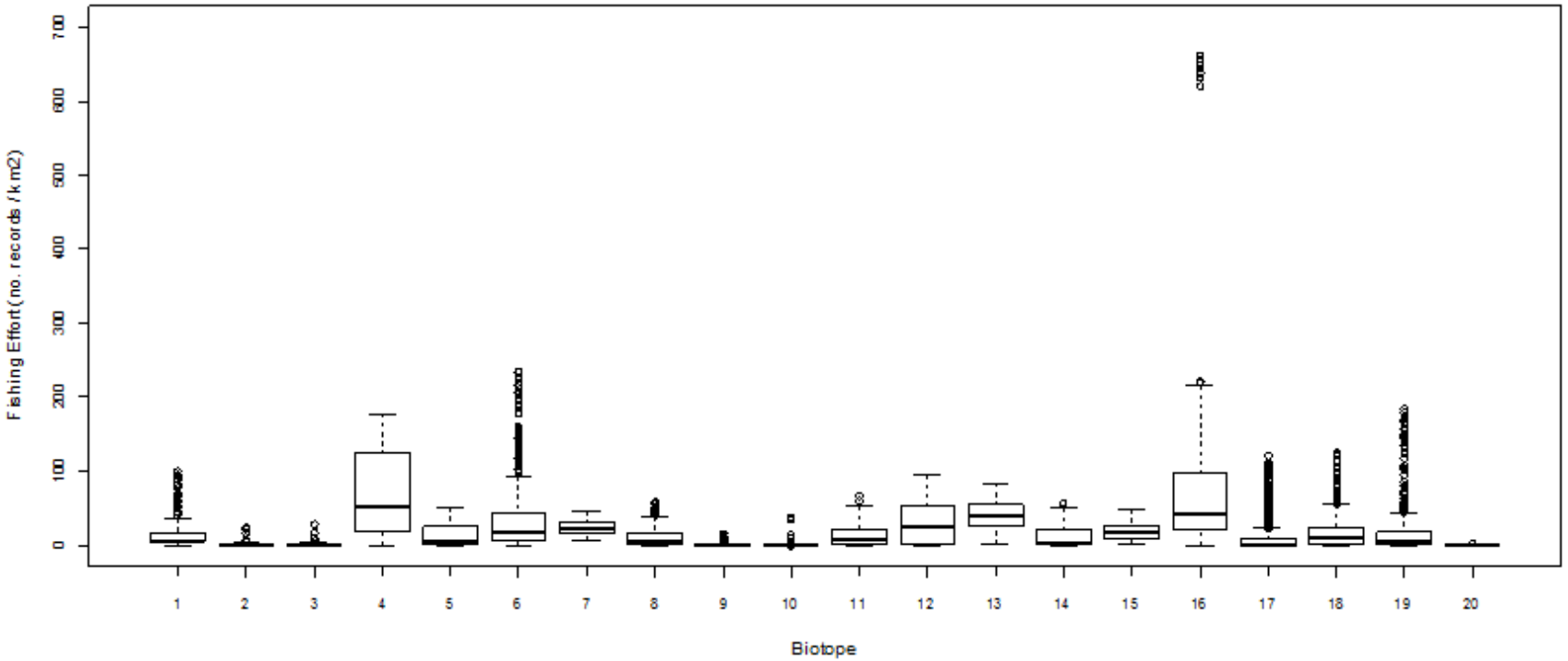

Figure 15. Boxplots depicting the range of fishing effort corresponding with the stations characterized by 20 separate biotopes identified in Manx territorial waters. Fishing effort represents all of the fishing effort records falling within 2 km buffer zones around the stations represented by each biotope. Biotope classifications were based on data that were collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Fishing effort was measured as the total number of Vessel Monitoring System (VMS) records km^{-2} documented for the years 2008-2010.

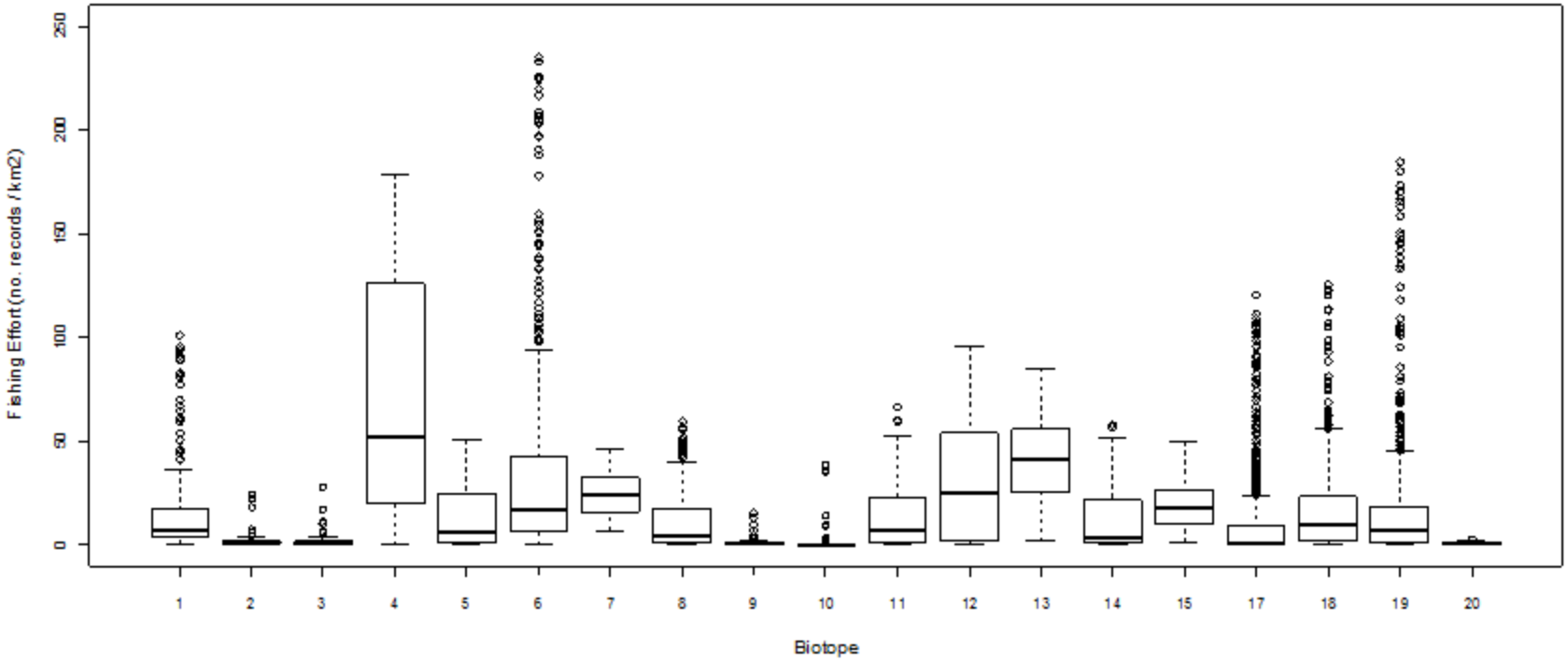

Figure 16. Boxplots depicting the range of fishing effort corresponding with the stations characterized by 19 separate biotopes identified in Manx territorial waters (biotope 16 was removed to allow for better visual interpretation of the data). Biotope classifications were based on data that were collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Fishing effort represents all of the fishing effort records falling within 2 km buffer zones around the stations represented by each biotope. Fishing effort was measured as the total number of Vessel Monitoring System (VMS) records km^{-2} documented for the years 2008-2010.

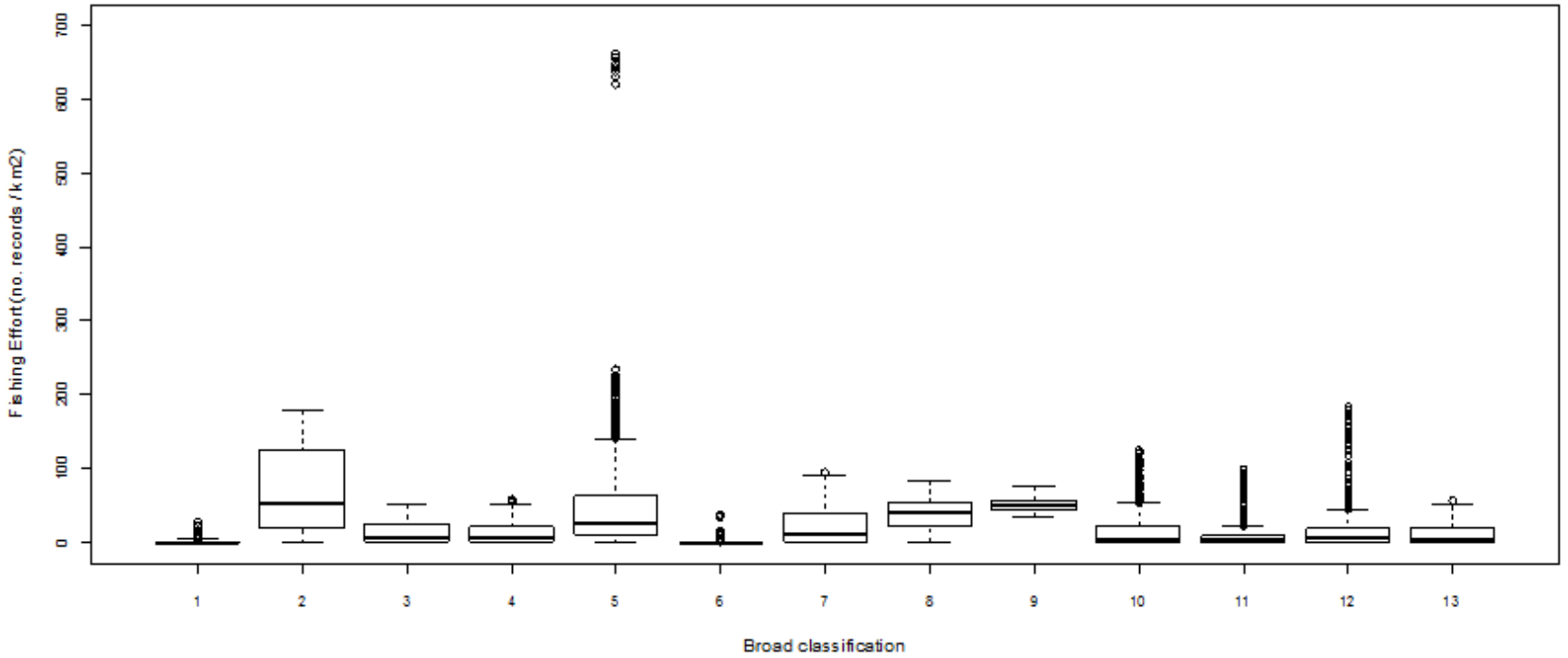

Figure 17. Boxplots depicting the range of fishing effort corresponding with the stations characterized by 13 broad habitats identified in Manx territorial waters. Broad habitat classifications were based on data that were collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Fishing effort represents all of the fishing effort records falling within 2 km buffer zones around the stations represented by each broad habitat. Fishing effort was measured as the total number of Vessel Monitoring System (VMS) records km^{-2} documented for the years 2008-2010.

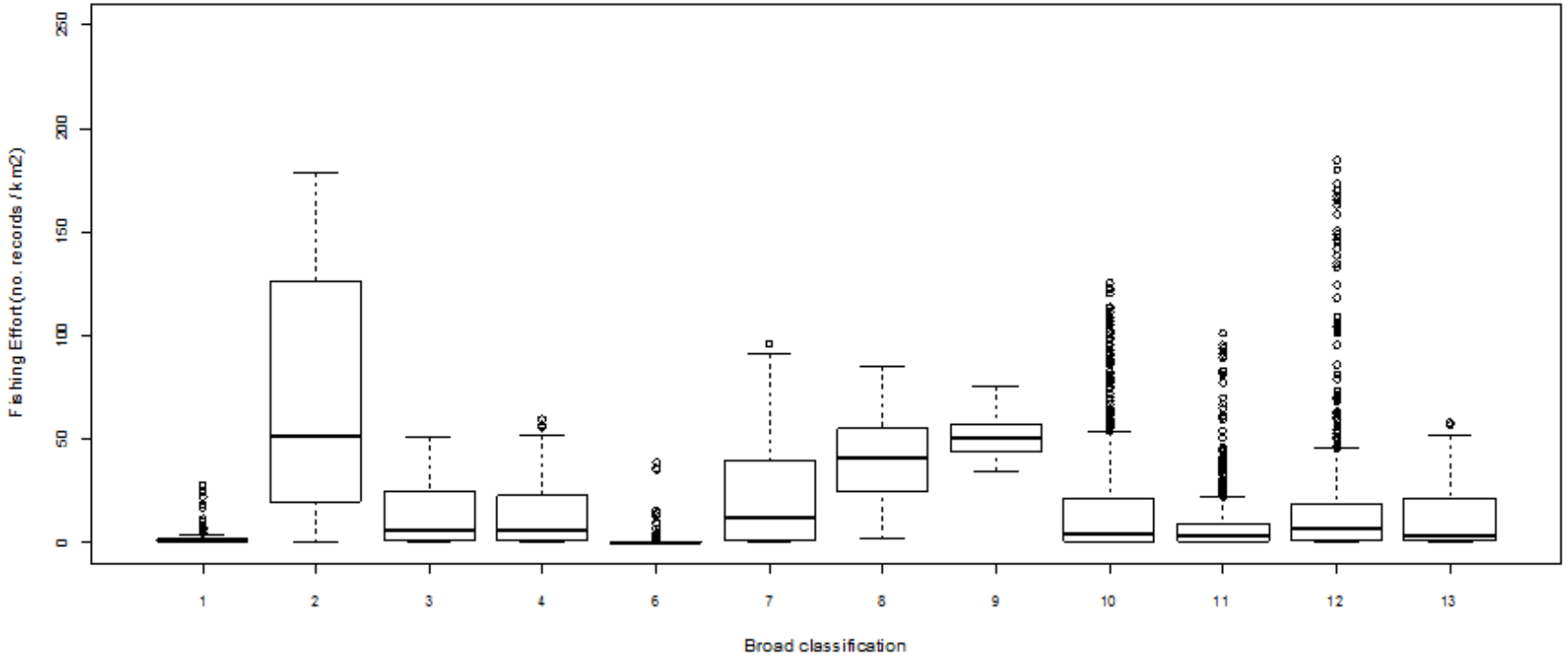

Figure 18. Boxplots depicting the range of fishing effort corresponding with the stations characterized by 12 broad habitats identified in Manx territorial waters (broad habitat 5 was removed to allow for better visual interpretation of the data). Broad habitat classifications were based on data that were collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. Fishing effort represents all of the fishing effort records falling within 2 km buffer zones around the stations in each group. Fishing effort was measured as the total number of Vessel Monitoring System (VMS) records km^{-2} documented for the years 2008-2010.

3.6 Differences in fishing effort among communities, biotopes, and broad habitats

Analysis of variance revealed significant differences in fishing effort between communities ($F_{20, 99}$ = 7.553, $P < 0.01$), biotopes ($F_{11, 128}$ = 8.045, $P < 0.01$), and broader habitats ($F_{8, 139}$ = 6.627, $P < 0.01$).

Post-hoc comparisons made using Dunnett's T3 test revealed that the mean score for fishing effort was higher for Group r than for Groups an, i, and s ($P \leq 0.001$), Group aa ($P < 0.01$), and Groups ah and j ($P < 0.05$). The mean score for fishing effort was also higher in Group a than in Group an ($P \leq 0.001$), Group s ($P \leq 0.01$), and Group i ($P < 0.05$).

Post-hoc comparisons made using the LSD test revealed that the mean score for fishing effort was higher for biotope 13 than for biotopes 8, 10, 17, and 19 ($P < 0.001$), biotopes 14 and 18 ($P < 0.01$), and biotopes 1 and 11 ($P < 0.05$). The mean score for fishing effort was higher for biotope 16 than for biotopes 8, 10, 14, 17, 18, and 19 ($P \leq 0.001$), biotopes 1 and 11 ($P < 0.01$), and biotope 6 ($P < 0.05$). The mean score for fishing effort was higher for biotope 6 than for biotopes 10 and 17 ($P < 0.001$) and biotopes 8 and 19 ($P < 0.05$). The mean score for fishing effort was higher for biotope 12 than for biotope 17 ($P < 0.001$) and biotopes 8 and 19 ($P < 0.05$). The mean score for fishing effort was lower for biotope 10 than for biotopes 6, 13, and 16 ($P < 0.001$), biotope 18 ($P < 0.01$) and biotopes 1, 8, 11, and 19 ($P < 0.05$). The mean score for fishing effort was lower for biotope 17 than for biotopes 18 and 19 ($P < 0.05$).

Post-hoc comparisons made using Dunnett's T3 test revealed that the mean score for fishing effort was higher for broad habitat 5 than for broad habitats 6 and 10 ($P \leq 0.001$), broad habitat 11 ($P \leq 0.01$), and broad habitat 4 ($P< 0.05$). The mean score for fishing effort was higher for broad habitat 8 than for broad habitats 6 and 10 ($P < 0.001$), broad habitats 4 and 11 ($P < 0.01$), and broad habitat 12 ($P < 0.05$). The mean score for fishing effort was higher for broad habitat 7 than for broad habitat 6 ($P \leq 0.01$).

The distributions of community Group a, biotope 13, and broad habitat 8, which had higher fishing effort than other groups, corresponded with fishing effort for *Nephrops,* which occurs in the muddy sediments characteristic of the deeper waters found to the west of the island (Mackie, 1990). Biotopes 16 and 6 and broad habitat 5, which had higher fishing effort than other groups, corresponded with the distributions of known scallop fishing grounds, as presented in Kaiser et al. (2008). The distribution of biotope 16 corresponded closely with seven known scallop fishing grounds; The Targets, H/I Sector (10-

20’ South of Port St. Mary), Southeast Douglas, East Douglas, The Chickens, Offshore Bradda/West Calf, and Kirkmichael bank. The distribution of biotope 6 also corresponded with The Targets and Offshore Bradda/West Calf, and also occurred within the Maughold, Port St. Mary main, Bradda Head, and Peel Head fishing grounds. Broad habitat 5 characterized the areas that were represented by biotopes 6 and 16, thus the distribution of this habitat also corresponded with these fishing grounds.

3.7 Fishing as an explanatory variable for community composition

The RELATE analysis revealed significant correlations between the community data and the fishing effort data for Group a ($\rho = 0.168$, $P < 0.05$) and Group aa ($\rho = 0.943$, $P < 0.05$), biotope 16 ($\rho = 0.284$, $P < 0.05$) and biotope 6 ($\rho = 0.303$, $P < 0.05$), and broad habitat 5 ($\rho = 0.309$, $P < 0.01$), broad habitat 7 ($\rho = 0.269$, $P < 0.05$), and broad habitat 10 ($\rho = 0.141$, $P < 0.05$). Thus, fishing effort was considered an explanatory variable for the community composition within in these groups. MDS plots for these community groups, biotopes, and broader habitats are presented in Figures 19, 20, and 21, respectively.

As identified by SIMPER analyses, the taxa which contributed to 40% of the dissimilarity between stations with high and low fishing effort, within the groups which had significant RELATE results, are presented in Table 10.

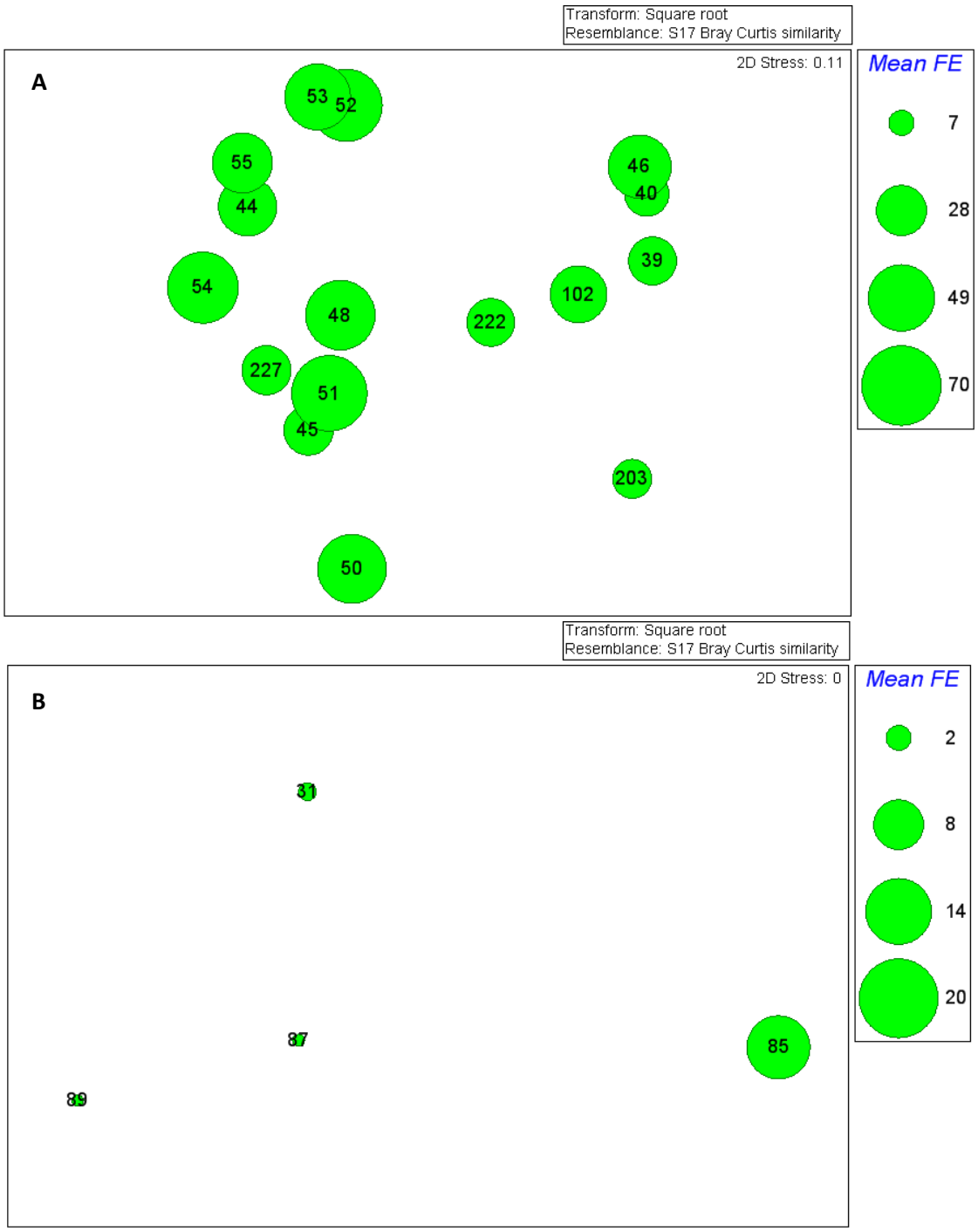

Figure 19. MDS plots for Group a (A) and Group aa (B) in which fishing effort was significantly correlated with community composition as revealed by the RELATE procedure in PRIMER v6; Group a ($\rho = 0.168$, $P < 0.05$), Group aa ($\rho = 0.943$, $P < 0.05$). Distance between stations represents Bray-Curtis similarity. The mean fishing effort at each station is overlaid for each station in the group and is measured as the number of VMS records km^{-2}. Mean fishing effort represents the mean of all fishing effort records falling within the 2 km buffer zone around the station, corresponding with fishing effort record for the years 2008-2010 in the 12 nautical mile territorial limit of the Isle of Man.

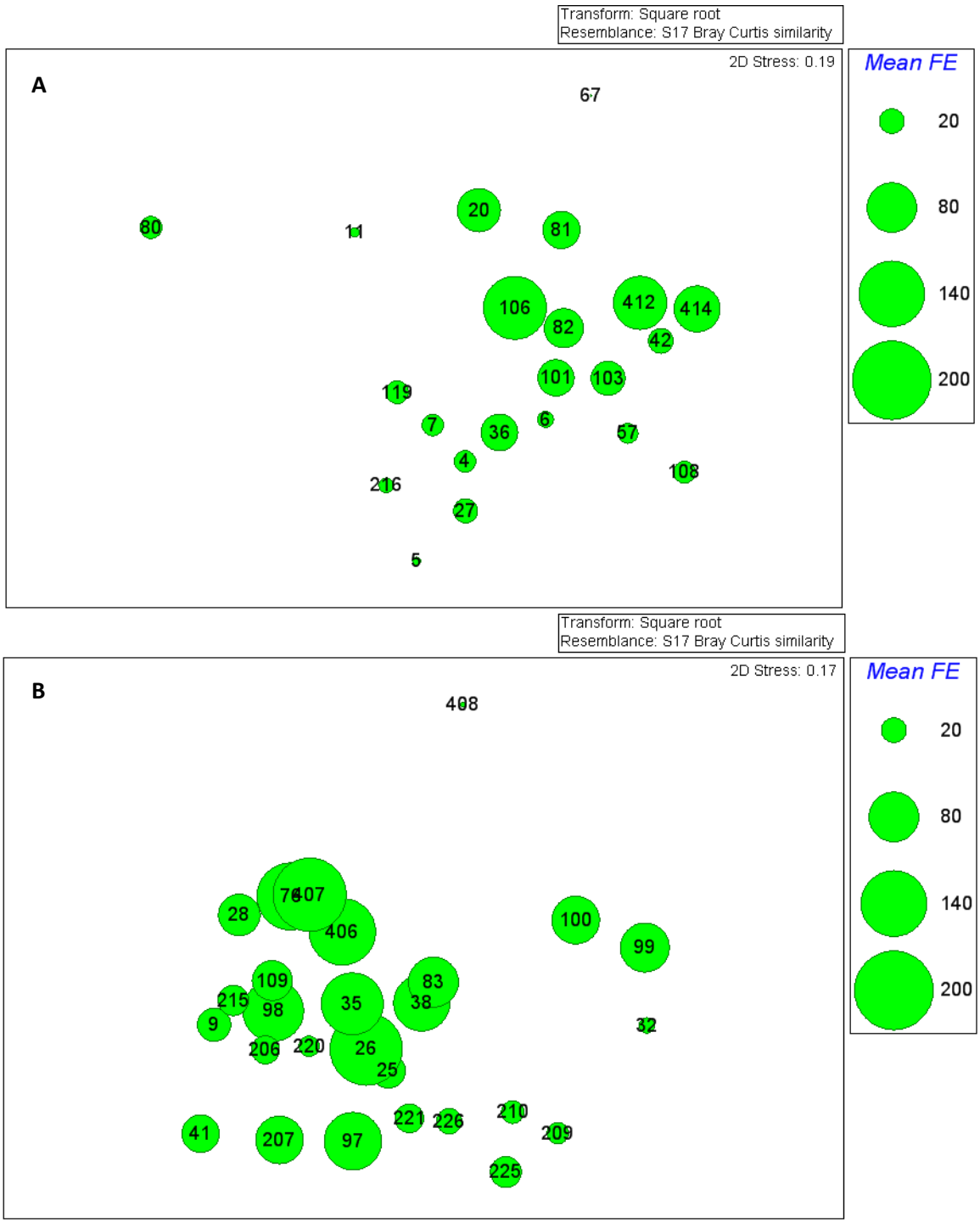

Figure 20. MDS plots for biotope 6 (A) and biotope 16 (B) in which fishing effort was significantly correlated with community composition as revealed by the RELATE procedure in PRIMER v6; biotope 6 (ρ = 0.303, $P < 0.01$), biotope 16 (ρ = 0.284, $P < 0.01$). Distance between stations represents Bray-Curtis similarity. The mean fishing effort at each station is overlaid for each station in the group and is measured as the number of VMS records km^{-2}. Mean fishing effort represents the mean of all fishing effort records falling within the 2 km buffer zone around the station, corresponding with fishing effort record for the years 2008-2010 in the 12 nautical mile territorial limit of the Isle of Man.

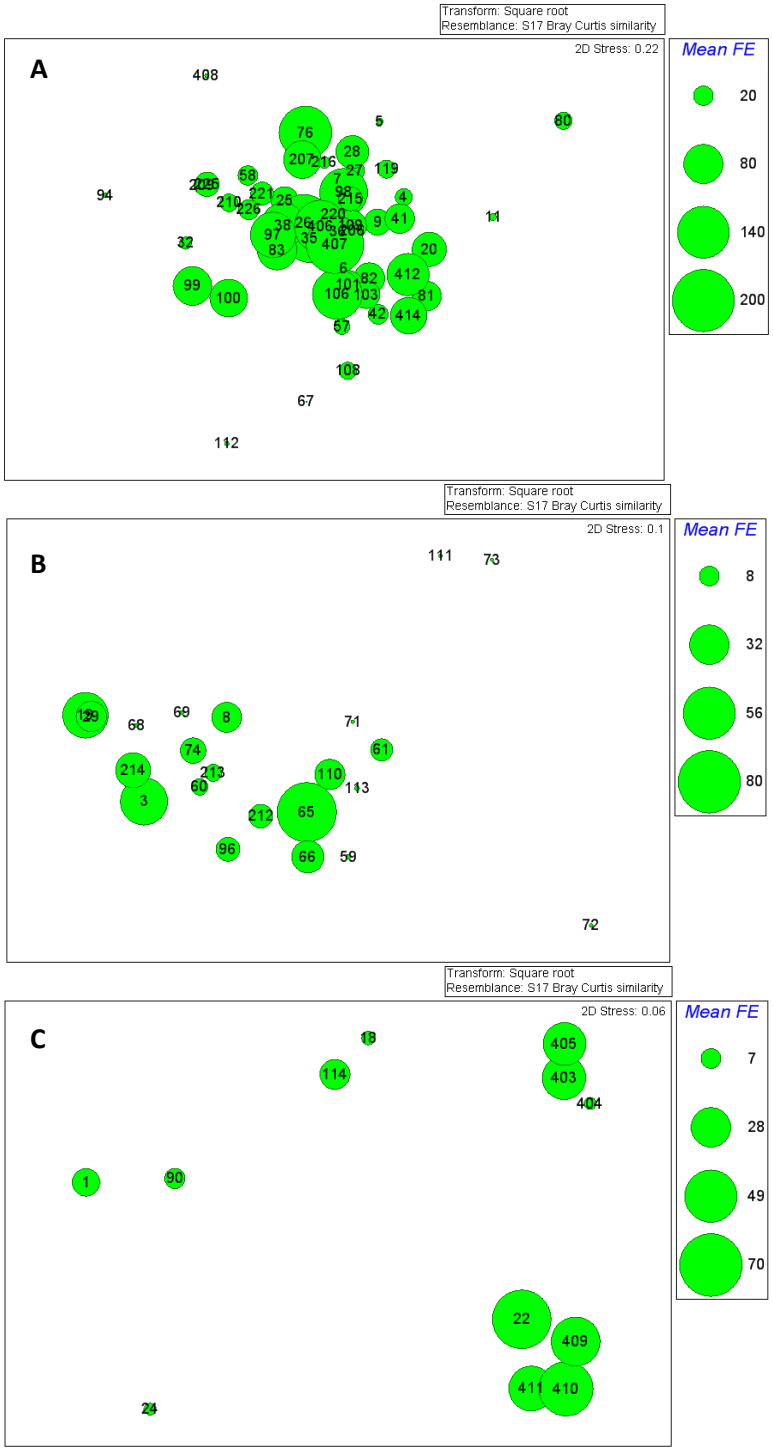

Figure 21. MDS plots for broad habitat 5 (A) broad habitat 7 (B) and broad habitat 10 (C) in which fishing effort was significantly correlated with community composition as revealed by the RELATE procedure in PRIMER v6; broad habitat 5 (ρ = 0.309, $P < 0.001$), broad habitat 7 (ρ = 0.269, $P < 0.05$), broad habitat 10 (ρ = 0.141, $P < 0.05$). Distance between stations represents Bray-Curtis similarity. The mean fishing effort at each station is overlaid for each station in the group and is measured as the number of VMS records km^{-2}. Mean fishing effort represents the mean of all fishing effort records falling within the 2 km buffer zone around the station, corresponding with fishing effort record for the years 2008-2010 in the 12 nautical mile territorial limit of the Isle of Man.

Table 10. Results from SIMPER analysis indicating the taxa which contributed up to 40% of the dissimilarity (cumulative) between stations characterized by high mean fishing effort per station (Group 3) and low mean fishing effort (Group 1). The results are presented for the community groups, biotopes, and broader habitats identified around the Isle of Man in which fishing effort was identified as an explanatory variable for community composition by the RELATE procedure in PRIMER v6. The community data were collected during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008.

Group a
Average dissimilarity = 81.12

Species	Group 1 Av.Abund	Group 3 Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Sagartia troglodytes	3.57	0.00	34.05	1.46	41.98	41.98

Group aa
Average dissimilarity = 36.68

Species	Group 3 Av.Abund	Group 1 Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Porifera unid.	1.60	4.69	5.19	1.94	14.15	14.15
Glycymeris glycymeris	3.25	4.99	2.99	1.16	8.14	22.29
Gibbula sp.	1.43	1.90	1.39	1.53	3.78	26.07
Flustra foliacea	0.77	0.16	1.33	1.03	3.62	29.69
Calliostoma zizyphinum	1.03	1.73	1.18	1.79	3.23	32.92
Galathea sp.	1.61	2.16	1.16	1.08	3.17	36.09
Tubularia indivisa	0.00	0.65	1.10	2.66	2.99	39.08

Biotope 6
Average dissimilarity = 71.85

Species	Group 1 Av.Abund	Group 3 Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Ophiura albida	0.48	2.09	8.00	1.06	11.13	11.13
Cellaria patches	0.63	0.90	4.99	1.51	6.95	18.08
Ophiura ophiura	0.27	0.53	3.25	1.44	4.53	22.60
Aequipecten opercularis	0.62	0.64	2.72	1.38	3.79	26.39
Ophiocomina nigra	0.00	0.53	2.70	0.71	3.76	30.15
Ascidian unid.	0.14	0.49	2.36	0.92	3.28	33.43
Aporrhais pespelecani	0.10	0.45	2.29	0.75	3.19	36.62
Ascidiella aspersa	0.00	0.45	2.24	0.77	3.12	39.74

Biotope 16
Average dissimilarity = 69.85

Species	Group 1 Av.Abund	Group 3 Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Ophiura albida	0.65	1.82	5.10	0.97	7.31	7.31
Alcyonium digitatum	0.67	0.88	3.08	1.15	4.42	11.72
Porifera unid.	0.86	0.44	2.99	0.84	4.28	16.00
Cerianthus lloydii	0.47	0.78	2.96	0.86	4.24	20.24
Clavelina lepadiformis	0.63	0.30	2.84	0.41	4.07	24.31
Cellaria patches	0.30	0.63	2.80	1.00	4.01	28.32
Gibbula sp.	0.69	0.42	2.67	0.90	3.82	32.13
Aequipecten opercularis	0.86	1.01	2.54	1.28	3.64	35.77
Ophiocomina nigra	0.16	0.52	2.19	0.57	3.14	38.91

Table 10 continued.

Broad habitat 5
Average dissimilarity = 78.70

Species	Group 3 Av.Abund	Group 1 Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Ophiothrix fragilis	2.62	1.17	8.65	0.52	10.99	10.99
Ophiura albida	1.94	0.31	6.42	1.00	8.15	19.14
Cerianthus lloydii	1.03	0.72	4.21	0.84	5.35	24.49
Aequipecten opercularis	1.11	0.42	3.16	1.00	4.02	28.51
Alcyonium digitatum	1.02	0.43	3.09	0.82	3.92	32.43
Gibbula sp.	0.52	0.66	2.66	0.94	3.38	35.80
Porifera unid.	0.56	0.45	2.33	0.81	2.96	38.76

Broad habitat 7
Average dissimilarity = 75.33

Species	Group 1 Av.Abund	Group 3 Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Ophiura albida	0.49	2.32	7.77	1.25	10.31	10.31
Cerianthus lloydii	0.65	1.12	4.91	0.90	6.52	16.83
Aequipecten opercularis	0.47	1.27	3.61	1.13	4.79	21.62
Cellaria patches	0.43	0.61	2.98	0.73	3.95	25.57
Alcyonium digitatum	0.40	0.88	2.90	0.99	3.85	29.42
Gibbula sp.	0.56	0.50	2.72	0.92	3.61	33.03
Clavelina lepadiformis	0.58	0.29	2.62	0.43	3.47	36.50
Pseudosuberites sulphureus	0.25	0.65	2.36	0.88	3.14	39.64

Broad habitat 10
Average dissimilarity = 78.57

Species	Group 3 Av.Abund	Group 1 Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Ophiothrix fragilis	2.62	1.17	8.70	0.52	11.07	11.07
Ophiura albida	1.94	0.43	6.51	1.02	8.28	19.35
Cerianthus lloydii	1.03	0.72	4.24	0.84	5.40	24.75
Aequipecten opercularis	1.11	0.43	3.17	1.00	4.03	28.78
Alcyonium digitatum	1.02	0.42	3.11	0.82	3.95	32.73
Gibbula sp.	0.52	0.61	2.62	0.92	3.33	36.07
Cellaria patches	0.47	0.32	2.27	0.61	2.89	38.96

3.8 Extent of fishing activity in identified communities, biotopes, and broader habitats

The proportion of the seabed allocated to each group, biotope, and broad habitat, as well as the extent and range of fishing activity within the area covered by each are presented in Tables 11, 12, and 13, respectively. The distribution of fishing effort is depicted in Figure 22. The distribution of fishing effort in relation to the identified communities, biotopes, and broad habitats is depicted in Figures 23, 24, and 25, respectively.

For most of the communities, biotopes, and broad habitats, fishing activity affected most, if not all, of the area covered by each group. Only the community groups aj, i, and c, biotope 10, and broad habitat 6 occurred with a high proportion of the seabed unaffected by fishing activity. The fishing effort was distributed across all three levels of intensity for Group r, biotope 16, and broad habitat 5, which each represented a high proportion of the seabed. Group r had the highest proportion affected by medium fishing effort, while the majority of the area covered by biotope 16 and broad habitat 5 were affected by low fishing effort. Group a, biotope 13, and broad habitat 8 also represented a high proportion of the seabed and corresponded with the *Nephrops* fishing grounds, which was affected predominately by medium fishing effort and low fishing effort.

For maerl-containing biotopes, 11 and 12, and biotope 5, which was characterized by both maerl and a *Modiolus* bed, the majority of the area covered by each was affected by fishing activity to some extent. The highest proportion of each of these biotopes was affected by low fishing, but medium fishing activity also occurred in each. Biotope 12 occurred east of Laxey and at Ramsey Bay and fishing effort in the area covered by this biotope was more evenly distributed between low and medium fishing intensity. High fishing effort was also recorded for biotope 12. Biotopes 1, 2, 3, and 4 were circalittoral and infralittoral rock habitats, which corresponded with designations as Annex I “reefs”. For circalittoral rock biotopes 1, 2, and 3 the majority of the area covered by each was affected by low fishing effort. In comparison, an even distribution across all three levels of fishing intensity affected the area covered by biotope 4, the infralittoral rock habitat, which was in proximity to the Port St. Mary Inshore fishing ground (Kaiser et al., 2008). The broad habitats corresponding with these sensitive biotopes reflected the same patterns in the distribution of fishing effort.

Table 11. Presented is the proportion of the seabed allocated to each community group and the extent of fishing activity in the area covered by each group, based on the interpolation of the area covered by each over the whole seabed. The mean fishing effort, corresponding with the fishing effort in 2 km buffers around each station represented by the group, is presented for comparisons in the overall level of fishing activity among groups. The fishing records corresponding with the interpolated area covered by each group were used to determine the extent to which each was subjected to fishing activity. Fishing effort was ranked according to the proportion of the area covered by the group that was affected by fishing activity; light (0-0.3), medium (0.3-0.6), heavy (0.6-1). The proportion affected by different fishing intensities, is presented in relation to the total number of VMS records km^{-2} documented from 2008-2010 for the area corresponding with each group. Fishing intensity was ranked as no fishing, low (0-30 records km^{-2}), medium (30-96 records km^{-2}), and high (96-662 records km^{-2}) based on natural breaks in the data.

Group	Mean	Prop. seabed	Prop. fished	Fishing Effort	No fishing	Low (0-30)	Medium (30-96)	High (96-662)
a	39.790	0.142	1	Heavy	0	0.324	0.676	0
aa	3.697	0.024	0.874	Heavy	0.126	0.807	0.053	0.013
ab	20.870	0.014	1	Heavy	0	0.671	0.329	0
ac	0.980	0.006	0.903	Heavy	0.097	0.903	0	0
ad	5.916	0.005	1	Heavy	0	0.938	0.062	0
ae	14.430	0.005	0.963	Heavy	0.037	0.817	0.146	0
af	15.090	0.034	1	Heavy	0	0.888	0.103	0.009
ag	15.700	0.017	1	Heavy	0	0.960	0.040	0
ah	26.120	0.020	1	Heavy	0	0.760	0.240	0
ai	23.150	0.053	0.938	Heavy	0.062	0.725	0.199	0.014
aj	0.069	0.014	0.216	Light	0.784	0.216	0	0
ak	0.363	0.008	0.612	Heavy	0.388	0.612	0	0
al	18.760	0.030	0.864	Heavy	0.136	0.684	0.138	0.041
am	30.940	0.025	1	Heavy	0	0.532	0.468	0
an	8.806	0.032	0.998	Heavy	0.002	0.883	0.107	0.008
b	0.300	0.007	0.538	Medium	0.462	0.538	0	0
c	0.141	0.008	0.351	Medium	0.649	0.351	0	0
d	23.320	0.026	0.912	Heavy	0.088	0.465	0.447	0
e	35.690	0.010	0.948	Heavy	0.052	0.610	0.149	0.188
f	0.262	0.016	0.703	Heavy	0.297	0.703	0	0
g	9.054	0.016	0.905	Heavy	0.095	0.846	0.059	0
h	1.398	0.006	0.576	Medium	0.424	0.515	0.061	0
i	1.276	0.017	0.199	Light	0.801	0.152	0.025	0.022
j	9.566	0.063	0.712	Heavy	0.288	0.616	0.095	0
k	27.190	0.015	0.874	Heavy	0.126	0.463	0.386	0.024
l	4.562	0.012	1	Heavy	0	1	0	0
m	33.350	0.024	1	Heavy	0	0.451	0.518	0.031
n	23.480	0.032	0.998	Heavy	0.002	0.664	0.334	0
o	78.310	0.020	0.974	Heavy	0.026	0.242	0.661	0.071
p	89.903	0.005	0.590	Medium	0.410	0.072	0.482	0.036

Table 11 continued.

Group	Mean	Prop. seabed	Prop. fished	Fishing Effort	No fishing	Low (0-30)	Medium (30-96)	High (96-662)
q	32.230	0.007	1	Heavy	0	0.438	0.554	0.009
r	77.139	0.128	0.994	Heavy	0.006	0.341	0.411	0.242
s	13.980	0.075	0.978	Heavy	0.022	0.887	0.089	0.003
t	42.840	0.010	0.891	Heavy	0.109	0.423	0.205	0.263
u	42.060	0.012	0.929	Heavy	0.071	0.551	0.168	0.209
v	6.010	0.015	0.610	Heavy	0.390	0.589	0.020	0
w	10.280	0.013	0.947	Heavy	0.053	0.904	0.043	0
x	2.534	0.006	0.794	Heavy	0.206	0.627	0.157	0.010
y	7.638	0.022	0.926	Heavy	0.074	0.847	0.080	0
z	2.578	0.005	0.975	Heavy	0.025	0.962	0.013	0

Table 12. Presented is the proportion of the seabed allocated to each biotope and the extent of fishing activity in the area covered by each, based on the interpolation of the area covered by each over the whole seabed. The mean fishing effort, corresponding with the fishing effort corresponding with the fishing effort in 2 km buffers around each station represented by the biotope, is presented for comparisons in the overall level of fishing activity among biotopes. The fishing records corresponding with the interpolated area covered by each biotope were used to determine the extent to which each was subjected to fishing activity. Fishing effort was ranked according to the proportion of the area covered by the biotope that was affected by fishing activity; light (0-0.3), medium (0.3-0.6), heavy (0.6-1). The proportion affected by different fishing intensities, is presented in relation to the total number of VMS records/km^2 documented from 2008-2010 for the area corresponding with each biotope. Fishing intensity was ranked as no fishing, low (0-30 records km^{-2}), medium (30-96 records km^{-2}), and high (96-662 records km^{-2}) based on natural breaks in the data.

Biotope	Mean	Prop. seabed	Prop. fished	Fishing Effort	No fishing	Low (0-30)	Medium (30-96)	High (96-662)
1	15.090	0.034	1	Heavy	0	0.888	0.103	0.009
2	2.602	0.004	0.803	Heavy	0.197	0.770	0.033	0
3	2.534	0.006	0.794	Heavy	0.206	0.627	0.157	0.010
4	71.010	0.005	0.973	Heavy	0.027	0.280	0.307	0.387
5	14.430	0.005	0.963	Heavy	0.037	0.817	0.146	0
6	30.001	0.154	0.876	Heavy	0.124	0.600	0.259	0.016
7	24.800	0.006	1	Heavy	0	0.554	0.446	0
8	11.280	0.041	0.960	Heavy	0.040	0.798	0.162	0
9	1.398	0.006	0.576	Medium	0.424	0.515	0.061	0
10	1.276	0.017	0.199	Low	0.801	0.152	0.025	0.022
11	14.160	0.026	0.910	Heavy	0.090	0.770	0.139	0
12	30.630	0.017	0.825	Heavy	0.175	0.442	0.380	0.004
13	40.460	0.154	1	Heavy	0	0.309	0.691	0
14	11.420	0.045	0.896	Heavy	0.104	0.763	0.133	0
15	19.640	0.009	0.993	Heavy	0.007	0.690	0.303	0
16	64.871	0.169	0.985	Heavy	0.015	0.450	0.332	0.203
17	10.680	0.096	0.849	Heavy	0.151	0.744	0.094	0.011
18	16.750	0.093	0.921	Heavy	0.079	0.715	0.190	0.016
19	17.650	0.099	0.813	Heavy	0.187	0.664	0.126	0.022
20	0.683	0.012	0.703	Heavy	0.297	0.703	0	0

Table 13. Presented is the proportion of the seabed allocated to each broad habitat and the extent of fishing activity in the area covered by each, based on the interpolation of the area covered by each over the whole seabed. The mean fishing effort, corresponding with the fishing effort in the 2 km buffers around each station represented by the broad habitat, is presented for comparisons in the overall level of fishing activity among habitats. The fishing records corresponding with the interpolated area covered by each habitat were used to determine the extent to which each was subjected to fishing activity. Fishing effort was ranked according to the proportion of the area covered by the habitat that was affected by fishing activity; light (0-0.3), medium (0.3-0.6), heavy (0.6-1). The proportion affected by different fishing intensities, is presented in relation to the total number of VMS records/km^2 documented from 2008-2010 for the area corresponding with each habitat. Fishing intensity was ranked as no fishing, low (0-30 records km^{-2}), medium (30-96 records km^{-2}), and high (96-662 records km^{-2}) based on natural breaks in the data.

Broad	Mean	Prop. Seabed	Prop. Fished	Fishing Effort	No fishing	Low (0-30)	Medium (30-96)	High (96-662)
1	2.564	0.010	0.798	Heavy	0.202	0.681	0.110	0.006
2	71.008	0.005	0.973	Heavy	0.027	0.280	0.307	0.387
3	14.430	0.005	0.963	Heavy	0.037	0.817	0.146	0
4	13.017	0.048	0.966	Heavy	0.034	0.766	0.200	0
5	46.177	0.343	0.934	Heavy	0.066	0.539	0.288	0.107
6	1.309	0.024	0.298	Light	0.702	0.247	0.035	0.016
7	22.012	0.043	0.876	Heavy	0.124	0.638	0.236	0.001
8	39.794	0.142	1	Heavy	0	0.324	0.676	0
9	50.980	0.012	1	Heavy	0	0.126	0.874	0
10	15.389	0.167	0.871	Heavy	0.129	0.705	0.152	0.014
11	9.956	0.058	0.949	Heavy	0.051	0.855	0.083	0.011
12	17.647	0.099	0.813	Heavy	0.187	0.664	0.126	0.022
13	11.423	0.045	0.896	Heavy	0.104	0.763	0.133	0

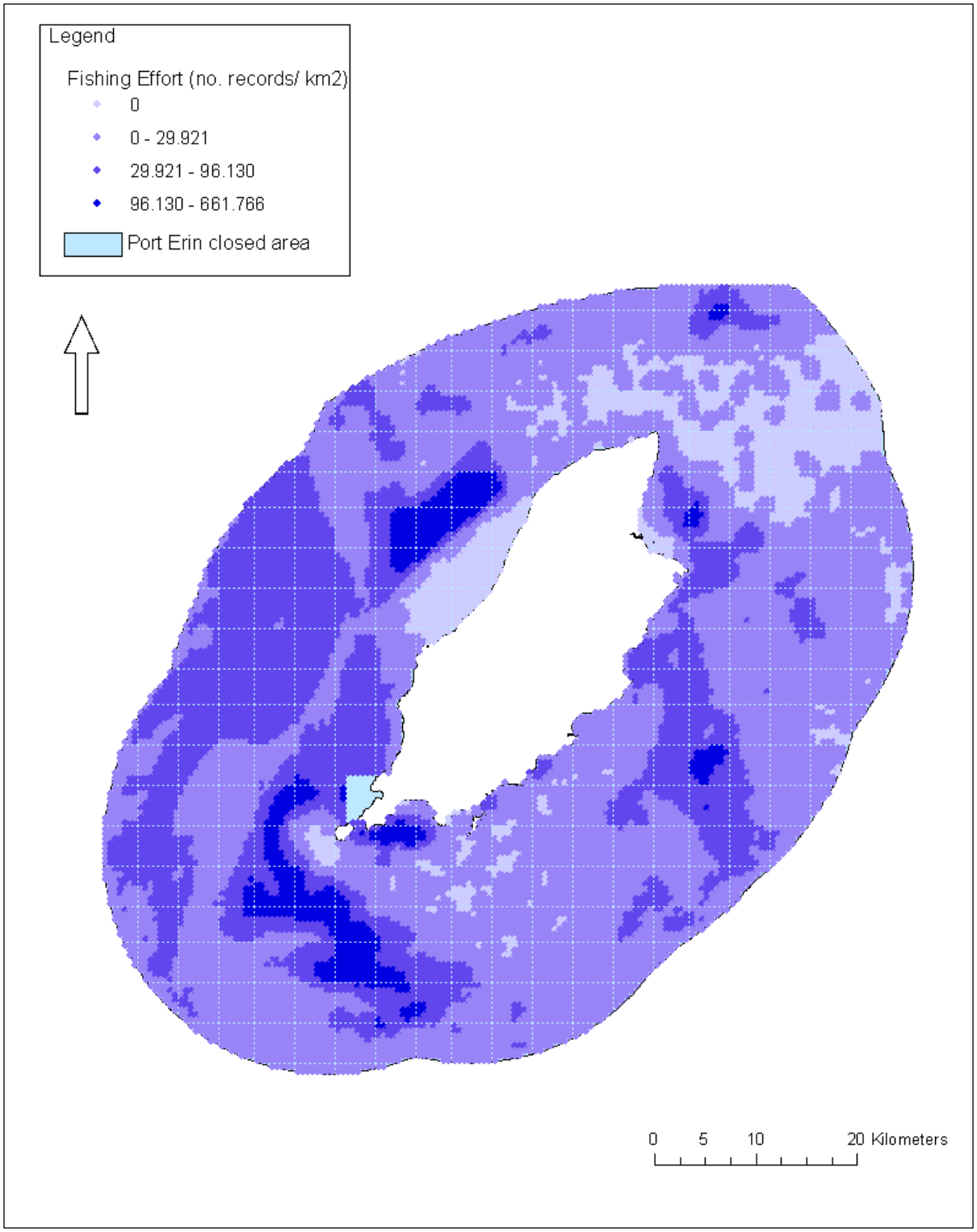

Figure 22. The distribution of fishing effort within the 12 nautical mile territorial limit of the Isle of Man. Fishing effort was measured as the total number of VMS records km^{-2} for the years 2008-2010. Map was generated using ArcGIS.

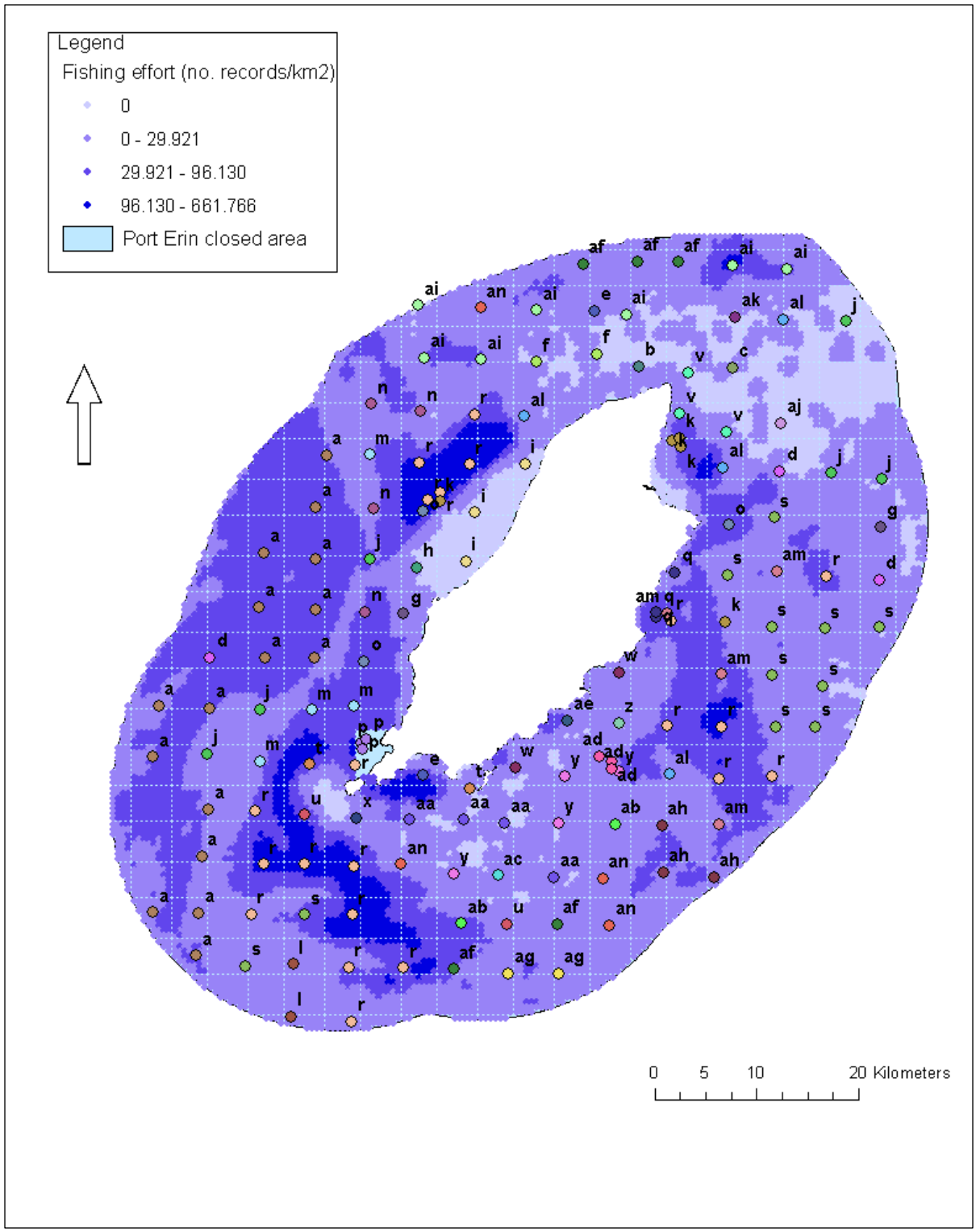

Figure 23. The distribution of 40 benthic community groups identified within the 12 nautical mile territorial limit of the Isle of Man in relation to fishing effort. Fishing effort was measured as the total number of VMS records km^{-2} for the years 2008-2010. Letter codes for each community correspond with the locations of the stations which were surveyed during visual habitat surveys conducted in 2008. Map was generated using ArcGIS.

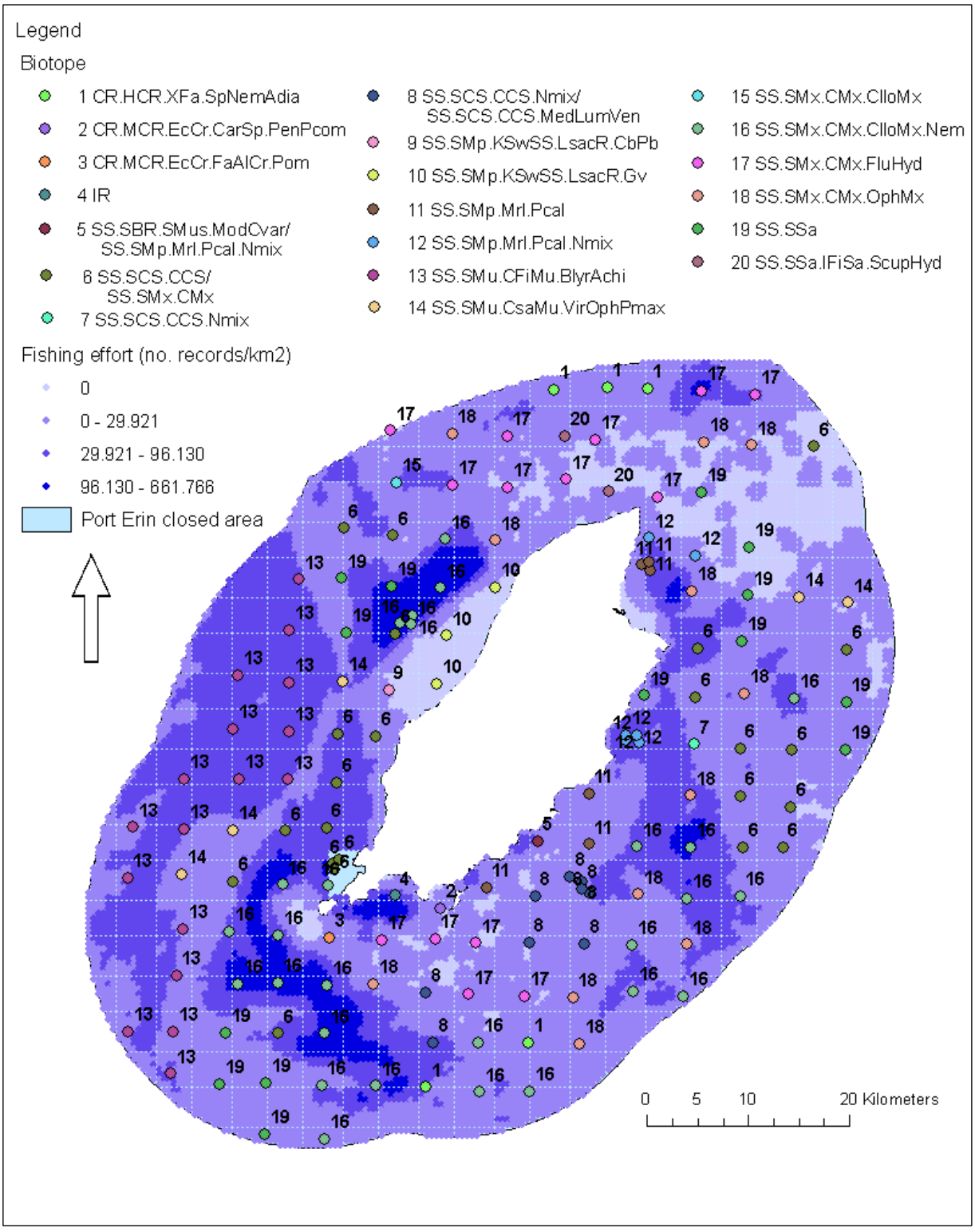

Figure 24. The distribution of 20 biotopes identified within the 12 nautical mile territorial limit of the Isle of Man in relation to fishing effort. Fishing effort was measured as the total number of VMS records km^{-2} for the years 2008-2010. Number labels for each biotope correspond with the locations of the stations which were surveyed during visual habitat surveys conducted in 2008. Map was generated using ArcGIS.

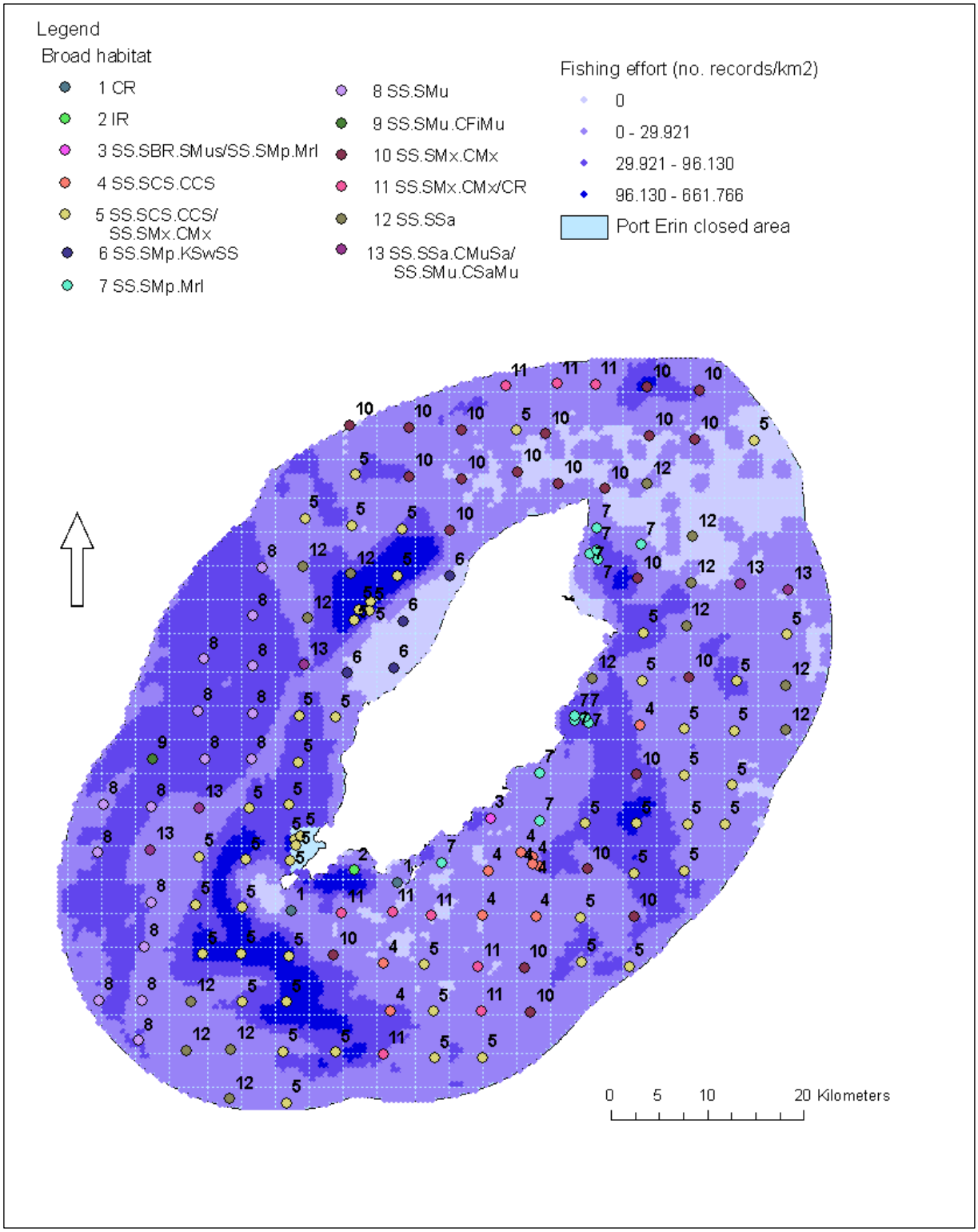

Figure 25. The distribution of 13 broad habitats identified within the 12 nautical mile territorial limit of the Isle of Man in relation to fishing effort. Fishing effort was measured as the total number of VMS records km^{-2} for the years 2008-2010. Number labels for each broad habitat correspond with the locations of the stations which were surveyed during visual habitat surveys conducted in 2008. Map was generated using ArcGIS.

3.9 Fishing effort in relation to fished species and features of conservation concern

The distribution of the highest fishing intensity recorded between 2008 and 2010 corresponded closely with the distribution of the king scallop *Pecten maximus* (Figure 26). The queen scallop *Aequipecten opercularis* had a more widespread distribution over the seabed than *Pecten maximus* (Figure 27). The distribution of fishing effort in the deeper waters to the west and southwest of the island corresponded with the distribution of the Norway lobster *Nephrops norvegicus* (Figure 28). Figure 29 depicts the distribution of fishing effort in relation to features of conservation concern identified at particular stations, including maerl, *Modiolus modiolus, Sabellaria spinulosa,* and *Edwardsia* sp. Mainly, these taxa occurred in areas with low fishing activity. In two stations to the west and the southwest of the island, the presence of the anemone *Edwardsia* sp. seemed to correspond with higher fishing activity. Stations characterized by maerl at Ramsey Bay and to the east of Laxey corresponded with medium fishing intensity, which also characterized the area adjacent to the maerl/*Modiolus* bed at station 23. *Modiolus* also occurred in areas with medium or high fishing intensity at Ramsey and to the southwest of the island.

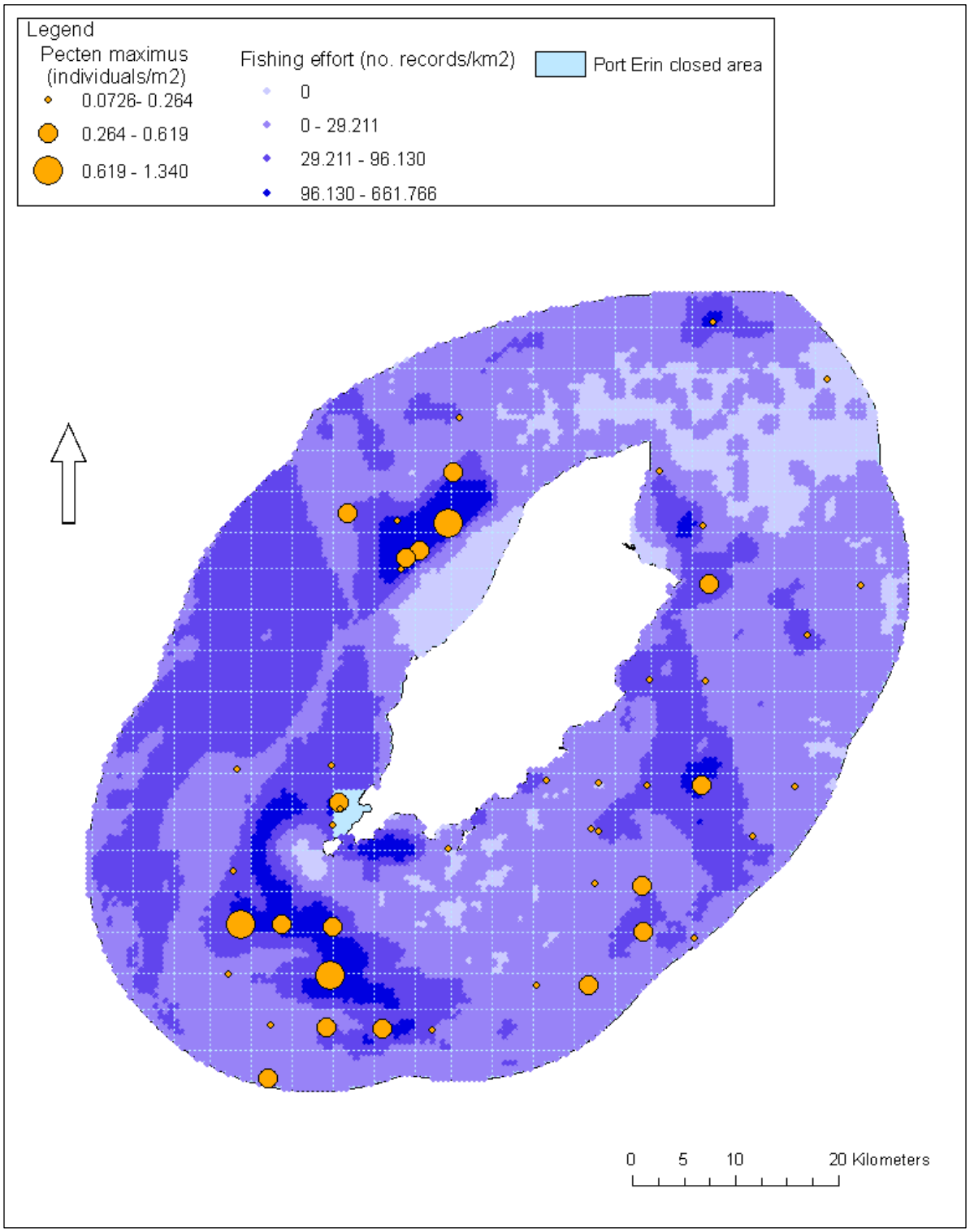

Figure 26. The distribution of fishing effort in relation to the distribution of the commercially targeted king scallop *Pecten maximus* within the 12 nautical mile territorial limit of the Isle of Man. The biological data were collected during visual habitat surveys conducted in 2008. Fishing effort was measured as the total number of VMS records km^{-2} for the years 2008-2010. Map was generated using ArcGIS.

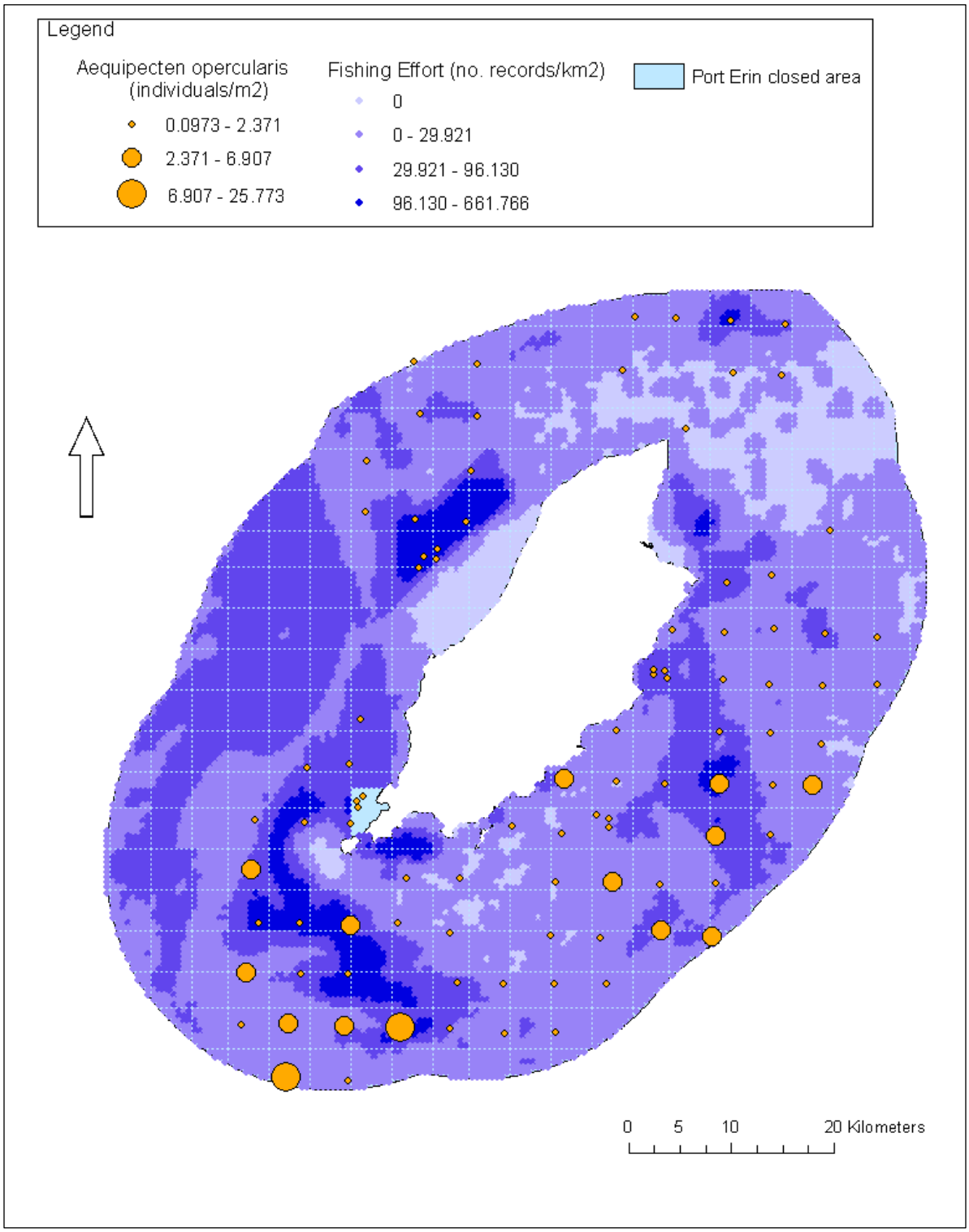

Figure 27. The distribution of fishing effort in relation to the distribution of the commercially targeted queen scallop *Aequipecten opercularis* within the 12 nautical mile territorial limit of the Isle of Man. The biological data were collected during visual habitat surveys conducted in 2008. Fishing effort was measured as the total number of VMS records km^{-2} for the years 2008-2010. Map was generated using ArcGIS.

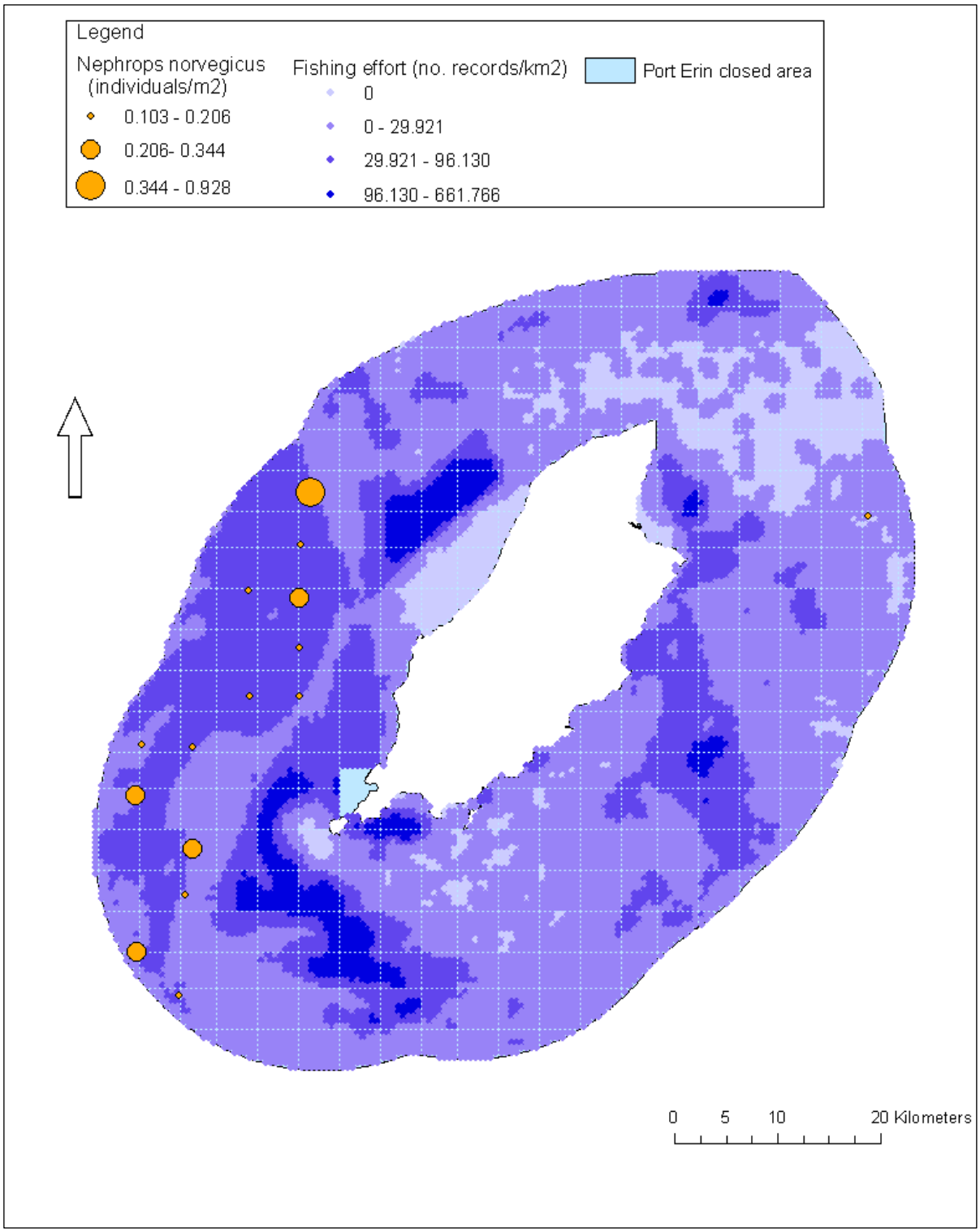

Figure 28. The distribution of fishing effort in relation to the distribution of the commercially targeted Norway lobster *Nephrops norvegicus* within the 12 nautical mile territorial limit of the Isle of Man. The biological data were collected during visual habitat surveys conducted in 2008. Fishing effort was measured as the total number of VMS records km^{-2} for the years 2008-2010. Map was generated using ArcGIS.

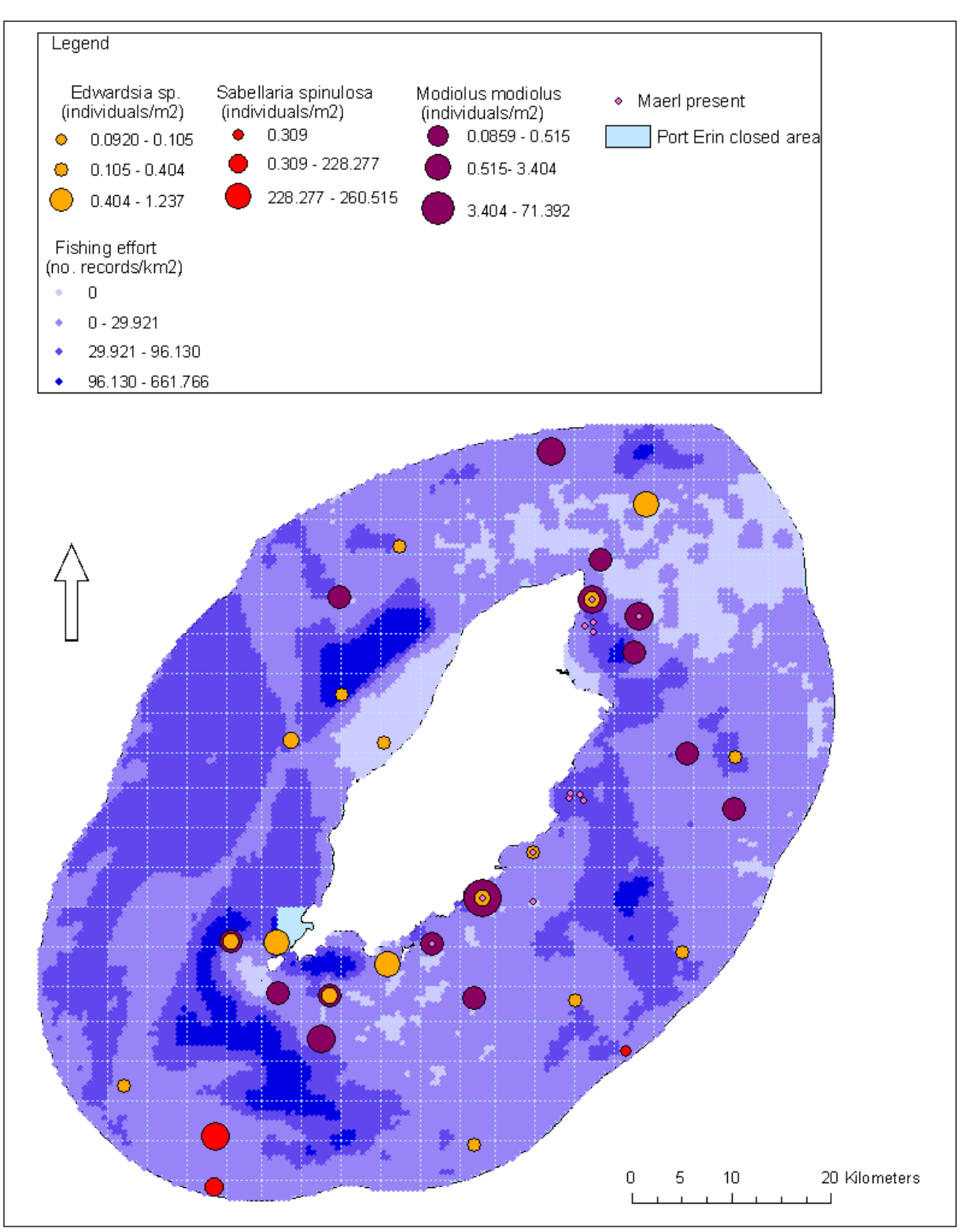

Figure 29. The distribution of fishing effort in relation to the distribution of biological features of conservation interest within the 12 nautical mile territorial limit of the Isle of Man. The biological data were collected during visual habitat surveys conducted in 2008. Fishing effort was measured as the total number of VMS records km^{-2} for the years 2008-2010. Map was generated using ArcGIS.

3.10 Spatial resolution analysis

3.10.1 Differences in community type among stations sampled at < 5 km apart

Different community types were identified among the stations that were sampled at < 5 km apart at both Targets and at Laxey (Table 14). Notable differences in the taxa which contributed the most to group similarity were identified for Groups r and k, which were both represented by the stations at Targets (Appendix 7.3). The same was true for Groups q and am, which were represented by the stations sampled at Laxey. While all the stations at Laxey occurred on similar substrata, the station represented by Group am was differentiated by the high abundance of the brittlestar *Ophiothrix fragilis*. In comparison, the substratum at station 408, characterized as clean gravel and small pebbles, differed from the mixed gravel and sand which occurred at the other two stations, which may have contributed to the observed differences in the community type.

3.10.2 Differences between stations sampled at < 5 km apart and "nearest neighbor"

Each of the communities identified for the grouped stations sampled at < 5 km apart differed from that identified for the nearest station that was surveyed on the 5 km grid. Additionally, in three out of the five areas sampled, the biotope classifications differed between the grouped stations and the nearest survey station. Of the three levels of classification, only the same broad habitat classification was applicable to all stations compared, for each of the five areas. MDS plots depicting the Bray-Curtis similarity between the communities at each of the stations are presented in Figure 30.

Differences in community type identified for the grouped stations and the nearest survey station at Targets, Laxey, Port Erin, and Ramsey seemed reflect "real" differences in community type based on the differences in the taxa which contributed to the similarity of the community groups identified among the stations, which tended to be easily identifiable taxa (see Appendix 7.3 for descriptions of groups identified in Table 14). In some cases, there were also obvious differences in the substrata, which could have influenced the observed differences in community type between the grouped stations and the nearest survey station.

"Real" differences in community type were not as obvious at East Douglas, where the stations that were compared occurred on the same type of substratum (gravel with shell), and community composition for Group ad and Group y were very similar. The bivalve *Glycymeris glycymeris* and the top-shell *Gibbula* sp. contributed 40 % or more to the community similarities for both of these groups. Differences in the

abundance of *Glycymeris* between the groups, and the absence of "Gastropod unid." from Group y, an important taxon in Group ad, contributed 25% to the dissimilarity between the groups.

Biotope classifications differed between the grouped stations and the nearest neighbor at Port Erin, Ramsey, and Targets. This was reflective of the differences in the community groups and the physical differences in the substratum, which resulted in separate biotope classifications.

Table 14. Community, biotope, and broader habitat classifications for stations sampled at <5km apart (station numbers in 400s) in selected areas around the Isle of Man during visual habitat surveys conducted in 2008. These are compared with the classifications applied to the nearest station that was surveyed on a 5 km grid of the seabed. The maximum distance between any three of the stations sampled at <5 km was approximated using ArcGIS and is presented. The maximum distance between the nearest station sampled on the 5 km grid and any of the three stations sampled at < 5km apart was approximated using ArcGIS and is presented in the last column.

				Approximated max. distance		Approximated max. distance
East Douglas	Station 400	Station 401	Station 402	1.7 km	Station 92	2.5 km
Group	ad	ad	ad		y	
Biotope	8	8	8		8	
Broad	4	4	4		4	
Ramsey	Station 403	Station 404	Station 405	1.0 km	Station 114	3.3 km
Group	k	k	k		v	
Biotope	11	11	11		12	
Broad	7	7	7		7	
Targets	Station 406	Station 407	Station 408	1.5 km	Station 106	2.5 km
Group	r	r	k		o	
Biotope	16	16	16		6	
Broad	5	5	5		5	
Laxey	Station 409	Station 410	Station 411	1.2 km	Station 22	1.6 km
Group	q	am	q		r	
Biotope	12	12	12		12	
Broad	7	7	7		7	
Port Erin	Station 412	Station 413	Station 414	1.2 km	Station 83	2.8 km
Group	p	p	p		r	
Biotope	6	6	6		16	
Broad	5	5	5		5	

Figure 30. MDS plots depicting the Bray-Curtis similarity between the community compositions of three survey stations sampled at < 5 km apart (stations in 400s) and that of the nearest station surveyed on a 5 km grid within the Manx territorial sea. The biological data were collected at these stations during visual habitat surveys conducted within the 12 nautical mile territorial limit of the Isle of Man in 2008. (A) Targets (B) Ramsey (C) Port Erin (D)Laxey (E) East Douglas. Plots were generated using PRIMER v6 software.

4. Discussion

4.1 Community identification and classification

4.1.1 Community identification

The distribution of benthic communities is predominately influenced by the distribution of suitable environmental conditions, and most benthic communities tend to occur consistently within a particular range of conditions (Connor et al., 2004). While 40 communities were identified using the SIMPROF procedure, 13 of these community groups were subdivided further based on the identification of broad differences in the habitat types in which the community occurred. In some cases, this was attributed to the impoverishment of the identified communities, where extremely low faunal abundances contributed to the similarity of the grouped stations. In other instances, the exclusion of maerl, kelp, or seaweeds from the community analysis resulted in the grouping of communities which occurred in different habitats and were, otherwise, biologically similar. Another factor which could have affected the community analysis, but instead would have led to the discrimination between similar communities, was the level of taxonomic resolution that could be achieved during the photo analysis. The biological similarities of sites could have been affected by the differences in the number of taxa identified and the taxonomic resolution achieved by different photo analysts, as a result of differences in skill and perception. The taxonomic resolution achieved was also limited by the inability to rotate the organisms or examine them more closely under a microscope to make accurate identifications at the species or the genus level. This has been identified as a limitation of photo analysis for the identification of benthic epifauna in other works (Collie et al., 2000b, Lambert et al., 2011).

4.1.2 Biotope classification

The Marine Habitat Classification for Britain and Ireland Version 04.05 is based on a top-down approach, whereby biological communities are nested within a hierarchy of habitat types and are only distinguished at the lowest levels of the hierarchy (Connor et al., 2004). As the identified biological communities were used to identify biotopes and to classify the habitats around the Isle of Man, with only limited physical data input, there were difficulties in making accurate classifications using the hierarchical scheme. Of the environmental factors governing the distribution of benthic communities, the nature of the substratum is perhaps the most important in determining the characteristics of the community type which can inhabit an area (Connor et al., 2004). While best estimates were made of the substratum on which different community types occurred, so that the top-down approach could be

employed to classify these communities, more specific information with respect to the nature of the substratum and the energy of the environment was often necessary for making accurate classifications. Overlap in the range of sediment sizes and types described for biotopes nested within different habitats presented difficulties in narrowing down the most appropriate main habitats and biotope complexes (habitat levels 3 and 4). This was particularly the case for communities which occurred on coarse mixed sediments, which corresponded with both the "circalittoral coarse sediment" and "circalittoral mixed sediment" biotope complexes. The British Geological Survey (BGS) Folk sediment trigon presents ranges in the percentage of gravel and the ratio of sand to mud which correspond with the four sublittoral sediment main habitats included in the classification scheme; "mixed sediment", "coarse sediment", "mud and sandy mud", and "sand and muddy sand"(see Coltman et al., 2008). As this detailed information had not been determined for the composition of the sediments around the Isle of Man, this tool could not be used to make more accurate distinctions between the most appropriate habitat types. In some cases, this resulted in the application of hybrid classifications between the most fitting habitat types. In addition, a lack of infaunal data limited the resolution to which the communities could be classified. The structure of the classification scheme reflects the importance of the physical environment for influencing benthic communities. Thus the biologically driven approach taken here was limited in terms of accurately identifying the distinct habitat types on which the communities occur.

While the classification of biotopes is convenient for identifying the distribution of different community types, it may not always be appropriate to try to fit a community to a predefined type. The distribution of Group r, for example, closely followed the distribution of fishing grounds targeted by the scallop fisheries (Kaiser et al, 2008). While it is possible that the range of natural environmental conditions in these areas was favorable for the establishment of the Group r community, it is likely that, with a history of fishing disturbance in these areas, fishing could have been a structuring force for this community. The Marine Habitat classification for Britain and Ireland takes only "relatively poor" account of anthropogenic disturbance, and thus takes little account of the links between disturbed biotopes and classified undisturbed biotopes (Connor, 2006). Therefore, the classification of communities to the biotope level might not always be appropriate. The benefit of the hierarchical structure of the classification scheme is that classification of habitats at broader habitat levels still reflects the general nature of the community types that occur in them, as the suitability of the physical habitat determines the type of communities which can be established (Connor et al., 2006). As broader levels of classification can more accurately be applied than biotope classifications, these are perhaps more useful for broadscale mapping and management (Connor et al., 2004).

4.2 Mapping and interpolation

4.2.1 Comparisons with other mapping projects

As each level of classification provided slightly different information, community types, biotopes, and broader habitat classifications were mapped by station and were also interpolated between stations to generate full-coverage maps of the seabed. While point maps reflect the occurrence of real data, full-coverage maps are important for predicting the distribution of habitat and community types at a broader scale, and are thus valuable tools for management of the marine environment (Robinson et al., 2007). Interpolation of the available data or methods of predictive modelling can be implemented to generate full coverage maps. In this study, interpolation of the data was a reasonable approach, as the survey stations had been evenly spaced throughout the whole of the territorial sea. This is in contrast to other mapping projects, such at the HABMAP project, where the available biological survey data came from patchily distributed areas of the sea and alternative methods were necessary (Robinson et al., 2007).

While biotope and habitat classification in this study was primarily motivated by the identification of benthic community types, other habitat mapping projects have concentrated on the collation of comprehensive physical datasets in order to predict biological distribution. The HABMAP project, which was conducted to produce biotope maps of the Southern Irish Sea, combined sediment, bathymetry, wave and tidal stress, temperature, salinity and light attenuation data and used predictive modelling to create biotope maps, based on the relationships identified between biological communities and these environmental variables (Robinson et al., 2007). The MESH and UKSeaMap 2010 projects also relied on significant input of physical data for the mapping of seabed habitats. These projects both identified the distribution of level 3 and level 4 habitats (main habitats and biotope complexes) (Coltman et al., 2008, Joint Nature Conservation Committee, 2009). This highlights a weakness in the current study, as the distributions of biotopes and habitats were mapped using limited physical data.

4.2.2 Spatial resolution analysis

The results of the spatial resolution analysis indicated the usefulness of interpolation between stations sampled on a 5 km grid for the prediction of community, biotope, and broader habitat distributions. Different community types existed among stations that were sampled at less than 5 km apart from each other, which indicated that interpolation between stations sampled on the 5 km grid might not be appropriate for predicting the distribution of community types. As only one person

conducted the photo analysis for each of the stations sampled at < 5 km, the perception of the photo analyst would not have been a factor in the identification of different community types among these stations. Stations on the 5 km grid were analyzed by different analysts than those which were sampled at < 5 km. While, for most areas, differences in community type and biotope between the grouped stations and the nearest broad survey station were considered "real", it is important to acknowledge the possibility that the perceptions of different photo analysts could create artefacts in the community analysis. At East Douglas, for example, the biggest differences in the community composition between the grouped stations and the nearest survey station were based on differences in the abundance of *Glycymeris* and the occurrence of "Gastropod unid." at the grouped stations. The record of "Gastropod unid." in the grouped stations and not in the neighboring station could reflect the inability of the analysts to achieve the same taxonomic resolution during the image analysis. In addition, *Glycymeris* was typically buried with only the margin of the shell visible at the sediment surface. Differences in the ability to detect this species could have influenced the abundance recorded. As differences did exist at the community and biotope level, but not at the broad habitat level, it is likely that the level of spatial resolution achieved by sampling at 5 km is appropriate for interpolation at the broader habitat level, but not at the biotope or community level. However, with respect to the limited input of physical data to identify these habitat types, it is important that the interpolation of habitat distribution is supplemented with remotely-sensed or otherwise collected physical data, to verify that the method of interpolation was valid (Foster-Smith et al., 2007). This is particularly important with respect to the maps generated here as not all survey stations had been analyzed, and thus large areas of the seabed were interpolated between the stations with available data. Predicting the distribution of biotopes and specific community types will require more sampling at a scale less than 5 km to identify an appropriate scale for interpolation.

4.3 Distribution of fishing effot and its influence on community structure

4.3.1 Susceptibility of communities, biotopes, and broader habitats to fishing disturbance

Commercially targeted species *Pecten maximus, Aequipecten opercularis,* and *Nephrops norvegicus* did not occur in every community, biotope, and broad habitat, yet each community and habitat group was subjected to some degree of fishing activity from 2008-2010. Significant differences in the level of fishing activity were identified for groups containing commercially targeted species, and the distribution of groups with significantly higher fishing effort corresponded closely with the distribution of known fishing grounds (Mackie, 1990, Kaiser et al., 2008). Among the biotopes compared with

ANOVA, biotopes 16 and 13 were characterized by the highest fishing effort, which was significantly higher than for sensitive biotopes 1 and 11, but not for biotope 12. As biotope 12 represented six sites identified as maerl habitats within the Laxey Bay and Ramsey Bay fishing grounds, this highlighted the heightened vulnerability of maerl habitats to fishing disturbance in these areas.

4.3.2 Influence of fishing on community structure

Fishing effort was identified as an explanatory variable for community composition in only a few of the communities, biotopes, and broad habitats. The consistently higher average abundance of *Ophiura albida* at sites with higher fishing effort agreed with the work of Kaiser et al. (2000), which compared benthic communities in areas which had been subjected to high levels of fishing activity with areas characterized by low fishing activity over a 10 year period around the Isle of Man. Lightly fished areas were characterized by larger, sessile epifauna whereas a high biomass of brittlestars occurred in heavily fished areas. The authors suggested that small-sized organisms could be less susceptible to damage than larger sessile biota, which would explain their dominance in areas of greater fishing disturbance. Interestingly, in the current study, emergent epifaunal species that were listed among the top taxa contributing to the dissimilarity between areas of high and low fishing effort occurred in higher average abundances at sites characterized by high fishing effort. These included the bryozoan *Cellaria* sp., the soft-coral *Alcyonium digitatum,* and in one case the bryozoan *Flustra foliacea*. This contrasts with other works which have identified a negative influence of fishing effort on the biomass of emergent epifauna (Kaiser et al., 2000, Veale et al., 2000, Lambert et al., 2011). The commercially targeted *Aequipecten opercularis* also occurred consistently at higher abundances, along with these emergent species, in areas with high fishing effort. The occurrence of the queen scallop in areas with a greater abundance of emergent epifauna could reflect a preference of the scallop for higher quality habitats, which subsequently draws fishing effort to these areas. While the overall effort at these sites was greater, the fishing grounds in which they occur might be subjected to only a brief duration of intense fishing activity, as the fleet generally fishes grounds sequentially (Brand & Prudden, 1997). This would allow for some degree of recovery in the benthic epifauna (Veale et al., 2000), and thus why abundance of these taxa could have been higher in these areas. The higher abundance of the burrowing anemone *Cerianthus lloydii* at sites with higher fishing effort agrees with the work of Collie et al. (2000b) in which burrowing anemones were identified with a greater prevalence in gravel sediments disturbed by scallop dredging in comparison with undisturbed sites. The authors suggested that this related to the ability of burrowing anemones to retract beneath the surface to avoid disturbance. The anemone *Sagartia*

troglodytes was only present in sites characterized by low fishing effort in muddy sediments to the west of the island. The interaction of mobile fishing gear with muddy sediments can decrease the structural complexity of the habitat by collapsing faunal burrows and emergent tubes (Watling and Norse, 1998). By decreasing the quality of the habitat, fishing activity might have excluded *Sagartia* from the heavily fished areas.

4.4 Features of conservation concern and management recommendations

4.4.1 Biological designations

Four main biological features of conservation concern were identified in the Manx territorial waters during the photo analysis. These were the anemone *Edwardsia* sp., which could represent the UK BAP priority species *Edwardsia timida,* maerl, horse mussels *Modiolus modiolus*, and the ross worm *Sabellaria spinulosa.* The latter three contribute to habitat structural complexity and correspond with habitat conservation designations, which are discussed below. The burrowing anemone *Edwardsia timida* is listed as a UK BAP priority species for its rarity in British waters and its decline in abundance by 50% or more since 1983 (JNCC, 2010b). While the identification of *Edwardsia* sp. as *Edwardsia timida* requires expert confirmation, it is important to note the wide distribution of *Edwardsia* sp. around the Isle of Man. Stations with the highest abundances occurred at station 69, northeast of the Point of Ayre, at station 83, which occurred within the Port Erin closed area, and station 88, west of Langness. With respect to the vulnerability of these *Edwardsia* "hotspots" to fishing disturbance, only low abundances of *Aequipecten opercularis* and/or *Pecten maximus* occurred at these stations in comparison with other areas. The susceptibility to disturbance could additionally be mitigated by the exclusion of fishing in the Port Erin closed area and through the implementation of the marine nature reserve at Ramsey Bay, for which the proposed conservation zone would incorporate station 69 and possibly station 114, which both support *Edwardsia* (Gell & Hanley, 2010). Station 88 would remain vulnerable to fishing activity without additional measures taken to avoid fishing in this area.

4.4.2 Habitat designations

The biotope and broad habitat classifications corresponded with two Annex I habitats listed under the EC Habitats Directive, "sandbanks which are slightly covered by seawater all the time" and "reefs". The applicability of "sandbanks" in Manx waters was uncertain. While some sandy habitats fell into the appropriate depth range defined for this habitat (<20 m), the topography of the seabed could not be deciphered from photo analysis alone, and thus the distribution of sandbanks needs further

investigation. Annex I "reefs" corresponded with the classifications for circalittoral and infralittoral rock habitats identified close to the southern coast of the island at stations 84, 86, and 88, as well as several stations further to the south and directly north of the island, near the 12 nautical mile boundary. Rocky reefs or, in general, habitats with hard substrata are important in that their structural complexity provides for the association of diverse epifaunal assemblages, or "turfs", ranging from encrusting organisms to emergent forms. These habitats, including the associated epifaunal components, also provide food and places of refuge for species of commercial importance (Lambert et al., 2011). Scallop spat has been observed on emergent hydroids and bryozoans, which indicates that the integrity of emergent epifauna could have important benefits for fisheries (Lambert et al., 2011). Encrusting sponges, top-shells, the soft coral *Alcyonium digitatum,* and various hydroids and byrozoans were among the taxa observed in some of these rocky habitats around the Isle of Man. The infralittoral bedrock habitat at station 86 supported high amounts of algae among which the faunal assemblage occurred. The abundances of *Aequipecten opercularis* and *Pecten maximus* at stations corresponding with these rocky habitats were low in comparison with other areas, and most of the areas covered by circalittoral rock habitats were characterized by low fishing effort. In contrast, the infralittoral rock habitat at station 86 (biotope 4) was associated with a higher degree of fishing , which corresponded with the effort at the Port St. Mary Inshore fishing ground, although there were no scallops recorded at station 86 (Kaiser et al., 2008). As scallop dredging has been shown to limit the maximum size and total biomass of emergent epifauna on hard substrata, efforts should be made to avoid fishing in these habitats (Lambert et al, 2011). Most of these rocky stations seemed to occur away from core fishing grounds and had relatively low scallop densities, thus, averting fishing efforts from these areas could potentially be implemented with limited displacement of effort to other areas. Further investigation into the extent of the infralittoral rock habitat near the Port St. Mary Inshore fishing ground should be made to make more informed decisions about the distribution of fishing activity allowed in that area.

The classification for the *Modiolus modiolus* bed at station 23 corresponded with both the listing of "reefs" under Annex I and the UK BAP priority habitat, "*Modiolus* beds". This bed was identified south of Douglas and supported a diversity of sponges, the soft coral *Alcyonium digitatum*, hydroids, top-shells, and queen scallops, among other taxa. *Modiolus* beds have high benthic productivity and, like rocky reefs, they may provide food and habitat for species of commercial importance (Rees, 2009). The appropriateness of the term "biogenic reef" with respect to mussel bed at station 23 was uncertain, as this depends on factors such as the turbidity of the environment, the degree to which faeces and

pseudofaeces build up in the bed, the extent of the mussels across the substratum, and the height of the reef, according to Holt et al. (1998). No other *Modiolus* beds were identified during the photo analysis, however a rocky area to the southeast at station 211 supported *Modiolus* which, along with the rocky substratum, seemed support high numbers of the soft coral *Alcyonium digitatum.* Further investigation into the abundance and extent of *Modiolus* in this area is necessary. The *Modiolus* reef known to occur off the Point of Ayre was not revealed by the photo analysis, although *Modiolus* was recorded at station 71, which corresponded with the area surveyed during previous work which examined the extent of the reef (Hinz et al., 2008). *Modiolus* beds are vulnerable to damage by fishing activity as towed gear can damage both the mussels and the associated epifauna, thereby degrading the quality of the habitat (Rees, 2009). *Modiolus* beds also exhibit very slow recovery rates (Holt et al., 1998). The *Modiolus* bed at station 23 is potentially vulnerable to damage by fishing activity as both *Aequipecten opercularis* and *Pecten maximus* targeted by fisheries were recorded at this station. In addition, medium fishing effort was recorded in the area adjacent to this station. Thus, the extent of the *Modiolus* habitat should be investigated further in this area and efforts to prevent damage by fishing activity should be made.

Sabellaria spinulosa reefs are designated as OSPAR priority habitats and are listed under Annex I of the EC Habitats Directive. In addition, *Sabellaria* reefs on sublittoral rock are listed as UK BAP habitats. *Sabellaria spinulosa* was identified in high abundances at stations 205 and 219 to the south of the island. These stations were classified as sand habitats, rather than biogenic reef habitats, as the *Sabellaria* occurred in dispersed clumps over the sediment surface. While the term “reef” may not be readily applied in this case, the matrix of tubes provided a coarse element to the substratum, likely widening the range of fauna that could become established (Connor et al., 2004). Like *Modiolus* beds, *Sabellaria* reefs are vulnerable to damage by heavy fishing gear and are likely to exhibit slow recovery rates (Holt et al., 1998). While stations 205 and 219 occurred in an area characterized by low fishing activity, these stations supported a high abundance of *Aequipecten opercularis* and a low abundance of *Pecten maximus,* which makes the area potentially vulnerable to fishing activity. Measures should therefore be taken to prevent the use of mobile fishing gear in this area, to preserve the structural complexity in the habitat.

Thirteen stations located along the east coast of the island were classified as maerl habitats. Maerl habitats develop as a result of the fragmentation of coralline red algae into maerl thalli which may accumulate to form beds. These maerl thalli often have a branching structure, which adds to the structural complexity of the habitat. Maerl beds are therefore capable of supporting high biodiversity are have been recognized as UK biodiversity action plan priority habitats and OSPAR priority habitats

(Birkett et al., 1998). Two of the maerl forming species, *Phymatholithon calcareum* and *Liothothamnium coralloides,* are listed under Annex V of the EC Habitats Directive and are also listed as UK biodiversity action plan priority species. The species *Phymatholithon calcareum* was identified as the maerl forming species at survey stations along the east coast of the Isle of Man, in accordance with the most suitable biotope matches for these stations. Further confirmation of the identification of this species is necessary. In addition to supporting a high diversity of species, studies carried out in maerl habitats in Scotland have revealed a preference by juvenile queen scallops for pristine live maerl habitats as nursery grounds, in comparison with dead maerl, rock, seagrass, sand, and gravel habitats (Kamenos et al., 2004). One of the benefits of the maerl to the scallops is refuge from predators provided by the maerl's complex structure. Scallop dredging is detrimental to maerl habitats as heavy gear may directly damage the beds and as burial by sediments resuspended by demersal gear can prevent light from reaching the surface layer of slow-growing algae necessary for maintaining good status of the maerl bed (Hall-Spencer & Moore, 2000). Scallops species tended to occur with relatively low abundances in maerl habitats, with the exception of station 23 at which queen scallops had an intermediate abundance. Still, a high proportion of the seabed represented by biotope 12 at Laxey and Ramsey Bay was affected by medium fishing effort, as was the area adjacent to station 23. Based on the occurrence of maerl habitats at Ramsey Bay, it is important that the zonation and/or the activities allowed within the marine nature reserve proposed for the area do not render the maerl habitats susceptible to further disturbance, particularly with respect to stations 403, 404, and 405 which had mostly live maerl. With respect to the higher level of fishing activity recorded at Laxey and adjacent to station 23, efforts should be made to preserve the maerl habitats in these areas and to divert fishing activity from the other maerl habitats identified along the east coast.

Other UK BAP habitats corresponding with the classifications for Isle of Man habitats were "subtidal sands and gravels", which were relatively widespread, and "mud habitats in deep water", which corresponded with the muddy habitats to the west of the island and also with two stations to the northeast of the island. "May occur in tide-swept channels" corresponded with one of the macrophyte-dominated habitat classifications, however the applicability of "tide-swept channel" was questionable and could not be determined from photo analysis alone, thus further assessment is necessary. The distribution of habitats with biogenic structural components appeared to be limited, thus closing off smaller areas of the seabed from fishing activity could help to preserve these sensitive habitats. Around the Isle of Man, muds and sands and gravels are more widespread and deciding on where, and at what scale, to designate closed areas to preserve the integrity of these habitats might not be practical, or

necessary. Additionally, large closures could result in the displacement of fishing effort to previously undisturbed areas with pristine habitat (Kaiser, 2005). One method which could be employed to manage the impact of fisheries on these widespread habitats is through a system of individual habitat quotas, as described by Holland and Schnier (2006). The habitat quota system is based on the amount of habitat impacts allowed within a fishery. The habitat "stock" is decided upon to maintain a target level of average habitat quality. The stock is distributed among fishers as allowable habitat impact units (HIU). As fishing activities are more damaging in pristine habitats, a larger amount of the individual habitat quota would be used for fishing in these areas, thus the system encourages fishing in areas which have previously been fished, instead of in undisturbed areas. Habitat quotas could be implemented for different habitat types, depending on the area covered by, and the sensitivity, of each. To implement a system of IHQs at the Isle of Man, more refined methods of interpolation or predictive modelling should be implemented in the future to predict habitat distribution, in order to develop a more accurate account of the habitat "stock". This would necessitate a greater input of physical data. It is recommended that a system of IHQs is implemented at the broader habitat level (broad and main habitats, or biotope complexes). The broader habitat level is ecologically relevant and can be more accurately applied to identify distinct habitat types than at the biotope level, at which classifications are assigned with more physical and biological specificity (Connor et al., 2006).

5. CONCLUSIONS

Analysis of the community data revealed the occurrence of a variety of benthic communities and habitats in the Manx territorial sea. Classification of these communities has allowed for the distribution of biotopes and broad habitats which correspond with conservation designations to be mapped and compared with the distribution of three years of fishing effort, as well as with the occurrence of the commercially targeted species. In addition, the distribution of individual taxa of conservation interest, including *Edwardsia* sp.*, Sabellaria spinulosa, Modiolus modiolus,* and maerl were mapped in relation to fishing effort and compared with the distribution of commercially targeted species. In this way, areas of conflict between fisheries and conservation interest were identified. Particular focus was on the interaction of fishing effort with habitats with biogenic structural components or taxa which contribute to the structural complexity of the habitat, as these support high biodiversity and may be important habitats for commercially targeted species. Additionally, they are known to be particularly sensitive to damage by mobile fishing gear and are more limited in distribution in comparison with subtidal sands, gravel, and deep mud habitats. It was found that not all benthic

communities, biotopes, and broader habitats identified were equally susceptible to fishing disturbance in Manx waters and, in some, fishing was identified as an explanatory variable for community composition. A high level of fishing activity was associated with the infralittoral rock habitat identified in proximity to the Port St. Mary Inshore fishing grounds, which warrants further investigation into the extent of the rocky habitat whereby the distribution of fishing activity can be managed accordingly. While fishing effort was mainly low in circalittoral rocky habitats, these areas are also important for supporting biodiversity and efforts to avoid disturbance in these areas should be made. Additionally, maerl habitats at Laxey and Ramsey Bay, in particular, were affected by medium levels of fishing effort. While the designation of the marine nature reserve at Ramsey Bay could eliminate fishing disturbance to the maerl habitats there, additional efforts will be required to preserve the maerl habitats at Laxey and the others which occur along the east coast. Recommendations have been made to determine the extent of the *Modiolus* bed at station 23, south of Douglas, and to divert fishing from this area, as an area of medium fishing activity adjacent to the bed highlighted its vulnerability. While *Sabellaria spinulosa* did not form dense reefs at the two stations to the south of the island where this species was highly abundant, the tubes of the worm added structural complexity to the otherwise sandy habitat, which also supported high densities of the queen scallop. Thus it has been recommended that fishing efforts are also diverted from this area to preserve the habitat complexity. Further confirmation of the occurrence of *Edwardsia timida* is necessary as *Edwardsia* sp. was widely distributed around the island and is potentially vulnerable to fishing activity. In addition, the distribution of Annex I listed "sandbanks that are slightly covered by seawater all the time", and the applicability of the UK BAP habitat "tide-swept channel" , for a macrophyte-dominated community to the west of the island, need to be confirmed, as these could not be determined through the photo analysis. For more widespread habitats that were listed as UK BAP habitats including subtidal sands and gravels and deep muds, a system of Individual Habitat Quotas could be implemented to maintain an appropriate level of habitat quality. Implementation at the level of broader habitat was recommended, as accurate identification of broader habitats is less subjective than at the biotope level, which requires distinction between community types and more specific habitat descriptions. The use of this method for the management of habitat quality, however, would require more refined methods of interpolation and a more adequate input of physical data, whereby the habitat stock could be assessed more accurately.

While the maps that were generated are useful for identifying the location of features of conservation concern and areas with different community and habitat types, the accuracy of the biotope classifications and the broader habitat classifications was hindered by the limited input of

physical data. More detailed information about the substratum and the energy of the environment was necessary for distinguishing between several broader habitats, and thus hybrids between the most suitable broader habitats were applied in some cases. As the benthic communities were classified using the top-down classification scheme based on best estimates of the substratum and the most appropriate depth categories, future work should reassess the appropriateness of these classifications and refine them with a more comprehensive input of physical data. It was identified that interpolation between stations surveyed at 5 km apart was appropriate only for the prediction of broader habitat distributions. Thus, predicting the distribution of biotopes or community types may require more sampling at a smaller scale or the use of predictive modeling. An effective predictive model could be generated by relating an array of physical parameters to the community types that were identified here. While the method of interpolation used in this study seemed appropriate at the broad habitat level, the interpolated maps must be used cautiously, as the predicted distributions of the habitats in interpolated areas should be compared with real physical data for validation of the method of interpolation. This is particularly important with respect to the maps generated here as not all survey stations had been analyzed, and thus large areas of the seabed were interpolated between points with available data.

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7. APPENDICES

7.1 Detailed methodology for biotope classification

7.1.1. Narrowing down the potential habitat matches for biotope classification

7.1.1.1 Substratum

As differences in the physical nature of the substratum are important for differentiating between habitat types, the images for each station identified in a given SIMPROF group were re-visited to ensure that the terminology used to describe the substratum was consistent for all stations and was also consistent with the terminology and scale used by the habitat classification (for scale see Connor et al., 2004). Potential habitat matches were immediately limited to the broad habitats "circalittoral rock" or "infralittoral rock" for communities which occurred on bedrock. For community groups which occurred on rocky or stony sediments, the ranges in sediment diameter were estimated and categorized according to the sediment size classes defined by the classification scheme, which ranged from mud to boulders. A grid was overlaid, initially, to approximate the sizes of stones in different categories at the scale of the survey images, to be able to determine the potential fit of habitats which include stony sediments. For groups which occurred on finer sediments, the mean and median grain sizes for each station, derived from sediment particle size analysis, helped to narrow down potential habitat matches according to the ranges in sediment size described in the classification for soft-sediment habitats. Specifically, grain size was used to distinguish between coarse sands and fine sands, which occur in different "main habitats". Descriptions of grain size also helped to distinguish between mud and medium to fine sand habitats, which also occurred in different "main habitats". Medium sands were included in the descriptions of more than one "main habitat", each of which needed to be taken into consideration for groups occurring on medium sands. In this way, potential habitat matches were narrowed down according to the most appropriate fit with the substratum.

7.1.1.2 Marine biological zone

The occurrence and the characteristics of maerl and algae, which were not included in the community analysis, were also examined in further detail during the re-examination of the still images for each community group. The presence and type of algae was important for determining the most appropriate marine biological zone (infralittoral vs. circalittoral), as the distribution of kelp is limited to the infralittoral zone, while sparse foliose algae may occur in the upper circalittoral zone (Connor et al.,

2004). While the broad habitats (level 2) “infralittoral rock” and “circalittoral rock” could be distinguished based on the occurrence of kelp in a community group, rocky main habitats (level 3) are distinguished from one another based on the energy of the environment. As no information was available on the wave exposure or the strength of tidal streams at the survey stations, the list of main rock habitats could not be narrowed down further and each was examined for potential matches with the habitat of the SIMPROF community. In soft-sediment habitats, the presence of algae and/or maerl in a community allowed for the potential habitat matches to be narrowed down to the biotope complex level (level 4).

Depth was also used to narrow down the potential habitat matches according to the most appropriate marine biological zone. The stations characterized by each SIMPROF group were located on an admiralty chart and the depth range was estimated and recorded for the group. The depth range gave some indication of whether the SIMPROF community should be compared with infralittoral or circalittoral habitats as the upper boundaries of the infralittoral zone are +1 to 0 m MLWS and for the circalittoral zone are -5 to -20 m (Connor et al., 2004). However, as the ranges often overlapped between infralittoral and circalittoral habitats, depth was only useful when a group occurred in particularly deep waters and infralittoral habitats could be disregarded with confidence.

7.1.2 Data collation for comparison of Isle of Man community data with core biotope records

The biological comparative tables which accompany the Marine Habitat Classification for Britain and Ireland Version 04.05 on the JNCC website were used to make objective comparisons between the Isle of Man communities and the communities which characterized the defined biotopes. The biological data presented in the comparative tables represent the core records used to characterize each biotope, and only species which occur in more than 20% of the records for a given biotope or sub-biotope are included (Connor et al., 2004). To compare this data with the Isle of Man data, littoral habitats were first excluded from the comparative dataset and only the biological data for the remaining biotopes and sub-biotopes were included, as this was the target resolution for classifying the Isle of Man communities. Taxa that were not included in the Isle of Man community analysis were also excluded from the comparative dataset, as these taxa, with no counterpart in the Isle of Man dataset, were not useful for making meaningful comparisons between the communities. The data in the comparative tables were then merged, where necessary, to match the taxonomic resolution achieved for the Isle of Man community data and consistency in nomenclature was determined prior to collation of the datasets. As

the abundance data were represented by % prevalence in the comparative dataset and it was necessary to merge abundances to the appropriate taxonomic resolution, the abundance data were converted to presence/absence data, as % prevalence could not be merged. For each of the identified Isle of Man community groups, the presence/absence data for taxa which occurred at the stations included in a group were combined. The comparative data and the Isle of Man community data were then collated for analysis using PRIMER v6, whereby a resemblance matrix based on Bray-Curtis similarity between the community groups and the defined biotopes was generated.

7.1.3. Comparison of SIMPROF communities with biotope descriptions

The suitability of the substratum and depth band was considered first, as the classification system is primarily based on the physical attributes of a habitat. If there was uncertainty with respect to the fit of the physical description, the physical comparative tables which accompany the classification on the JNCC website were examined. These tables include information on the occurrence of a given biotope in different depth bands as well as more detailed information about the substratum. With respect to the latter, this includes the average percentage of sediments from different size categories that occur within the habitat (Connor et al., 2004). The community description provided for each biotope was compared with the list of taxa identified by the SIMPER analysis for the community in question, or the most dominant taxa recorded for community groups that were represented by only one station. The relative abundances of the taxa within a community group were compared to the biotope description with reference to the SIMPER output and the raw abundance data recorded during the photo analysis. The general nature of the community within the habitat was determined and compared with the biotope description based on the re-examination of the survey images. Mention of the most dominant taxa in the Isle of Man communities in the biotope description was important for identifying fitting community descriptions. When the physical habitat description seemed fitting, but there was a question of biological fit after comparisons with the community description, the list of SIMPER species, or the list of dominant taxa, was entered into the biotope decision support tool *BioScribe,* available from the JNCC website. This software has been developed to assist in making objective decisions when classifying communities according to the Marine Habitat Classification for Britain and Ireland (Joint Nature Conservation Committee, n.d.a). A list of potential habitat/biotope matches is returned based on the input of a list of characterizing species and the percentage prevalence of each input species is listed for each habitat. As the list generated in *BioScribe* includes of all of the habitats and biotopes containing one or more of the input taxa, this tool was used as a secondary method of community comparison only

when the potential biotope matches had been significantly narrowed down. *BioScribe* provided information about the presence or absence and the relative importance of the SIMPER taxa, or dominant taxa, in the potential biotope matches. This was useful information which could not be deciphered from the Bray-Curtis similarity with the core biotope records.

7.2 Station mean fishing effort used for ANOVA

Table 1. Mean fishing effort at survey stations corresponding with benthic communities, biotopes, and broad habitats identified in Manx territorial waters. Mean fishing effort for each station corresponded with the mean fishing effort recorded within a 2 km buffer zone surrounding each survey station. Fishing effort was measured as the total number of Vessel Monitoring System (VMS) records km^{-2} documented for the years 2008-2010. These data were used to conduct an analysis of variance (ANOVA) to determine whether or not there were significant differences in the fishing effort among communities, biotopes, and broader habitats. Stations within each group represented the replicates for comparison. Standard error for the mean fishing effort is presented for each station (SE).*Not enough replicates for inclusion in ANOVA.

Community	Station	Fishing effort (records/km^2)	SE	Biotope	Station	Fishing effort (records/km^2)	SE	Broad classification	Station	Fishing effort (records/km^2)	SE
a	39	25.688	1.948	1	62	11.985	1.165	1*	84	2.534	0.687
a	40	22.132	1.525	1	63	5.038	0.25	1*	88	2.602	0.908
a	44	38.035	1.978	1	64	5.736	0.378	2*	86	71.008	8.301
a	45	27.238	0.926	1	208	47.371	3.624	3*	23	14.43	2.508
a	46	44.214	2.679	1	211	5.836	0.524	4	30	7.652	0.657
a	48	53.68	0.97	2*	88	2.602	0.908	4	33	33.822	1.984
a	50	52.515	0.911	3*	84	2.534	0.687	4	91	1.989	0.272
a	51	63.448	1.64	4*	86	71.008	8.301	4	92	26.12	1.147
a	52	57.632	1.654	5*	23	14.43	2.508	4	93	1.055	0.08
a	53	48.237	1.253	6	4	15.084	0.485	4	95	1.498	0.31
a	54	56.129	1.456	6	5	2.082	0.295	4	120	24.803	1.524
a	55	39.901	3.286	6	6	8.524	0.709	4	400	8.511	1.656
a	102	35.993	2.026	6	7	15.073	0.797	4	401	2.355	0.509
a	203	16.979	1.609	6	11	2.696	0.37	4	402	16.87	3.183
a	222	25.363	0.962	6	20	60.947	2.703	5	4	15.084	0.485
a	227	26.834	1.372	6	27	18.982	1.176	5	5	2.082	0.295
aa	31	1.028	0.091	6	36	44.01	3.126	5	6	8.524	0.709
aa	85	12.907	2.191	6	42	20.245	2.767	5	7	15.073	0.797
aa	87	0.481	0.067	6	57	13.001	1.252	5	9	35.644	1.328
aa	89	0.424	0.047	6	67	0.095	0.026	5	11	2.696	0.37
ab	30	7.652	0.657	6	80	15.809	1.426	5	20	60.947	2.703
ab	33	33.822	1.984	6	81	45.302	1.091	5	25	38.353	1.555
ac*	94	0.98	0.062	6	82	50.235	1.428	5	26	169.322	26.907

Table 1 continued.

Community	Station	Fishing effort (records/km^2)	SE	Biotope	Station	Fishing effort (records/km^2)	SE	Broad classification	Station	Fishing effort (records/km^2)	SE
ad	400	8.511	1.656	6	101	42.985	2.423	5	27	18.982	1.176
ad	401	2.355	0.509	6	103	37.985	2.06	5	28	56.06	3.33
ad	402	16.87	3.183	6	106	129.036	10.285	5	32	7.848	0.997
ae*	23	14.43	2.508	6	108	15.541	1.733	5	35	123.901	3.568
af	62	11.985	1.165	6	119	16.921	0.573	5	36	44.01	3.126
af	63	5.038	0.25	6	216	7.149	0.553	5	38	102.821	2.941
af	64	5.736	0.378	6	412	92.856	6.238	5	41	45.856	3.772
af	208	47.371	3.624	6	414	69.232	6.844	5	42	20.245	2.767
af	211	5.836	0.524	7*	120	24.803	1.524	5	57	13.001	1.252
ag	209	14.899	1.199	8	30	7.652	0.657	5	58	19.642	1.797
ag	210	16.509	0.611	8	33	33.822	1.984	5	67	0.095	0.026
ah	221	26.738	0.953	8	91	1.989	0.272	5	76	145.423	5.615
ah	225	30.997	0.495	8	92	26.12	1.147	5	80	15.809	1.426
ah	226	20.811	1.233	8	93	1.055	0.08	5	81	45.302	1.091
ai	58	19.642	1.797	8	95	1.498	0.31	5	82	50.235	1.428
ai	59	0.47	0.084	8	400	8.511	1.656	5	83	80.833	8.776
ai	61	10.055	1.431	8	401	2.355	0.509	5	94	0.98	0.062
ai	65	72.722	3.834	8	402	16.87	3.183	5	97	107.086	5.132
ai	66	21.658	1.568	9*	79	1.398	0.45	5	98	119.691	3.833
ai	110	18.939	2.005	10	75	3.522	1.349	5	99	77.649	7.591
ai	113	0.466	0.083	10	77	0.223	0.088	5	100	73.799	6.727
aj*	116	0.069	0.024	10	78	0	0	5	101	42.985	2.423
ak*	69	0.363	0.082	11	1	13.513	0.912	5	103	37.985	2.06
al	19	42.72	6.478	11	24	2.578	0.412	5	106	129.036	10.285
al	29	19.244	1.148	11	90	7.335	1.916	5	108	15.541	1.733
al	68	0.351	0.037	11	403	33.93	2.372	5	109	51.391	5.52

Table 1 continued.

Community	Station	Fishing effort (records/km^2)	SE	Biotope	Station	Fishing effort (records/km^2)	SE	Broad classification	Station	Fishing effort (records/km^2)	SE
al	74	13.45	2.901	11	404	2.653	1.392	5	112	1.059	0.11
am	3	46.123	1.839	11	405	32.786	5.411	5	119	16.921	0.573
am	8	18.456	1.027	12	18	3.364	0.842	5	206	25.153	1.685
am	214	25.527	1.304	12	22	61.446	2.947	5	207	73.426	3.037
am	410	52.794	4.059	12	114	16.067	2.52	5	209	14.899	1.199
an	60	5.597	0.971	12	409	42.914	4.063	5	210	16.509	0.611
an	96	11.827	1.948	12	410	52.794	4.059	5	215	30.068	2.477
an	212	11.553	0.432	12	411	35.969	0	5	216	7.149	0.553
an	213	5.944	0.668	13	39	25.688	1.948	5	220	13.442	1
b*	72	0.3	0.045	13	40	22.132	1.525	5	221	26.738	0.953
c*	17	0.141	0.022	13	44	38.035	1.978	5	225	30.997	0.495
d	49	50.98	1.386	13	45	27.238	0.926	5	226	20.811	1.233
d	117	8.432	2.11	13	46	44.214	2.679	5	406	142.767	11.964
d	218	9.955	1.131	13	48	53.68	0.97	5	407	173.161	9.878
e*	86	71.008	8.301	13	49	50.98	1.386	5	408	0.764	0.371
e*	112	1.059	0.11	13	50	52.515	0.911	5	412	92.856	6.238
f*	73	0.227	0.033	13	51	63.448	1.64	5	414	69.232	6.844
f*	111	0.294	0.034	13	52	57.632	1.654	6	75	3.522	1.349
g*	11	2.696	0.37	13	53	48.237	1.253	6	77	0.223	0.088
g*	80	15.809	1.426	13	54	56.129	1.456	6	78	0	0
h*	79	1.398	0.45	13	55	39.901	3.286	6	79	1.398	0.45
i	75	3.522	1.349	13	102	35.993	2.026	7	1	13.513	0.912
i	77	0.223	0.088	13	203	16.979	1.609	7	18	3.364	0.842
i	78	0	0	13	222	25.363	0.962	7	22	61.446	2.947
j	12	0.637	0.075	13	227	26.834	1.372	7	24	2.578	0.412
j	13	2.559	0.474	14	12	0.637	0.075	7	90	7.335	1.916

Table 1 continued.

Community	Station	Fishing effort (records/km^2)	SE	Biotope	Station	Fishing effort (records/km^2)	SE	Broad classification	Station	Fishing effort (records/km^2)	SE
j	43	7.62	1.113	14	13	2.559	0.474	7	114	16.067	2.52
j	47	13.038	1.83	14	43	7.62	1.113	7	403	33.93	2.372
j	67	0.095	0.026	14	47	13.038	1.83	7	404	2.653	1.392
j	104	33.398	1.323	14	104	33.398	1.323	7	405	32.786	5.411
k	120	24.803	1.524	15*	58	19.642	1.797	7	409	42.914	4.063
k	403	33.93	2.372	16	9	35.644	1.328	7	410	52.794	4.059
k	404	2.653	1.392	16	25	38.353	1.555	7	411	35.969	0
k	405	32.786	5.411	16	26	169.322	26.907	8	39	25.688	1.948
k	408	0.764	0.371	16	28	56.06	3.33	8	40	22.132	1.525
l*	205	6.112	0.447	16	32	7.848	0.997	8	44	38.035	1.978
l*	219	2.469	0.243	16	35	123.901	3.568	8	45	27.238	0.926
m	42	20.245	2.767	16	38	102.821	2.941	8	46	44.214	2.679
m	56	20.015	2.282	16	41	45.856	3.772	8	48	53.68	0.97
m	82	50.235	1.428	16	76	145.423	5.615	8	50	52.515	0.911
m	101	42.985	2.423	16	83	80.833	8.776	8	51	63.448	1.64
n	57	13.001	1.252	16	97	107.086	5.132	8	52	57.632	1.654
n	103	37.985	2.06	16	98	119.691	3.833	8	53	48.237	1.253
n	105	27.375	2.85	16	99	77.649	7.591	8	54	56.129	1.456
n	108	15.541	1.733	16	100	73.799	6.727	8	55	39.901	3.286
o	20	60.947	2.703	16	109	51.391	5.52	8	102	35.993	2.026
o	81	45.302	1.091	16	206	25.153	1.685	8	203	16.979	1.609
o	106	129.036	10.285	16	207	73.426	3.037	8	222	25.363	0.962
p*	412	92.856	6.238	16	209	14.899	1.199	8	227	26.834	1.372
p*	414	69.232	6.844	16	210	16.509	0.611	9*	49	50.98	1.386
q	21	26.101	1.151	16	215	30.068	2.477	10	3	46.123	1.839
q	409	42.914	4.063	16	220	13.442	1	10	8	18.456	1.027

Table 1 continued.

Community	Station	Fishing effort (records/km^2)	SE	Biotope	Station	Fishing effort (records/km^2)	SE	Broad classification	Station	Fishing effort (records/km^2)	SE
q	411	35.969	0	16	221	26.738	0.953	10	19	42.72	6.478
r	9	35.644	1.328	16	225	30.997	0.495	10	29	19.244	1.148
r	22	61.446	2.947	16	226	20.811	1.233	10	59	0.47	0.084
r	25	38.353	1.555	16	406	142.767	11.964	10	60	5.597	0.971
r	26	169.322	26.907	16	407	173.161	9.878	10	61	10.055	1.431
r	28	56.06	3.33	16	408	0.764	0.371	10	65	72.722	3.834
r	35	123.901	3.568	17	31	1.028	0.091	10	66	21.658	1.568
r	37	12.09	1.039	17	59	0.47	0.084	10	68	0.351	0.037
r	38	102.821	2.941	17	61	10.055	1.431	10	69	0.363	0.082
r	41	45.856	3.772	17	65	72.722	3.834	10	71	0.261	0.045
r	76	145.423	5.615	17	66	21.658	1.568	10	72	0.3	0.045
r	83	80.833	8.776	17	71	0.261	0.045	10	73	0.227	0.033
r	97	107.086	5.132	17	73	0.227	0.033	10	74	13.45	2.901
r	98	119.691	3.833	17	85	12.907	2.191	10	96	11.827	1.948
r	107	109.024	6.629	17	87	0.481	0.067	10	110	18.939	2.005
r	109	51.391	5.52	17	89	0.424	0.047	10	111	0.294	0.034
r	206	25.153	1.685	17	94	0.98	0.062	10	113	0.466	0.083
r	207	73.426	3.037	17	110	18.939	2.005	10	212	11.553	0.432
r	215	30.068	2.477	17	111	0.294	0.034	10	213	5.944	0.668
r	220	13.442	1	17	113	0.466	0.083	10	214	25.527	1.304
r	406	142.767	11.964	18	3	46.123	1.839	11	31	1.028	0.091
r	407	173.161	9.878	18	8	18.456	1.027	11	62	11.985	1.165
s	4	15.084	0.485	18	19	42.72	6.478	11	63	5.038	0.25
s	5	2.082	0.295	18	29	19.244	1.148	11	64	5.736	0.378
s	6	8.524	0.709	18	60	5.597	0.971	11	85	12.907	2.191
s	7	15.073	0.797	18	68	0.351	0.037	11	87	0.481	0.067

Table 1 continued.

Community	Station	Fishing effort (records/km^2)	SE	Biotope	Station	Fishing effort (records/km^2)	SE	Broad classification	Station	Fishing effort (records/km^2)	SE
s	27	18.982	1.176	18	69	0.363	0.082	11	89	0.424	0.047
s	36	44.01	3.126	18	74	13.45	2.901	11	208	47.371	3.624
s	118	16.49	1.115	18	96	11.827	1.948	11	211	5.836	0.524
s	119	16.921	0.573	18	212	11.553	0.432	12	17	0.141	0.022
s	204	2.767	0.274	18	213	5.944	0.668	12	21	26.101	1.151
s	216	7.149	0.553	18	214	25.527	1.304	12	37	12.09	1.039
s	217	6.474	1.002	19	17	0.141	0.022	12	56	20.015	2.282
t*	88	2.602	0.908	19	21	26.101	1.151	12	105	27.375	2.85
t*	100	73.799	6.727	19	37	12.09	1.039	12	107	109.024	6.629
u*	32	7.848	0.997	19	56	20.015	2.282	12	116	0.069	0.024
u*	99	77.649	7.591	19	105	27.375	2.85	12	117	8.432	2.11
v	18	3.364	0.842	19	107	109.024	6.629	12	118	16.49	1.115
v	71	0.261	0.045	19	116	0.069	0.024	12	204	2.767	0.274
v	114	16.067	2.52	19	117	8.432	2.11	12	205	6.112	0.447
w*	1	13.513	0.912	19	118	16.49	1.115	12	217	6.474	1.002
w*	90	7.335	1.916	19	204	2.767	0.274	12	218	9.955	1.131
x*	84	2.534	0.687	19	205	6.112	0.447	12	219	2.469	0.243
y	91	1.989	0.272	19	217	6.474	1.002	13	12	0.637	0.075
y	92	26.12	1.147	19	218	9.955	1.131	13	13	2.559	0.474
y	93	1.055	0.08	19	219	2.469	0.243	13	43	7.62	1.113
y	95	1.498	0.31	20*	72	0.3	0.045	13	47	13.038	1.83
z*	24	2.578	0.412	20*	112	1.059	0.11	13	104	33.398	1.323

7.3 Benthic community descriptions

The following descriptions of the community groups were based on the SIMPER output, for the forty communities identified using the SIMPROF procedure, and reference to the raw data and station images for relative taxa abundances, habit, and the nature of the substratum. With reference to the descriptions of the abundance for each taxon in the community, the term "very high" referred to taxa with typical abundances of 100 or more for the majority of the stations, "high" corresponded with an abundance of more than 20 individuals, "common" referred to abundances between 5-20, and "low" was used to described taxa which occurred with abundances of 5 or less at the majority of the stations within a community group.

Group a (16 stations)

Stations: 39, 40, 44, 45, 46, 48, 50, 51, 52, 53, 54, 55, 102, 203, 222, 227

COMMUNITY DESCRIPTION:

The occurrence of burrowing fauna in this community was indicated by the prevalence of small and large burrows in the sediment at these stations.

This community was characterized by the Norway lobster *Nephrops norvegicus* and shrimp-like decapods of the infraorder Caridea, including *Crangon* sp. and *Pandalus* sp.These decapods were prevalent across the stations and occurred at low abundances per station. The anemone *Sagartia troglodytes* occurred at high abundances at several stations within this group. Polychaete tubes emerging from the sediment were also commonly observed.

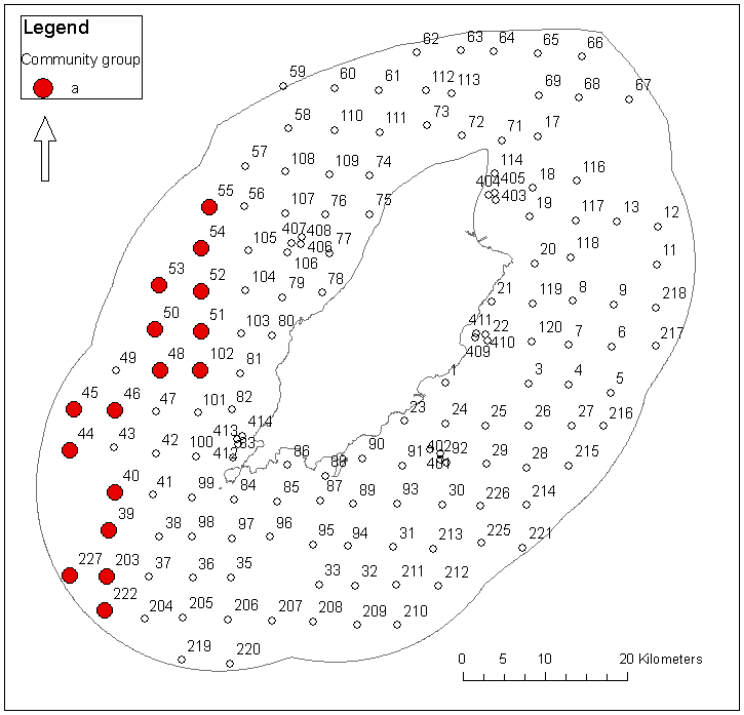

Figure 1. Distribution of stations which comprised community Group a in Manx territorial waters. Map generated using ArcGIS

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Nephrops norvegicus	11.98	0.99	48.28	0.22
Caridea unid.	4.86	0.5	19.59	0.16
Sagartia troglodytes	4.15	0.33	16.73	12.82
Crangon sp.	1.53	0.32	6.18	0.14

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Nephrops norvegicus	0.22
Taxa of conservation concern	
Edwardsia sp. (Station 203)	0.01

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: $\geq$ 50 m

SUBSTRATUM: Mud/fine sand; small and large burrows were prevalent, polychaete tubes were commonly observed.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group a	EUNIS	Similarity %	Fit
SS.SMu.CFiMu.SpnMeg	A5.361	26.67	Good
SS.SMu.CFiMu.MegMax	A5.362	20.00	Good physical, poor biological
SS.SMu.CFiMu.BlyrAchi	A5.363	8.00	Good*
SS.SMu.CSaMu.ThyNten	A5.352	8.00	Reasonable physical, poor biological
SS.SMu.OMu.LevHet	A5.375	No data	Poor biological, good physical
SS.SMu.OMu.MyrPo	A5.377	No data	Poor biological, good physical

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group a	**EUNIS**
SS.SMu	A5.3

REPRESENTATIVE IMAGES:

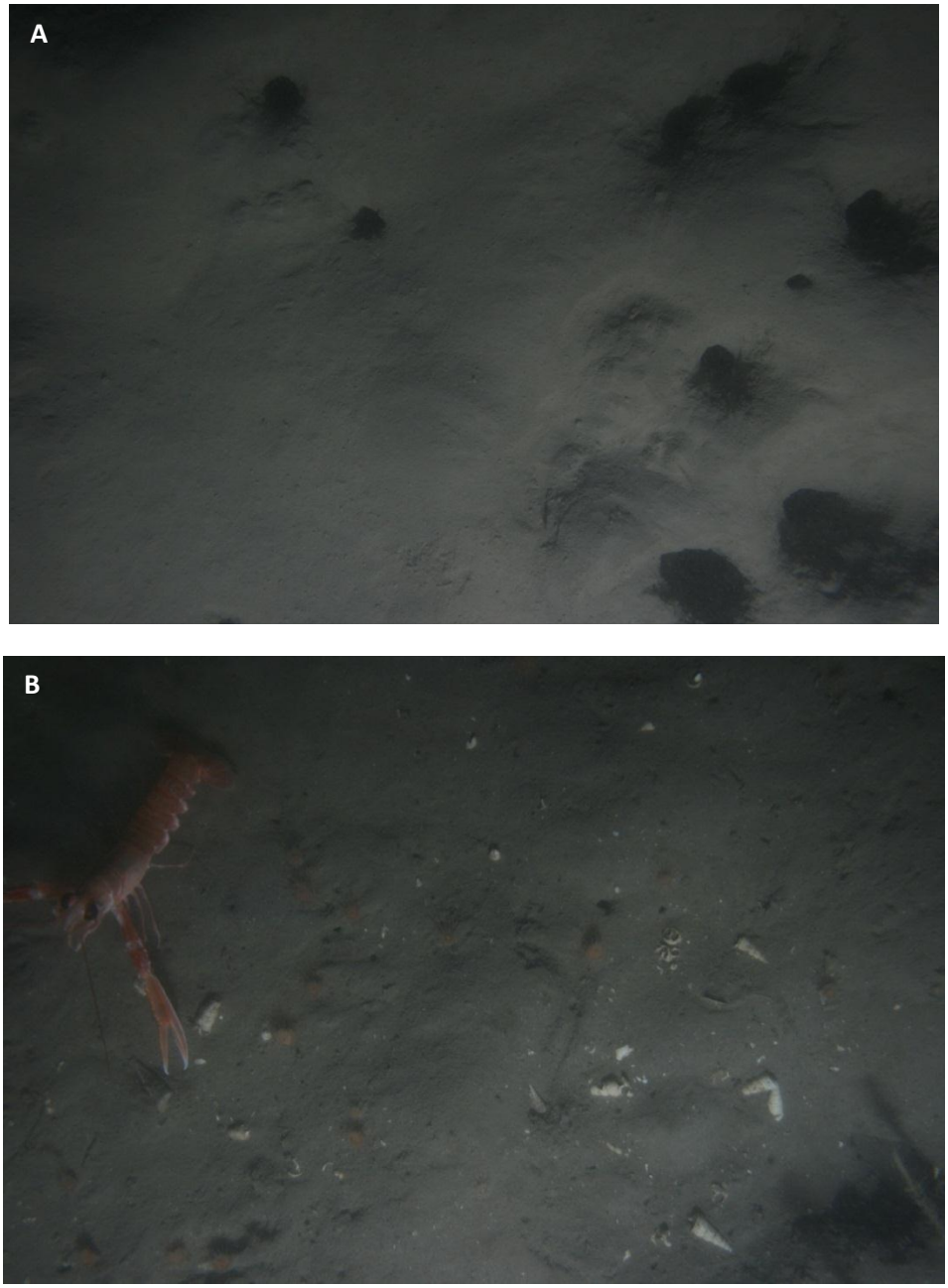

Plate 1. A) Megafaunal burrows at station 53, B) *Nephrops norvegicus* at station 40.

Group aa (4 stations)

STATIONS: 31, 85, 87, 89

COMMUNITY DESCRIPTION:

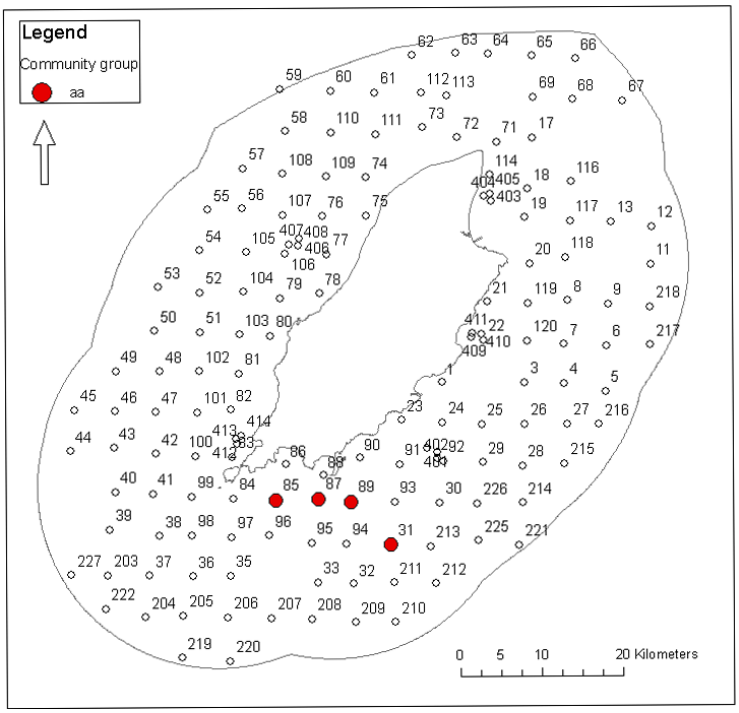

Figure 1. Distribution of stations which comprised community Group aa in Manx territorial waters. Map generated using ArcGIS.

This community was observed on coarse stony substrata often with shells on the surface of the substratum. Small patches of encrusting sponge were commonly observed on stones. The bivalve *Glycymeris glycymeris,* the squat lobster *Galathea* sp.*,* and unidentified hydroids occurred in high numbers across the stations. Top-shells *Gibbula* sp.*,* the painted top-shell *Calliostoma zizyphinum,* the hydroid *Nemertesia antennina,* the crab *Liocarcinus* sp.*,* the soft coral *Alcyonium digitatum,* the queen scallop *Aequipecten opercularis,* and the urchin *Echinus esculentus* also occurred consistently across the stations. Anemones were also commonly observed within this community. Present at lower abundances were the anemones *Sagartia elegans* and *Cerianthus lloydii.* The starfish *Asterias rubens,* feather duster worms of the Sabellidae family, and various decapods, including hermit crabs *Pagurus* spp., the crab *Ebalia* sp.*,* and the shrimp *Pandalus* sp. also occurred consistently across the stations with low abundances. Emergent polychaete tubes were also observed with low abundances across the stations.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Glycymeris glycymeris	10.74	2.72	16.63	18.56
Porifera unid.	5.82	1.53	9.01	13.22
Galathea sp.	5.01	2.79	7.76	3.84
Gibbula sp.	4.14	6	6.41	3.18
Calliostoma zizyphinum	3.61	2.9	5.58	2.08
Nemertesia antennina	3.38	5.02	5.23	1.90
Anemone unid.	2.92	7.5	4.53	0.92
Liocarcinus sp.	2.86	3.18	4.42	1.28
Alcyonium digitatum	2.8	5.67	4.34	0.90
Echinus esculentus	2.6	6.66	4.02	1.00
Pagurus spp.	2.32	8.08	3.59	0.54
Sagartia elegans	2.14	5.42	3.31	0.56
Asterias rubens	1.99	1.96	3.07	0.67
Decapoda unid.	1.7	6.24	2.63	0.31
Sabellidae unid.	1.57	14.04	2.43	0.36
Cerianthus lloydii	1.52	16.11	2.36	0.26
Aequipecten opercularis	1.29	0.91	1.99	0.46
Ebalia sp.	1.07	16.05	1.66	0.10
Pandalus sp.	0.85	0.91	1.31	0.33

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Aequipecten opercularis	0.46
Taxa of conservation concern	
Edwardsia sp. (Station 85)	0.05
Modiolus modiolus (Station 85)	0.03

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 20-50 m

SUBSTRATUM:

Very coarse mixture of coarse sand and stones ranging from gravel to small boulders; pebbles and cobbles dominated the mixture. Shells were also a prominent feature of the substratum.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group aa	EUNIS	Similarity %	Fit
SS.SMx.CMx.FluHyd	A5.444	40.00	Reasonable*
CR.HCR.XFa.SpNemAdia	A4.135	38.55	Reasonable
SS.SMx.CMx.ClloMx.Nem	A5.4411	34.29	Reasonable
CR.MCR.EcCr.UrtScr	A4.213	13.11	Poor
SS.SCS.CCS.PomB	A5.131	10.34	Poor

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group aa	EUNIS
SS.SMx.CMx/CR	A5.44/A4

REPRESENTATIVE IMAGES

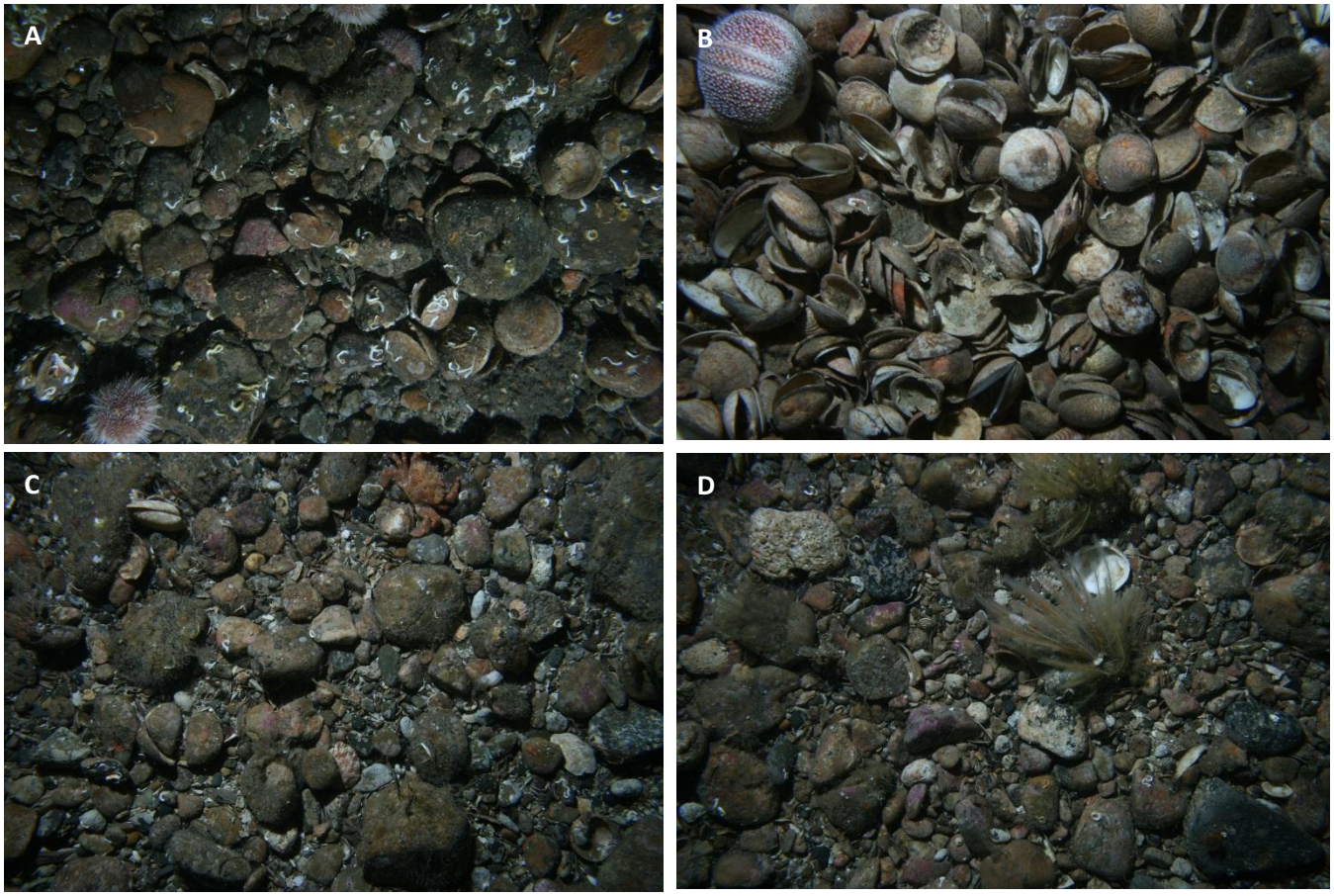

Plate 1. A) Station 31, B) example of high shell content at station 85, C) station 87, D) station 89.

Group ab (2 stations)

STATIONS: 30, 33

COMMUNITY DESCRIPTION:

This community was observed on substrata comprised of small stones, predominately gravel, and shell. This community was characterized by the high abundance and prevalence of the bivalve *Glycymeris glycymeris.* Top-shells *Gibbula* sp. and hydroids were also abundant across these stations. Also commonly observed were sponges, including the encrusting sponge *Pseudosuberites sulphureus,* which often encrusted the shells of the queen scallop *Aequipecten opercularis.* Squat lobsters *Galathea* sp. were also commonly observed. The shrimp *Pandalus* sp.,hermit crabs *Pagurus* spp.*,* chitons in the class *Polyplacophora,* the painted top-shell *Calliostoma zizyphinum,* the anemone *Cerianthus lloydii,* the starfish *Asterias rubens* and *Crossaster papposus,* and the urchin *Echinus esculentus* were observed at low abundances across the stations. Emergent polychaete tubes were observed in low numbers across these stations.

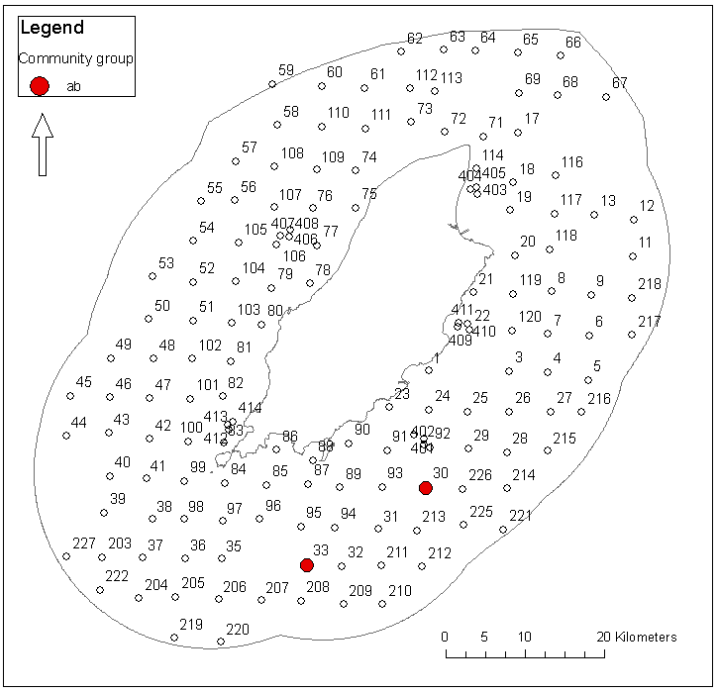

Figure 1. Distribution of stations which comprised community Group ab in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Glycymeris glycymeris	12.87	-	21.26	10.98
Gibbula sp.	8.81	-	14.56	3.35
Porifera unid.	5.57	-	9.21	2.84
Galathea sp.	4.55	-	7.52	1.55
Pseudosuberites sulphureus	3.22	-	5.32	0.82
Cerianthus lloydii	2.79	-	4.6	0.31
Pagurus spp.	2.79	-	4.6	0.41
Pandalus sp.	2.79	-	4.6	0.41
Aequipecten opercularis	2.28	-	3.76	1.80
Asterias rubens	2.28	-	3.76	0.31
Calliostoma zizyphinum	2.28	-	3.76	0.36
Echinus esculentus	2.28	-	3.76	0.21
Crossaster papposus	1.61	-	2.66	0.15
Polyplacophora unid.	1.61	-	2.66	0.10

Table 2. Presented are the average abundances m^{-2} for fished species that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group.

Fished species	Av. Abundance/m^2
Pecten maximus	0.05
Aequipecten opercularis	1.80

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 30-60 m

SUBSTRATUM:

Gravel and shells overlying coarse sand, some pebbles and cobbles.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group ab	EUNIS	Similarity %	Fit
SS.SMx.CMx.ClloMx	A5.441	35.29	Reasonable
SS.SMx.CMx.ClloMx.Nem	A5.4411	32.73	Reasonable
SS.SMx.CMx.FluHyd	A5.444	32.73	Poor physical, reasonable biological
SS.SCS.CCS.Nmix	A5.5112	28.57	Good physical, reasonable biological*
SS.SCS.CCS.MedLumVen	A5.132	18.18	Good physical, reasonable biological*
SS.SCS.OCS.GlapThyAmy	-	-	Reasonable physicial

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group ab	EUNIS
SS.SCS.CCS	A5.13

REPRESENTATIVE IMAGES:

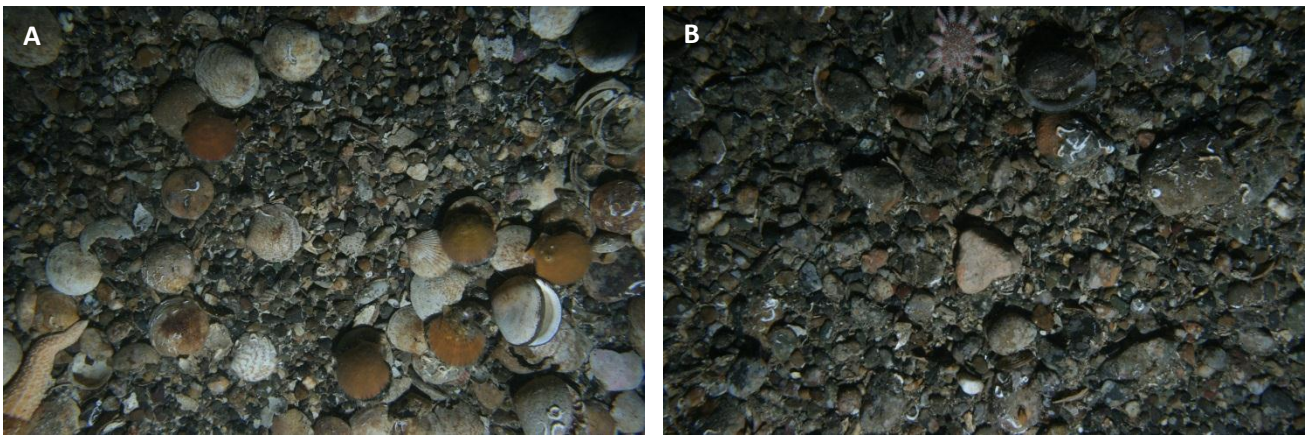

Plate 1. A) Station 30, B) station 33.

Group ac (1 station)

STATIONS: 94

COMMUNITY DESCRIPTION:

This community occurred on a coarse substratum with notable shell content. Other than the bivalve *Glycymeris glycymeris,* which was the most abundant species, the conspicuous fauna an this station occurred with low abundances. These included the top-shells *Gibbula* sp., squat lobsters *Galathea sp.,* the urchin *Echinus esculentus,* hydroids, including *Nemertesia antennina,* the painted top-shell *Calliostoma zizyphinum,* and the starfish *Henricia oculata.*

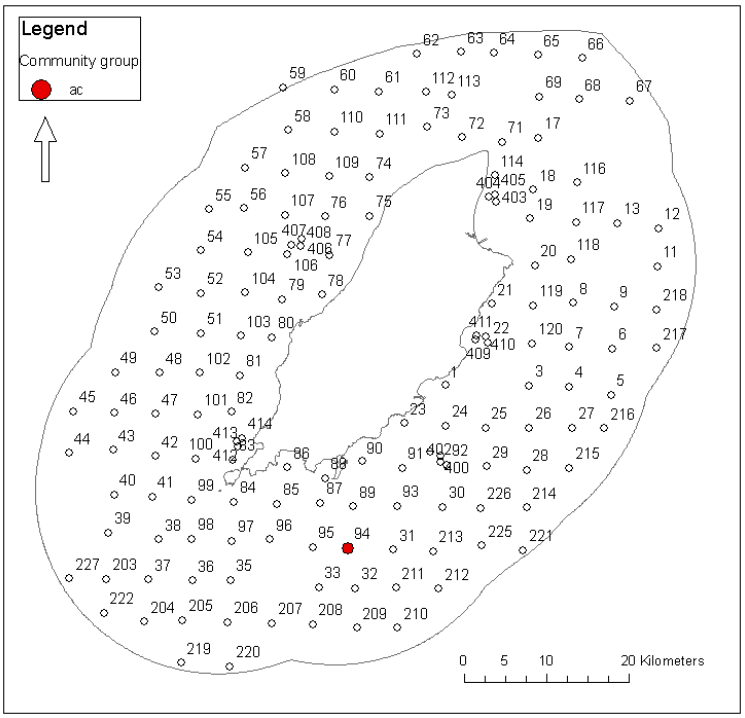

Figure 1. Distribution of stations which comprised community Group ac in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the abundances m^{-2} for the taxa which were recorded at the station characterized by this group. A SIMPER analysis could not be conducted to identify the characterizing taxa as the community was represented by only one station.

Species	Abundance/m^2
Glycymeris glycymeris	29.99
Gibbula sp.	2.34
Galathea sp.	1.87
Echinus esculentus	1.41
Henricia oculata	0.94
Nemertesia antennina	0.94
Calliostoma zizyphinum	0.94
Buccinum undatum	0.47
Anemone unid.	0.47
Ascidian unid.	0.47
Porifera unid.	0.47

No fished species or taxa of conservation concern were recorded for this community.

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 35-60 m

SUBSTRATUM:

Coarse sand underlying gravel, pebbles/cobbles, and shell.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Group ac	EUNIS	Similarity %	Fit
SS.SMx.CMx.FluHyd	A5.444	38.46	Reasonable physical, poor biological*
SS.SMx.IMx.CreAsAn	A5.431	30.00	Reasonable physical, poor biological
SS.SMx.CMx.ClloMx.Nem	A5.4411	15.38	Reasonable physical, poor biological
SS.SMx.CMx.ClloMx	A5.441	9.09	Reasonable physical, poor biological
SS.SCS.CCS.Blan	A5.135	0.00	Reasonable physical
SS.SCS.CCS.MedLumVen	A5.132	0.00	Reasonable physical
SS.SCS.CCS.Nmix	A5.134	0.00	Reasonable physical, poor biological

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification	EUNIS
SS.SCS.CCS/SS.SMx.CMx	A5.13/ A5.44

REPRESENTATIVE IMAGES:

Plate 1. Station 94.

Group ad (3 stations)

STATIONS: 400, 401, 402

COMMUNITY DESCRIPTION:

This community was observed on substrata comprised of small stones, predominately gravel, and shell. This community was characterized by the high abundance and prevalence of the bivalve *Glycymeris glycymeris.* Gastropods were also prevalent and abundant throughout these stations and included top-shells *Gibbula* sp. and the painted top-shell *Calliostoma zizyphinum,* although the latter was observed at low abundances per station. Other taxa observed at lower abundances in this community were squat lobsters *Galathea* sp., sponges including the encrusting sponge *Pseudosuberites sulphureus*, the bryozoan *Flustra foliacea,* the queen scallop *Aequipecten opercularis,* the starfish *Asterias rubens,* hermit crabs *Pagurus* spp., and unidentified ascidians. Hydroids were commonly observed across the stations and included *Nemertesia anntenina,* although the abundance of this hydroid varied by station. Polychaete tubes were commonly observed emerging from the sediment, including those of the polychaete *Lanice conchilega.* Small burrows were occasionally observed in the sediment. White encrusting *Pomatoceros* sp. tubes were often observed on shells and larger stones.

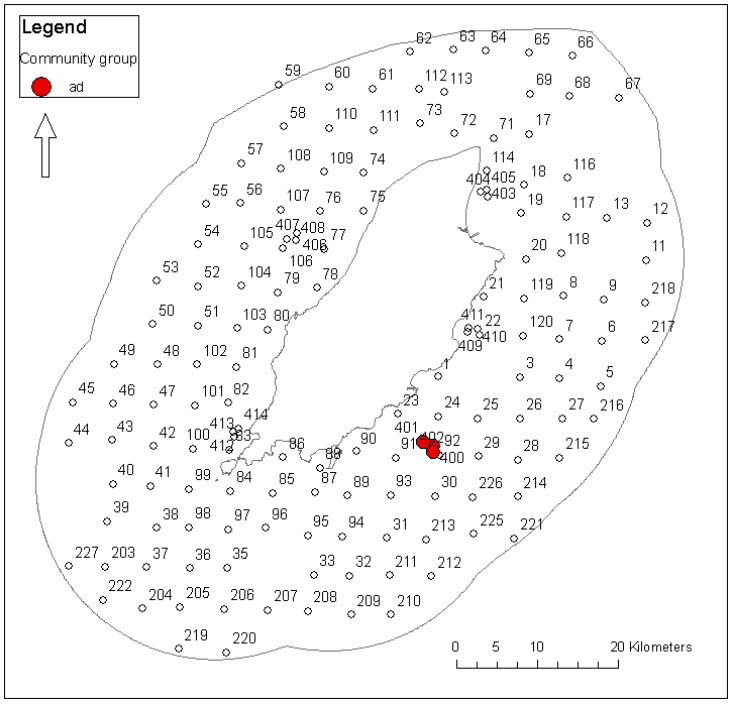

Figure 1. Distribution of stations which comprised community Group ad in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Glycymeris glycymeris	18.52	10.79	26.13	18.18
Gibbula sp.	9.55	4.39	13.47	4.71
Gastropod unid.	8.13	7.79	11.47	4.54
Galathea sp.	5.56	8.86	7.84	1.96
Nemertesia antennina	3.74	7.94	5.27	1.44
Porifera unid.	3.24	1.87	4.57	2.65
Flustra foliacea	2.97	1.91	4.2	0.62
Aequipecten opercularis	2.95	4.13	4.17	0.52
Calliostoma zizyphinum	2.67	11.93	3.76	0.45
Pagurus spp.	2.58	3.97	3.65	0.52
Ascidian unid.	1.54	11.93	2.17	0.10
Asterias rubens	1.54	11.93	2.17	0.17
Pseudosuberites sulphureus	1.54	11.93	2.17	0.14

Table 2. Presented are the average abundances m^{-2} for fished species that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group.

Fished species	Av. Abundance/m^2
Pecten maximus	0.03
Aequipecten opercularis	0.52

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 30-40 m

SUBSTRATUM:

Gravel and shells overlying sand, some pebbles and cobbles.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group ad	EUNIS	Similarity %	Fit
SS.SMx.CMx.ClloMx	A5.441	28.57	Reasonable
SS.SMx.CMx.ClloMx.Nem	A5.4411	26.42	Reasonable
SS.SMx.CMx.FluHyd	A5.444	26.42	Poor physical, reasonable biological
SS.SCS.CCS.Nmix	A5.5112	25.53	Good physical, reasonable biological*
SS.SCS.CCS.MedLumVen	A5.132	9.52	Good physical, reasonable biological*
SS.SCS.OCS.GlapThyAmy			Reasonable physicial

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group ad	EUNIS
SS.SCS.CCS	A5.13

REPRESENTATIVE IMAGES:

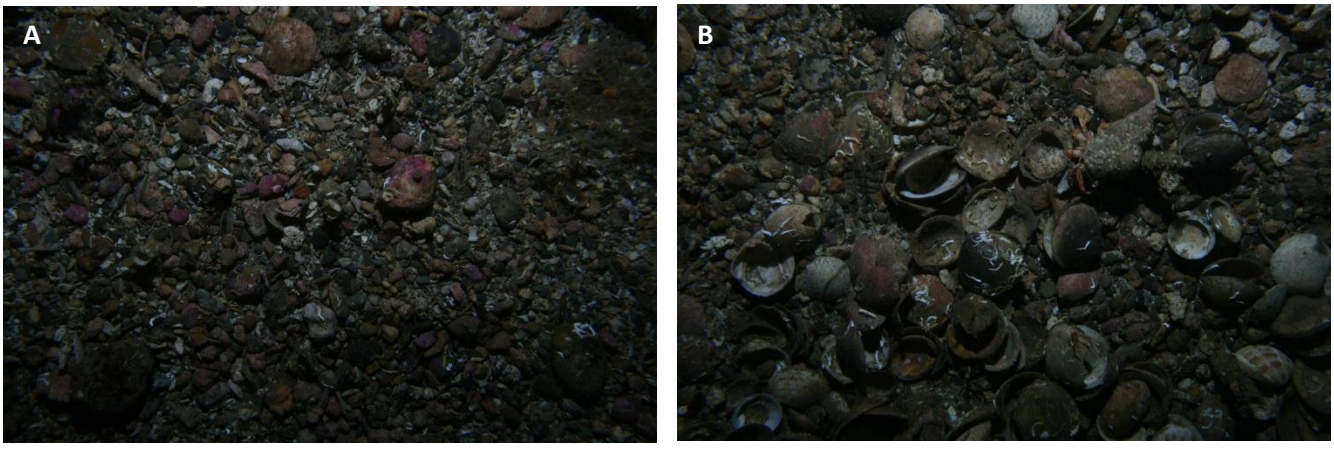

Plate 1. A) Station 401, B) station 402.

Group ae (1 station)

STATIONS: 23

COMMUNITY DESCRIPTION:

A maerl habitat, dominated by maerl gravel and shell, and a *Modiolus modiolus* bed were both observed at station 23 along different portions of the surveyed transect. Thus, the high abundance of the horse mussel *Modiolus modiolus* characterized this community. Also highly abundant were sponges, supported by the *Modiolus* bed. These included *Suberites* spp., *Hemimycale columella, Clathria atrasanguinea*, and *Phorbas fictitius.* The soft coral *Alcyonium digitatum* also occurred in very high numbers on the *Modiolus* bed. A high abundance of hydroids, including *Nemertesia antennina*, gastropods including the top-shells *Gibbula* sp. and the painted top-shell *Calliostoma zizyphinum,* squat lobsters *Galathea* sp., the bivalve *Glycymeris glycymeris,* and the queen scallop *Aequipecten opercularis* occurred at this station. Emergent polychaete tubes were commonly observed, including the emergent tubes of the polychaete *Lanice conchilega*. Observed at lower abundances were the urchin *Echinus esculentus,* feather duster worms of the family Sabellidae, the common whelk *Buccinum undatum,* chitons of the class Polyplacophora, the crabs *Ebalia* sp. and *Liocarcinus* sp., and decapods of the infraoder Caridea. The encrusting tubes of *Pomatoceros* sp. were a highly abundant feature in this habitat.

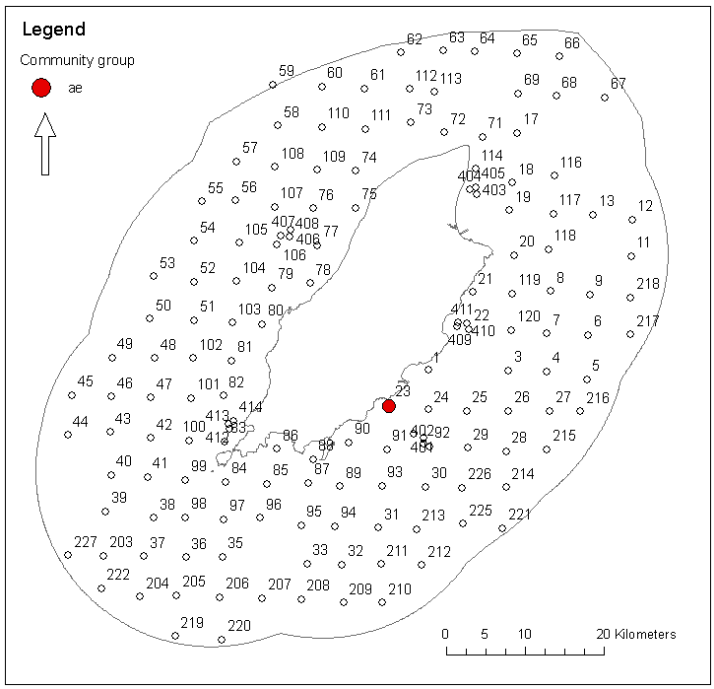

Figure 1. Distribution of stations which comprised community Group ae in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the abundances m^{-2} for the taxa which were recorded with an abundance of 5 or greater at the station characterized by this group. A SIMPER analysis could not be conducted to identify the characterizing taxa as the community was represented by only one station.

Species	Abundance/m^2
Modiolus modiolus	71.39
Porifera unid.	25.26
Alcyonium digitatum	11.43
Gibbula sp.	3.95
Galathea sp.	3.78
Glycymeris glycymeris	3.69
Calliostoma zizyphinum	3.35
Suberites spp.	2.92
Gastropod unid.	2.84
Clathria atrasanguinea	2.75
Aequipecten opercularis	2.75
Phorbas fictitius	1.89
Nemertesia antennina	1.89
Echinus esculentus	1.03
Hemimycale columella	0.95
Sabellidae unid.	0.95
Buccinum undatum	0.77
Polyplacophora unid.	0.69
Decapoda unid.	0.60
Liocarcinus sp.	0.60
Ebalia sp.	0.60
Natantia unid.	0.52
Henricia oculata	0.43
Sagartia elegans	0.43

Table 2. Presented are the abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group.

Fished species	Abundance/m^2
Pecten maximus	0.26
Aequipecten opercularis	2.75
Taxa of conservation concern	
Edwardsia sp.	0.26
Modiolus modiolus	71.39
Maerl	Present

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 10-30 m

SUBSTRATUM:

Two types of substratum were observed at this station and are described separately.

Gravel, maerl gravel (some alive), and shell overlying sandy sediment.

This graded into a diverse *Modiolus* bed which occurred with high amounts of shell.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Group ae- *Modiolus*	**EUNIS**	**Similarity %**	**Fit**
SS.SBR.SMus.ModCvar	A5.624	43.18	Reasonable*
SS.SBR.SMus.ModT	A5.621	33.80	Reasonable
Group ae-Maerl			
SS.SMp.Mrl.Pcal.Nmix	A5.5112	29.85	Good biological, reasonable physical*
SS.SMp.Mrl.Pcal	A5.511	25.81	Reasonable
SS.SCS.CCS.Nmix	A5.134	16.39	Reasonable

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification	**EUNIS**
SS.SBR.SMus/SS.SMp.Mrl	A5.62/A5.51

REPRESENTATIVE IMAGES:

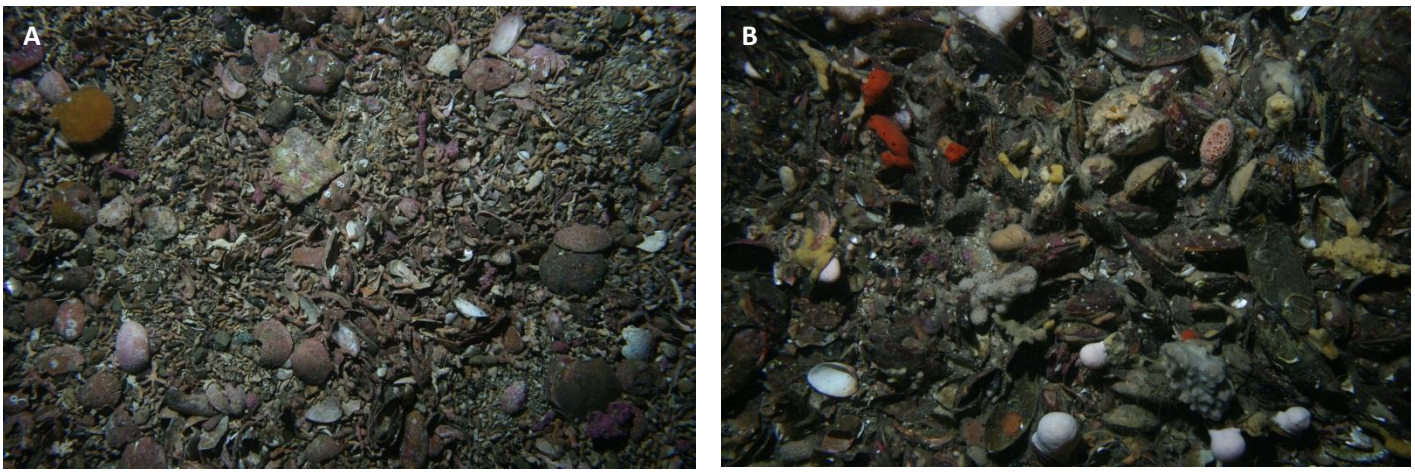

Plate 1. Station 23; A) Maerl, B) *Modiolus modiolus* bed.

Group af (5 stations)

STATIONS: 62, 63, 64, 208, 211

COMMUNITY DESCRIPTION:

This community was observed on very coarse, stony substrata, sometimes with high shell content on the surface. Small patches of encrusting sponge were commonly observed on the surfaces of stones throughout the stations in this group. Typically in high numbers were the top-shell *Gibbula* sp., the painted top-shell *Calliostoma zizyphinum,* the soft coral *Alcyonium digitatum,* the featherstar *Antedon bifida,* and unidentified hydroids. At most stations, the squat lobster *Galathea* sp. and the dog whelk *Nassarius* sp. were also commonly observed. Other characteristic species included the crab *Ebalia* sp. and hermit crabs *Pagurus* spp. Emergent polychaete tubes were also commonly observed in this community. Decapods of the infraorder Caridea, the urchin *Echinus esculentus,* and the anemones *Sagartia troglodytes* and *Sagartia elegans* occurred in lower numbers at these stations.

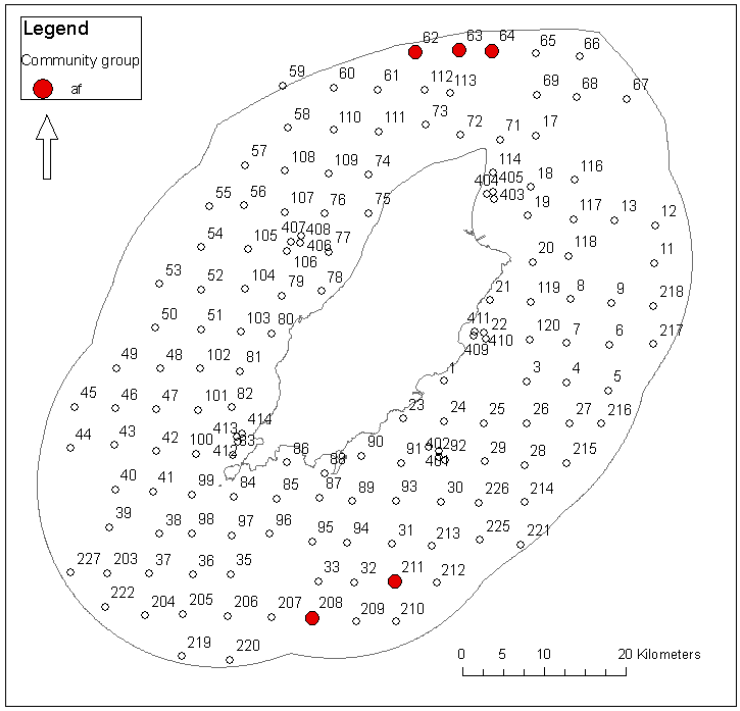

Figure 1. Distribution of stations which comprised community Group af in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Alcyonium digitatum	2.21	1.66	4.1	29.68
Anemone unid.	2.22	3.84	4.12	1.40
Antedon bifida	3.64	1.36	6.77	4.63
Ascidian unid.	0.66	1.1	1.23	0.26
Asterias rubens	0.7	0.88	1.3	0.44
Boreotrophon truncatus	0.55	0.62	1.02	0.38
Buccinum undatum	1	1.01	1.85	0.74
Calliostoma zizyphinum	3.98	6.01	7.39	4.23
Crossaster papposus	0.88	1.11	1.63	0.29
Ebalia sp.	3.25	5.32	6.04	1.79
Echinus esculentus	1.3	3.77	2.41	0.45
Galathea sp.	1.97	1.14	3.65	3.36
Gastropod unid.	0.82	1.07	1.53	0.63
Gibbula sp.	5.9	4.41	10.96	7.32
Glycymeris glycymeris	0.57	0.46	1.06	1.04
Hyas sp.	0.56	0.58	1.04	0.62
Inachus sp.	0.77	1.12	1.42	0.27
Nassarius sp.	2.14	1.13	3.98	2.22
Caridea unid.	1.96	3.23	3.63	1.13
Ocenebra erinacea	0.66	1.16	1.22	0.16
Pagurus spp.	2.85	6.82	5.3	1.83
Porifera unid.	6.16	2.01	11.44	21.23
Sabellidae unid.	0.73	0.99	1.35	0.25
Sagartia elegans	1.15	1.07	2.14	0.51
Sagartia troglodytes	0.85	7.98	1.58	0.25
Urticina spp.	1.12	0.83	2.08	1.30

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Pecten maximus	0.04
Aequipecten opercularis	0.10
Taxa of conservation concern	
Modiolus modiolus (Station 63)	0.41

*Undocmented *Modiolus* at station 211

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 20-65 m

SUBSTRATUM:

Very coarse mixture of coarse sand and stones ranging from gravel to small boulders; pebbles and cobbles dominated the mixture. Shells were also a feature of the substratum.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group af	EUNIS	Similarity %	Fit
CR.HCR.XFa.SpNemAdia	A4.135	34.00	Reasonable*
SS.SMx.CMx.ClloMx.Nem	A5.4411	32.18	Reasonable
SS.SMx.CMx.FluHyd	A5.444	27.59	Reasonable
CR.MCR.EcCr.UrtScr	A4.213	12.82	Poor

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group af	EUNIS
SS.SMx.CMx/CR	A5.44/A4

REPRESENTATIVE IMAGES:

Plate 1. A) Station 63, B) a large number of images at station 64 were characterized by gravel in addition to those with coarser substratum, C) station 208, D) station 211, E) undocumented *Modiolus* at station 211.

Group ag (2 stations)

STATIONS: 209, 210

COMMUNITY DESCRIPTION:

This community was observed on coarse sandy, stony substrata with a notable shell component. Small patches of encrusting sponge were often observed on the stones and shells. Also commonly observed in this community were top-shells *Gibbula* sp.*,* hydroids*,* squat lobsters *Galathea* sp.*,* hermit crabs *Pagurus* spp., the Devonshire cup coral *Caryophyllia smithii,* the crab *Ebalia* sp., and decapods of the infraorder Caridea, although the latter two occurred with varied abundance by station. This community was also characterized by the low abundances of the urchin *Echinus esculentus,* the queen scallop *Aequipecten opercularis,* the soft coral *Alcyonium digitatum,* the gastropods *Boreotrophon truncatus, Buccinum undatum,* and *Nassarius* sp., the starfish *Asterias rubens,* and chitons of the class Polyplacophora. Low numbers of the emergent tubes of the polychaete *Lanice conchilega* were also observed at these stations.

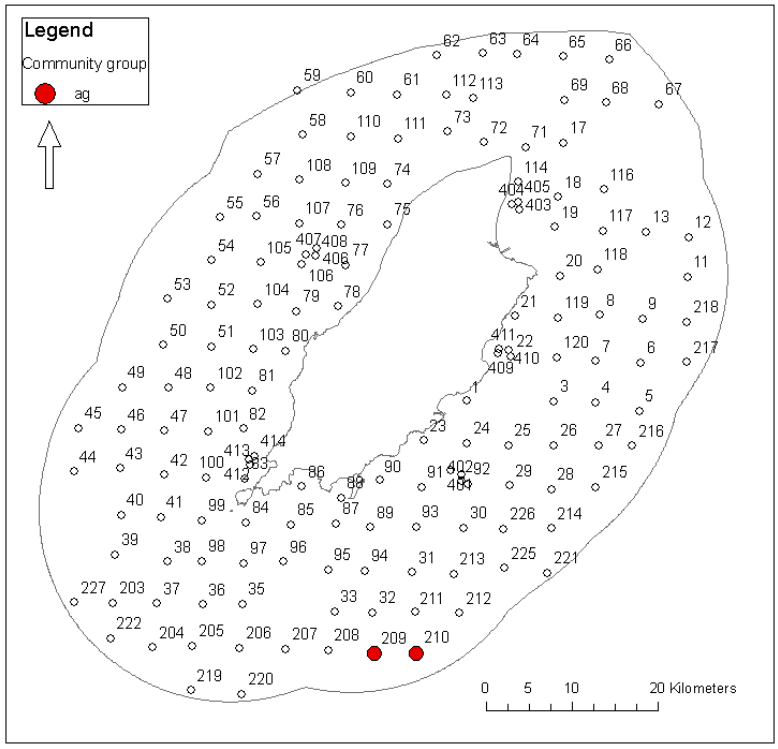

Figure 1. Distribution of stations which comprised community Group ag in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Porifera unid.	11.83	-	18.62	15.62
Gibbula sp.	7.48	-	11.77	2.06
Galathea sp.	5.29	-	8.33	1.60
Pagurus spp.	4.73	-	7.45	1.08
Caryophyllia smithii	3.74	-	5.89	0.62
Echinus esculentus	3.74	-	5.89	0.52
Ebalia sp.	3.34	-	5.27	0.82
Caridea unid.	2.9	-	4.56	0.57
Aequipecten opercularis	2.37	-	3.72	0.26
Alcyonium digitatum	2.37	-	3.72	0.36
Anemone unid.	2.37	-	3.72	0.46
Asterias rubens	1.67	-	2.63	0.10
Boreotrophon truncatus	1.67	-	2.63	0.10
Buccinum undatum	1.67	-	2.63	0.10
Nassarius sp.	1.67	-	2.63	0.10
Polyplacophora unid.	1.67	-	2.63	0.21

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Aequipecten opercularis	0.26
Taxa of conservation concern	
Edwardsia sp. (Station 210)	0.05

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 30-60 m

SUBSTRATUM:

Coarse sand underlying a mixture of gravel, pebbles, cobbles, and shell.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group ag	EUNIS	Similarity %	Fit
SS.SMx.CMx.ClloMx.Nem	A5.4411	26.92	Reasonable physical, poor biological*
SS.SMx.IMx.CreAsAn	A5.431	26.09	Reasonable physical, poor biological
SS.SMx.CMx.ClloMx	A5.441	25.00	Poor
SS.SMx.CMx.FluHyd	A5.444	23.08	Reasonable physical, poor biological
SS.SCS.CCS.Nmix	A5.5112	21.74	Reasonable physical, poor biological
SS.SCS.CCS.MedLumVen	A5.132	14.63	Reasonable physical
SS.SCS.CCS.PomB	A5.131	10.00	Reasonable
SS.SCS.CCS.Blan	A5.135	5.13	Reasonable physical
SS.SCS.OCS.GlapThyAmy	-	-	Reasonable physical

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group ag	EUNIS
SS.SCS.CCS/SS.SMx.CMx	A5.13/ A5.44

REPRESENTATIVE IMAGES:

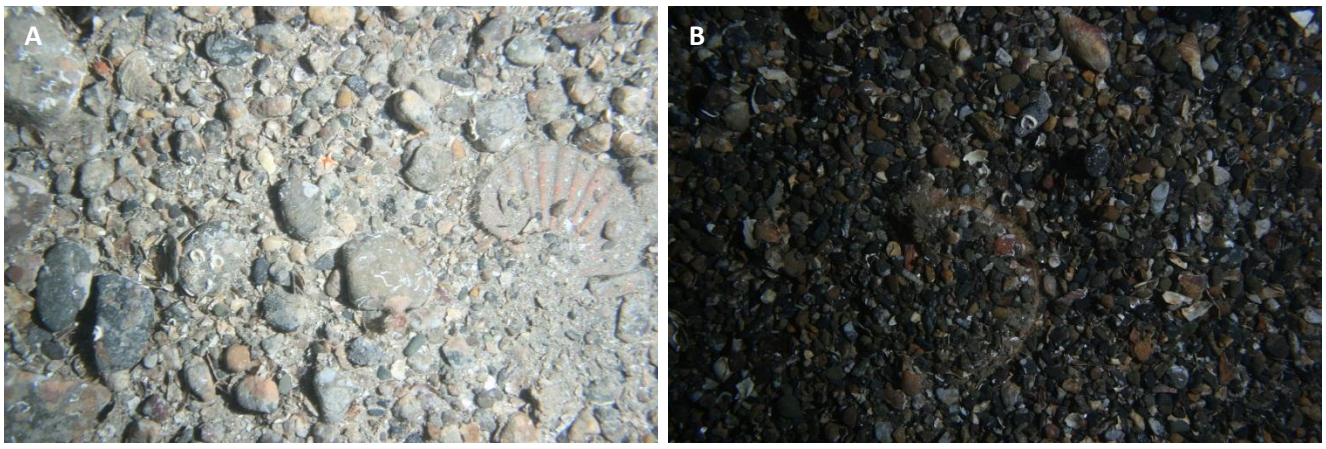

Plate 1. A) Station 209, B) station 210.

Group ah (3 stations)

STATIONS: 221, 225, 226

COMMUNITY DESCRIPTION:

This community was observed on coarse stony substrata. Small patches of encrusting sponge found on stones and shells were abundant. The encrusting tubes of the worm *Pomatoceros* sp. were also frequently observed on the surfaces of stones and shells. Top-shells *Gibbula* sp., the queen scallop *Aequipecten opercularis,* which was often encrusted by the sponge *Pseudosuberites sulphureus,* and the crab *Ebalia* sp. were abundant at these stations. Hydroids were also widely observed across the stations characterized by this community and included *Nemertesia antennina* and *Hydrallmania* sp. Other taxa commonly observed were hermit crabs *Pagurus* spp., feather duster worms of the Sabellidae family, and the brittlestars *Ophiura albida* and *Ophiothrix fragilis,* although the abundance of the latter varied greatly by station. The following characterized this community with consistently lower abundances at these stations, decapods of the infraorder Caridea, chitons of the class Polyplacophora, squat lobsters *Galathea* sp., anemones, including *Sagartia elegans* and *Cerianthus lloydii,* crabs *Macropodia* sp. and *Inachus* sp., the king scallop *Pecten maximus,* the painted top-shell *Calliostoma zizyphinum,* the bivalve *Palliolum tigerinum,* the starfish *Crossaster papposus,* and unidentified

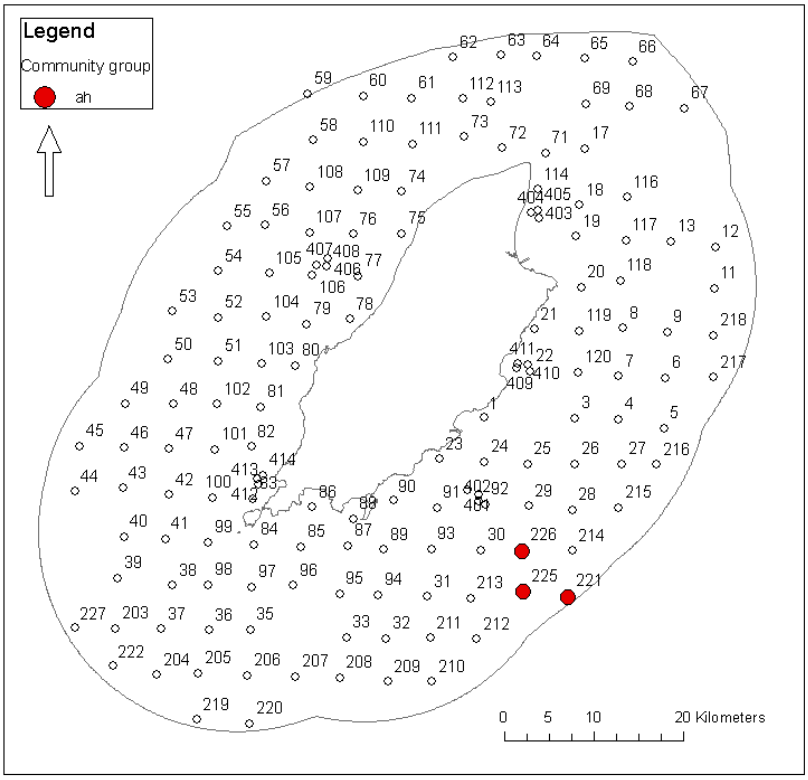

Figure 1. Distribution of stations which comprised community Group ah in Manx territorial waters. Map generated using ArcGIS.

ascidians. Solitary emergent polychaete tubes, including those of *Lanice conchilega,* were often a feature of the substratum.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Gibbula sp.	5.42	9.09	8.76	3.36
Porifera unid.	5.26	1.2	8.49	14.81
Pseudosuberites sulphureus	5.2	7.41	8.39	3.46
Aequipecten opercularis	4.37	4.76	7.05	3.11
Ophiothrix fragilis	4.08	1.45	6.6	6.47
Ebalia sp.	3.89	4.69	6.29	3.15
Pagurus spp.	2.59	12.56	4.18	1.04
Caridea unid.	2.12	12.56	3.42	0.69
Nemertesia antennina	2.1	3.81	3.4	1.21
Hydrallmania sp.	1.94	1.24	3.13	1.32
Sabellidae unid.	1.93	2.36	3.12	0.93
Polyplacophora unid.	1.88	6.3	3.03	0.45
Galathea sp.	1.65	4.95	2.66	0.84
Anemone unid.	1.58	7.16	2.55	0.42
Calliostoma zizyphinum	1.5	7.33	2.43	0.80
Inachus sp.	1.5	7.33	2.43	0.38
Ophiura albida	1.28	0.58	2.07	0.96
Pecten maximus	1.21	3.9	1.95	0.24
Palliolum tigerinum	1.15	3.14	1.86	0.31
Sagartia elegans	1.12	6.9	1.81	0.21
Crossaster papposus	0.99	9.22	1.6	0.14
Macropodia sp.	0.99	9.09	1.6	0.10
Pisces unid.	0.99	9.09	1.6	0.10
Cerianthus lloydii	0.67	0.58	1.08	0.35
Ascidian unid.	0.61	0.58	0.98	0.42

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Aequipecten opercularis	3.11
Pecten maximus	0.24
Taxa of conservation concern	
Edwardsia sp. (Station 226)	0.03
Sabellaria spinulosa (Station 221)	0.10

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 30-60 m

SUBSTRATUM:

Medium to coarse sand with a mixture of gravel, pebbles, and cobbles, and some surficial shell.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group ah	EUNIS	Similarity %	Fit
SS.SMx.CMx.ClloMx.Nem	A5.4411	32.88	Reasonable*
SS.SCS.ICS.HchrEdw	A5.122	28.17	Poor
SS.SMx.CMx.FluHyd	A5.444	27.40	Poor
SS.SCS.CCS.Nmix	A5.5112	26.87	Reasonable
SS.SMx.CMx.ClloMx	A5.441	26.09	Poor
SS.SCS.CCS.MedLumVen	A5.132	9.68	Reasonable physical
SS.SCS.OCS.GlapThyAmy			Reasonable physical

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group ah	EUNIS
SS.SCS.CCS/ SS.SMx.CMx	A5.13/ A5.44

REPRESENTATIVE IMAGES:

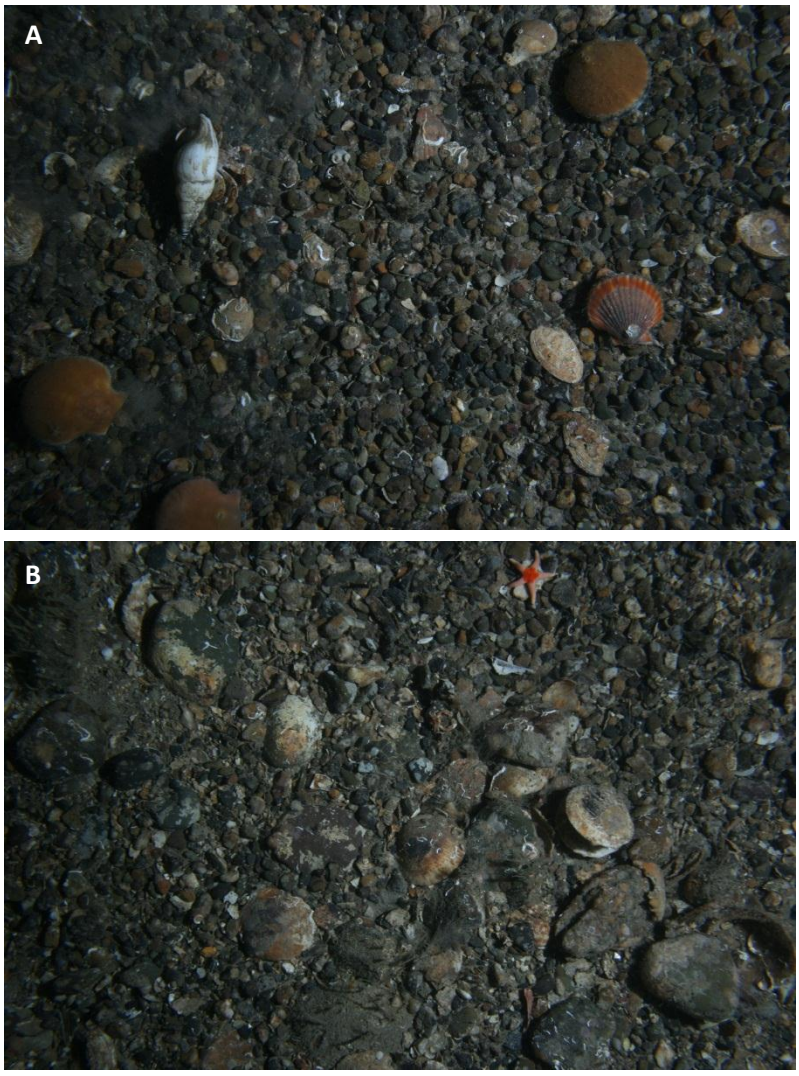

Plate 1. A) Station 221, B) station 226.

Group ai (7 stations)

STATIONS: 58, 59, 61, 65, 66, 110, 113

COMMUNITY DESCRIPTION:

This community was observed in coarse sandy, stony habitats, some with high shell content. The soft coral *Alcyonium digitatum* and the top-shell *Gibbula* sp. were abundant across the stations. Hydroids were also prevalent throughout the stations, including *Nemertesia antennina.* Other commonly observed taxa included the queen scallop *Aequipecten opercularis,* the starfish *Asterias rubens*, the painted top-shell *Calliostoma zizyphinum*, the crab *Ebalia* sp., hermit crabs *Pagurus* spp., and anemones *Urticina* spp*.* Tubes of the worm *Pomatoceros* sp. were observed in very high numbers encrusting stones and shells. Small patches of encrusting sponge were also observed on stones and shells. Unidentified emergent polychaete tubes were also prevalent in the sediment.

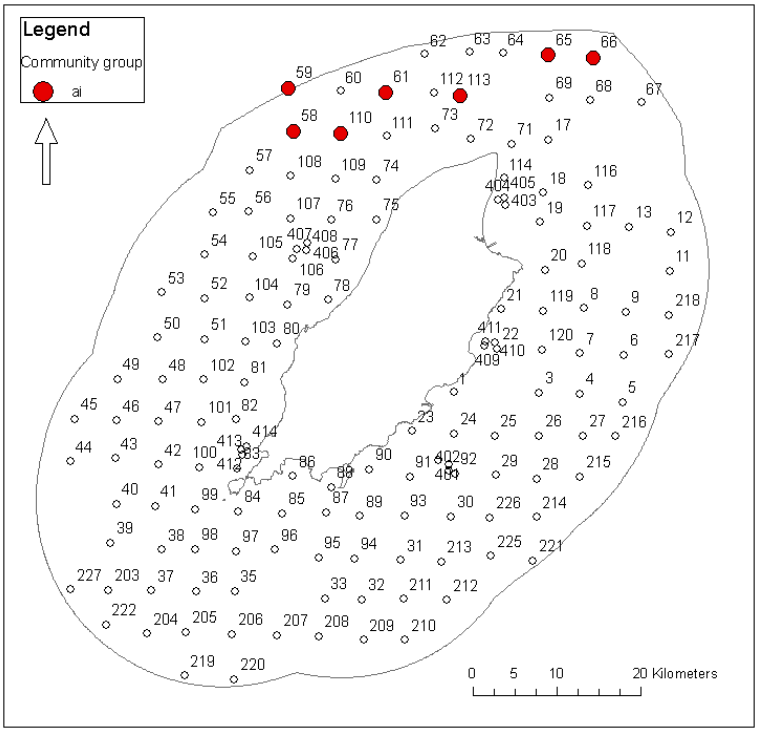

Figure 1. Distribution of stations which comprised community Group ai in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Alcyonium digitatum	7.02	1.62	15.5	8.23
Gibbula sp.	6.32	1.72	13.96	3.56
Nemertesia antennina	4.09	1.11	9.03	2.29
Pagurus spp.	4.03	2.66	8.91	0.97
Porifera unid.	2.99	2.95	6.61	1.67
Calliostoma zizyphinum	2.93	3.37	6.48	0.64
Asterias rubens	2.44	1.38	5.39	0.55
Aequipecten opercularis	2.08	1.38	4.59	0.60
Ebalia sp.	1.96	0.88	4.34	0.76
Urticina spp.	1.23	0.81	2.71	0.85
Flustra foliacea	1.03	0.49	2.28	1.09
Alcyonidium diaphanum	0.95	0.45	2.1	1.25
Inachus sp.	0.93	0.87	2.05	0.16
Cerianthus lloydii	0.91	0.61	2	0.35
Echinus esculentus	0.86	0.86	1.9	0.27
Polyplacophora unid.	0.84	0.54	1.86	0.66
Boreotrophon truncatus	0.59	0.58	1.29	0.12

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Aequipecten opercularis	0.60
Pecten maximus	0.06
Taxa of conservation concern	
Edwardsia sp. (Station 110)	0.01

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE**:** 20-50 m

SUBSTRATUM:

This community occurred on two different types of substratum, which are described separately.

Substratum Group ai-1**:** (59, 61, 65, 66, 110, 113)

Coarse sand with gravel, pebbles, cobbles, and occasionally boulders.

Stations 61 and 113 with high shell content.

Substratum Group ai -2: (58)

Shell and shell gravel over a gravelly sediment; larger stones did not appear to occur within this station.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group ai-1	**EUNIS**	**Similarity %**	**Fit**
CR.HCR.XFa.FluCoAs.X	A4.1343	46.46	Reasonable
SS.SMx.CMx.ClloMx.Nem	A5.4411	36.36	Reasonable
SS.SMx.CMx.FluHyd	A5.444	36.36	Reasonable biological, good physical*****
SS.SMx.IMx.CreAsAn	A5.431	28.17	Poor
Biotope Group ai -2			
SS.SMx.CMx.ClloMx	A5.441	30.14	Reasonable*
SS.SCS.CCS.Nmix	A5.134	25.35	Reasonable
SS.SCS.CCS.MedLumVen	A5.132	9.09	Reasonable physical
SS.SCS.CCS.Blan	A5.135	6.25	Reasonable physical

***Selected representative**

Table 4. Presented are the broader habitat classifications for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group ai-1	**EUNIS**
SS.SMx.CMx	A5.44
Broader classification Group ai-2	
SS.SCS.CCS/SS.SMx.CMx	A5.13/ A5.44

REPRESENTATIVE IMAGES:

Plate 1. A) Group ai-2; station 58, Group ai-1; B) station 65, C) station 110, D) station 59, E) station 61, F) station 113.

Group aj (1 station)

STATIONS: 116

COMMUNITY DESCRIPTION:

This community occurred on sand and was characterized by the abundance of the brittlestar *Ophiothrix fragilis,* which occurred in sporadic clumps and did not form beds. This community was also characterized by the very low occurrence and abundance of other conspicuous taxa. These included the heart urchin *Spatangus purpureus,* the anemones *Peachia cylindrica* and *Cerianthus lloydii,* the hermit crab *Pagurus* sp., and the brittlestar *Ophiura albida.* Two small burrows were also observed in the sediment. This station may have been better characterized by its infaunal component, for which the data were not available.

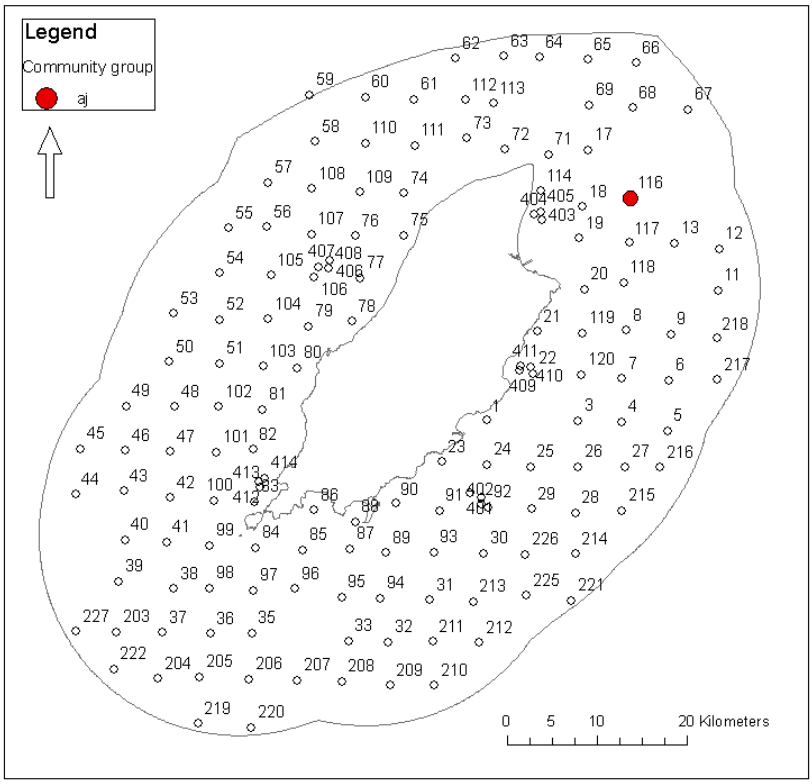

Figure 1. Distribution of stations which comprised community Group aj in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the abundances m^{-2} for the taxa which were recorded at the station characterized by this group. A SIMPER analysis could not be conducted to identify the characterizing taxa as the community was represented by only one station.

Species	Abundance/m^2
Ophiothrix fragilis	10.41
Spatangus purpureus	0.31
Peachia cylindrica	0.21
Pagurus spp.	0.10
Cerianthus lloydii	0.10
Ophiura albida	0.10

No fished species or taxa of conservation concern were recorded for this community.

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 5-30 m

SUBSTRATUM: Medium sand.

BIOTOPE CLASSIFICATION:

Table 3. Presented is the broader habitat classification for the listed group according to the Marine Habitat Classification for Britain and Ireland Version 04.05. Due to limitations in the available data, a broader classification was more appropriate than classification at the biotope level. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group aj	**EUNIS**
SS.SSa	A5.2

REPRESENTATIVE IMAGES:

Plate 1. Station 116.

Group ak (1 station)

STATIONS: 69

COMMUNITY DESCRIPTION:

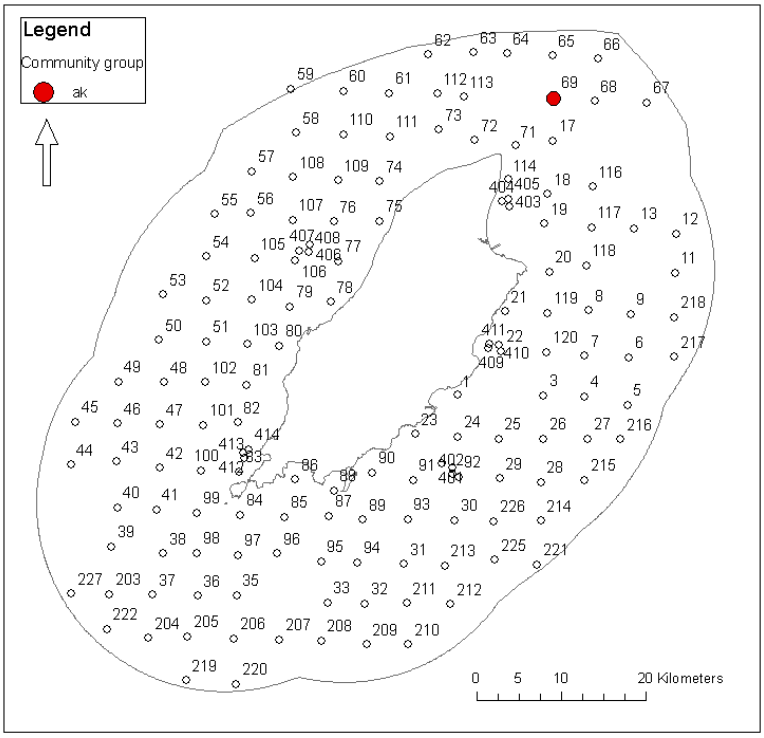

Figure 1. Distribution of stations which comprised community Group ak in Manx territorial waters. Map generated using ArcGIS.

This community occurred on a mixed sandy and stony substratum. Dense assemblages of the brittestar *Ophiothrix fragilis* characterized this community. In spaces free from brittlestars, other abundant species included the anemone *Cerianthus lloydii,* hydroids, including *Nemertesia antennina* and *Nemertesia ramosa,* and the feather worm *Antedon bifida.* Species which occurred with lower abundances in this community included the bryozoan *Bugula* sp., hermit crabs *Pagurus* spp.*,* the anemones *Edwardsia* sp., *Urticina* spp.*,* and *Sagartia elegans,* and feather duster worms of the family Sabellidae. Small burrows were also commonly observed in the sediment.

Table 1. Presented are the abundances m^{-2} for the taxa which were recorded with an abundance of 5 or greater at the station characterized by this group. A SIMPER analysis could not be conducted to identify the characterizing taxa as the community was represented by only one station.

Species	Abundance/m^2
Ophiothrix fragilis	258.76
Cerianthus lloydii	18.87
Antedon bifida	10.72
Nemertesia antennina	6.91
Nemertesia ramosa	2.16
Bugula spp.	1.96
Pagurus spp.	1.86
Edwardsia sp.	1.24
Sagartia elegans	1.13
Urticina spp.	0.93
Sabellidae unid.	0.62
Bivalvia unid.	0.52
Flustra foliacea	0.52

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Abundance/m^2
Aequipecten opercularis	0.10
Taxa of conservation concern	
Edwardsia sp.	1.24

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 20-50 m

SUBSTRATUM:

Coarse sand with gravel, pebbles, and shell.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group ak	EUNIS	Similarity %	Fit
CR.LCR.BrAs.AmenCio.Bri	A4.3112	43.08	Reasonable
SS.SMx.CMx.OphMx	A5.445	27.45	Good physical, reasonable biological*

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group ak	EUNIS
SS.SMx.CMx	A5.44

REPRESENTATIVE IMAGES:

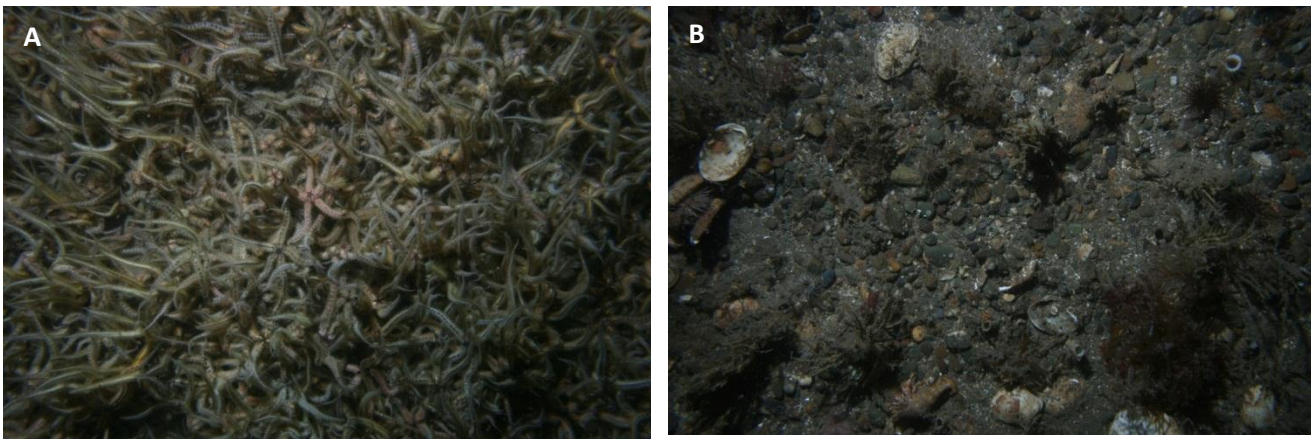

Plate 1. A) Dense brittlestar bed at station 69, B) an area free from brittlestars at station 69.

Group al (4 stations)

STATIONS: 19, 29, 68, 74

COMMUNITY DESCRIPTION:

Ophiothrix fragilis brittlestar beds, comprised of thousands of individuals, characterized this community. These occurred on various substrata including gravel, sand with small stones, and dead maerl gravel. Also characteristic of this community was the soft coral *Alcyonium digitatum* and the anemone *Cerianthus lloydii,* but neither occurred at very high abundances. Hydroids were also commonly observed throughout these stations. The anemones *Sagartia elegans and Urticina* spp. were also observed at the majority of the stations. The brittlestar *Ophiocomina nigra* was also present at most stations, but did not form beds.

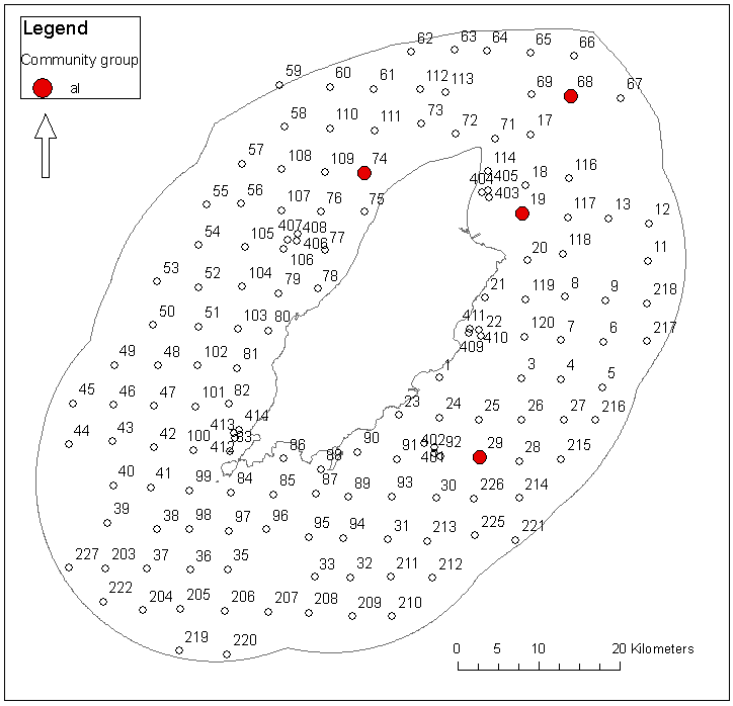

Figure 1. Distribution of stations which comprised community Group al in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Ophiothrix fragilis	55.08	5.18	85.4	467.78
Alcyonium digitatum	2.08	2.07	3.23	1.35
Cerianthus lloydii	1.78	4.01	2.76	0.58

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Pecten maximus	0.03
Aequipecten opercularis	0.08
Taxa of conservation concern	
Modiolus modiolus (Station 19)	0.10

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 10-60 m

SUBSTRATUM: Medium to coarse sand with surficial gravel and small pebbles.

Qualifying comments:

Mainly dead maerl gravel at station 19.

Station 74 had a much greater stone content and was better characterized as a mixture of medium sand, gravel, pebbles, and cobbles.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group al	EUNIS	Similarity %	Fit
SS.SMx.CMx.OphMx	A5.445	36.73	Reasonable

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group al	EUNIS
SS.SMx.CMx	A5.44

REPRESENTATIVE IMAGES:

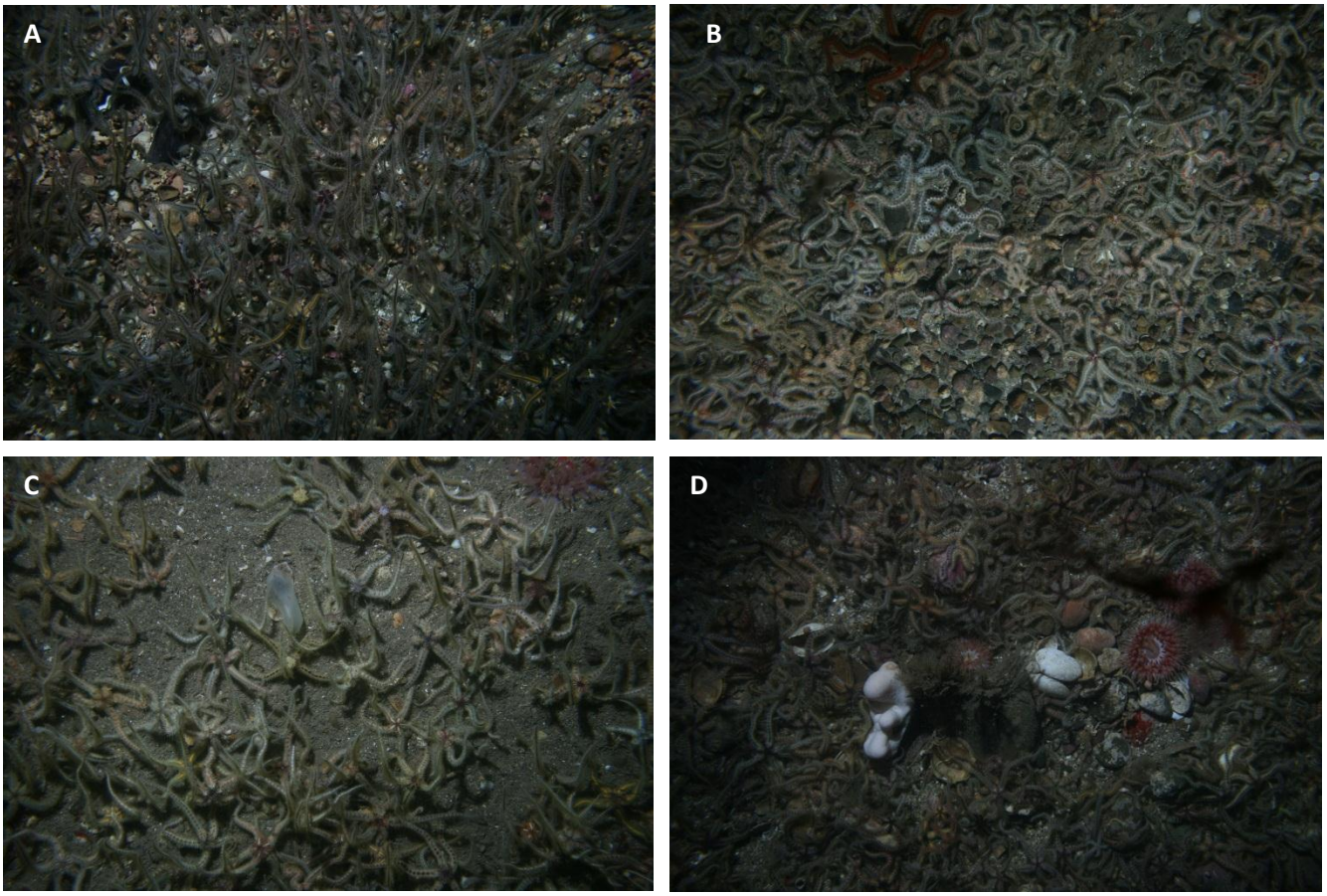

Plate 1. A) Station 19, B) station 29, C) station 68, D) station 74.

Group am (4 stations)

STATIONS: 3, 8, 214, 410

COMMUNITY DESCRIPTION:

This community was characterized by large assemblages of the brittlestar *Ophiothrix fragilis*, although this species did not occur in high enough abundances to form very dense brittlestar beds. The brittlestar *Ophiura albida* was also characteristic of this community, but was found in very low numbers in comparison with *Ophiothrix.* Other species which occurred in this community were the queen scallop *Aequipecten opercularis,* the anemone *Cerianthus lloydii,* and hydroids. Among the observed hydroids was *Nemertesia antennina,* which occurred in low numbers at these stations. Sponges, including the encrusting sponge *Pseudosuberites sulphureus,* and hermit crabs *Pagurus* spp. were also prevalent across the stations, but typically occurred in low numbers. Small burrows and polychaete tubes emerging from the sediment were also present at these stations. This community was observed in a maerl habitat at Laxey (station 410), where *Ophiothrix* did not occur in very high densities and the abundance of maerl was a more dominant feature of the community. This community was also found on sand with gravel, gravel, and sand with larger rocks.

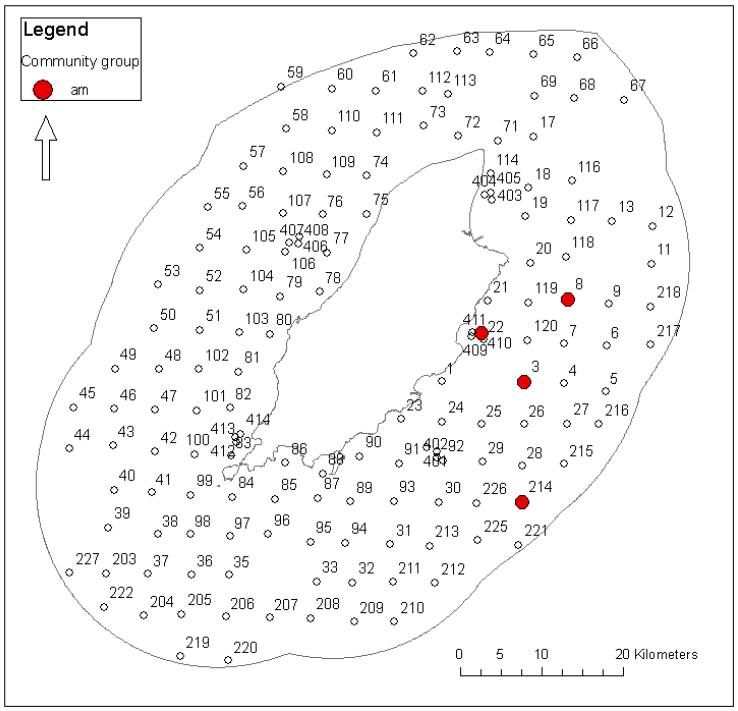

Figure 1. Distribution of stations which comprised community Group am in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Ophiothrix fragilis	25.74	5.65	48.76	51.29
Ophiura albida	6.34	1.04	12.01	8.63
Aequipecten opercularis	3.77	3.25	7.14	0.85
Cerianthus lloydii	3.52	2.09	6.67	1.13
Pagurus spp.	2.61	3.65	4.95	0.49
Porifera unid.	2.5	2.38	4.74	1.00
Pseudosuberites sulphureus	2.04	2.12	3.86	0.36
Nemertesia antennina	1.65	12.61	3.12	0.15

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Aequipecten opercularis	0.85
Taxa of conservation concern	
Modiolus modiolus (Station 8)	0.13
Maerl (Station 410)	Present

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 5-40 m

SUBSTRATUM:

This community occurred on two different types of substratum, which are described separately.

Substratum Group am-1 (3, 8, 214):

Gravel overlying medium to coarse sand, often with some shell on the surface.

Qualifying comments:

Larger cobbles also occurred at station 8.

Substratum Group am-2 (410):

Maerl (live and dead) scattered over sand, but not forming a dense bed.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group am-1	**EUNIS**	**Similarity %**	**Fit**
SS.SMx.CMx.OphMx	A5.445	25.45	Reasonable
Biotope Group am-2			
SS.SMp.Mrl.Pcal.Nmix	A5.5112	22.58	Reasonable*
SS.SMp.Mrl.Pcal	A5.511	17.54	Reasonable
SS.SMx.CMx.MysThyMx	A5.443	7.69	Reasonable physical

***Selected representative**

Table 4. Presented are the broader habitat classifications for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group am-1	**EUNIS**
SS.SMx.CMx	A5.44
Broader classification Group am-2	
SS.SMp.Mrl	A5.51

REPRESENTATIVE IMAGES:

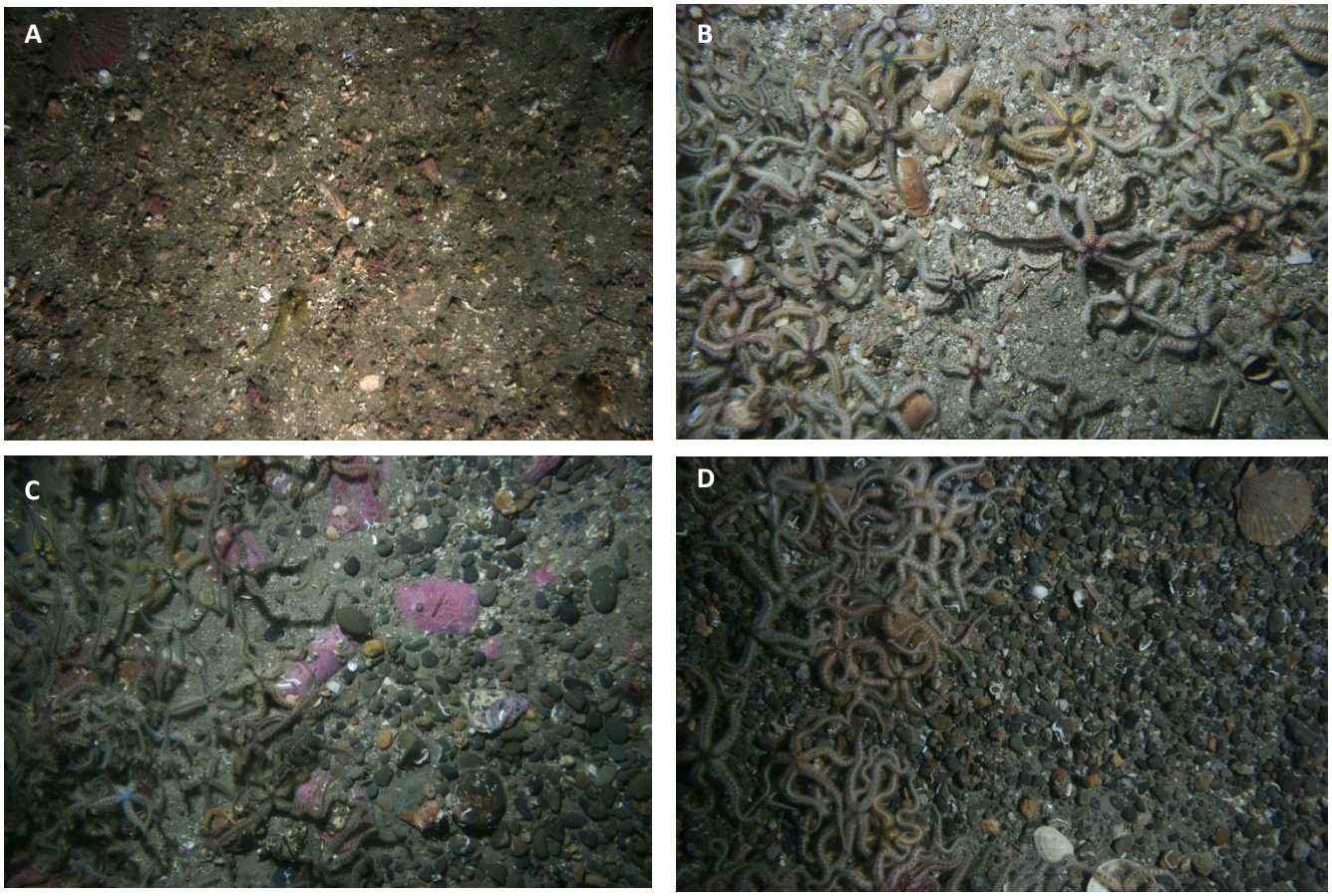

Plate 1. A) Group am-2; Station 410, Group am-1; B) station 3, C) station 8, D) station 214.

Group an (4 stations)

STATIONS: 60, 96, 212, 213

COMMUNITY DESCRIPTION:

This community was characterized by large assemblages of the brittlestar *Ophiothrix fragilis*, although this species did not occur in high enough abundances, in some cases, to form very dense brittlestar beds. The prevalence and the high abundance of the brittlestar *Ophiocomina nigra* also characterized this community. Other species commonly observed in this community were top-shells *Gibbula* sp.*,* hermit crabs *Pagurus* spp.*,* and the soft coral *Alcyonium digitatum.* Hydroids were also commonly observed across these stations including *Nemertesia antennina* and *Nemertesia ramosa,* which were usually observed at low abundances per station. Observed at lower abundances were the painted top-shell *Calliostoma zizyphinum,* the urchin *Echinus esculentus,* the crab *Ebalia* sp., sponges, the queen scallop *Aequipecten opercularis,* ascidians and anemones, including the anemones *Urticina* spp., and decapods of the infraorder Caridea. Emergent tubes of the polychaete *Lanice conchilega* were also observed in low numbers across these stations.

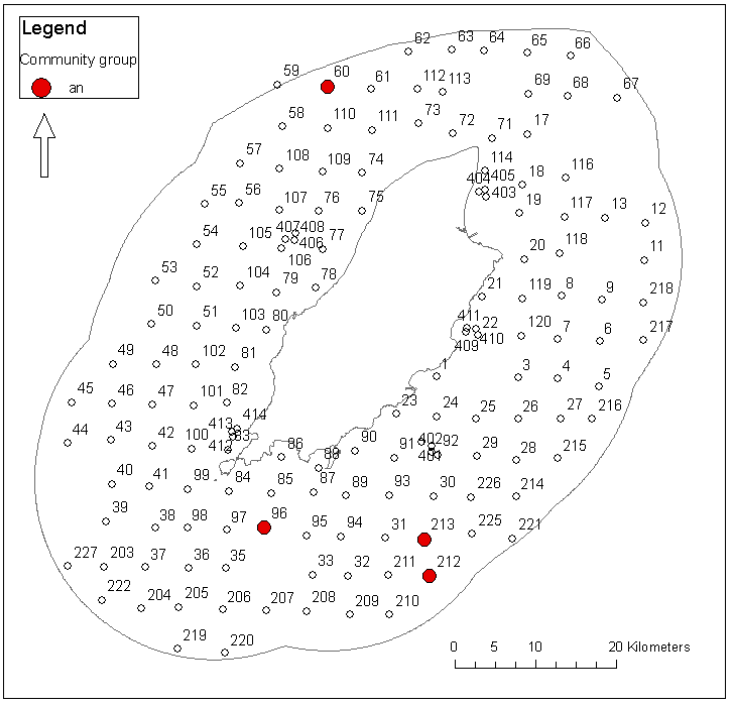

Figure 1. Distribution of stations which comprised community Group an in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Ophiothrix fragilis	14.2	2.89	28.23	45.76
Ophiocomina nigra	7.02	1.32	13.96	14.22
Gibbula sp.	3.54	4.18	7.04	3.91
Pagurus spp.	2.89	4.09	5.76	1.39
Alcyonium digitatum	2.31	0.8	4.59	2.87
Calliostoma zizyphinum	2.31	4.84	4.59	0.77
Echinus esculentus	2.22	13.21	4.42	0.46
Ebalia sp.	2.09	1.95	4.15	1.05
Nemertesia antennina	2.06	1.86	4.1	1.07
Porifera unid.	1.7	1.72	3.38	0.77
Aequipecten opercularis	1.19	7.03	2.36	0.43
Ascidian unid.	1.19	5.49	2.36	0.16
Anemone unid.	0.75	0.91	1.5	0.46
Nemertesia ramosa	0.7	0.84	1.4	0.23
Natantia unid.	0.69	0.82	1.37	0.41
Urticina spp.	0.63	0.9	1.25	0.13

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Pecten maximus	0.15
Aequipecten opercularis	0.43
Taxa of conservation concern	
Modiolus modiolus (Station 96)	0.64

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 30-50m

SUBSTRATUM:

This community occurred on different types of substratum, which are described separately.

Station 60 was characterized by coarse sand with gravel/small pebbles and shell on the sediment surface.

Station 96 was characterized by coarse sand with gravel and high amounts of shell and shell gravel.

Stations 212 and 213 were characterized by a coarser, stonier substratum, comprised of coarse sand, gravel, pebbles, cobbles, occasionally small boulders, and some shell.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group an	**EUNIS**	**Similarity %**	Fit
SS.SMx.CMx.OphMx	A5.445	24.32	Reasonable

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group an	**EUNIS**
SS.SMx.CMx	A5.44

REPRESENTATIVE IMAGES:

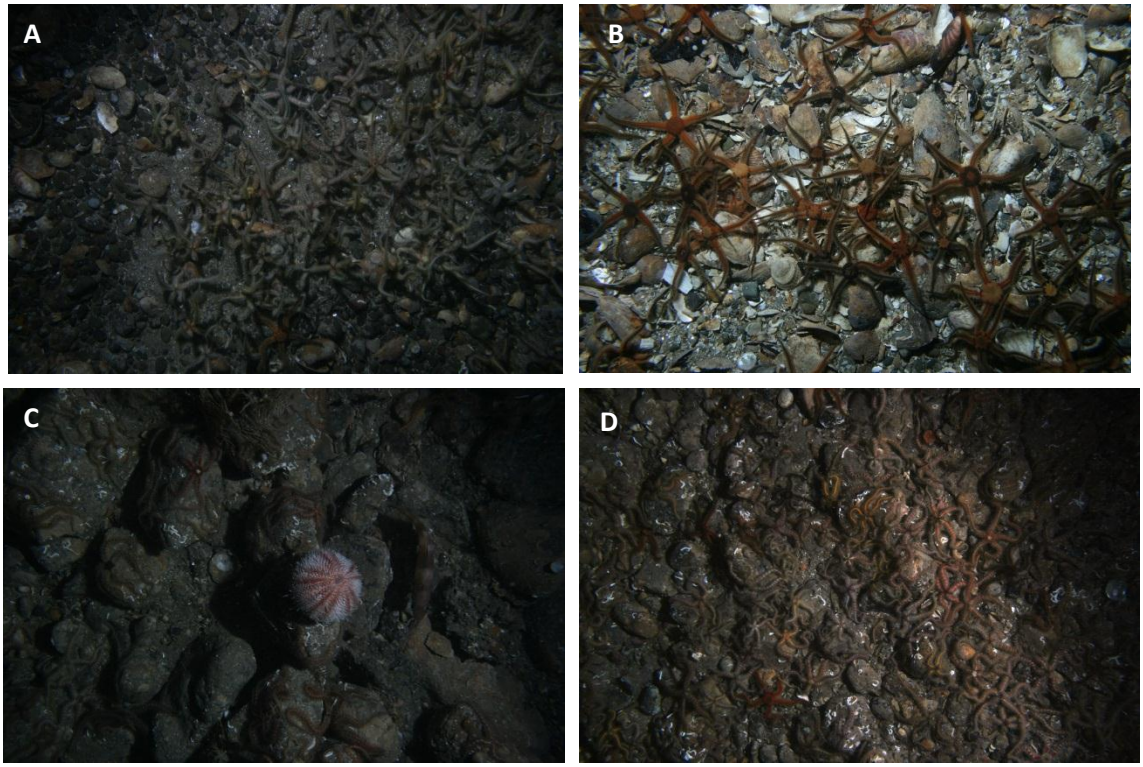

Plate 1. A) Station 60, B) station 96, C) station 212, D) station 213.

Group b (1 station)

STATIONS: 72

COMMUNITY DESCRIPTION:

This community occurred on sand with occasional shell and stone and was dominated by the bryozoan *Alcyonidium diaphanum,* which occurred in large clumps at this station. The only other species observed in this community was the painted top-shell *Calliostoma zizyphinum* and the station appeared, otherwise, faunally impoverished.

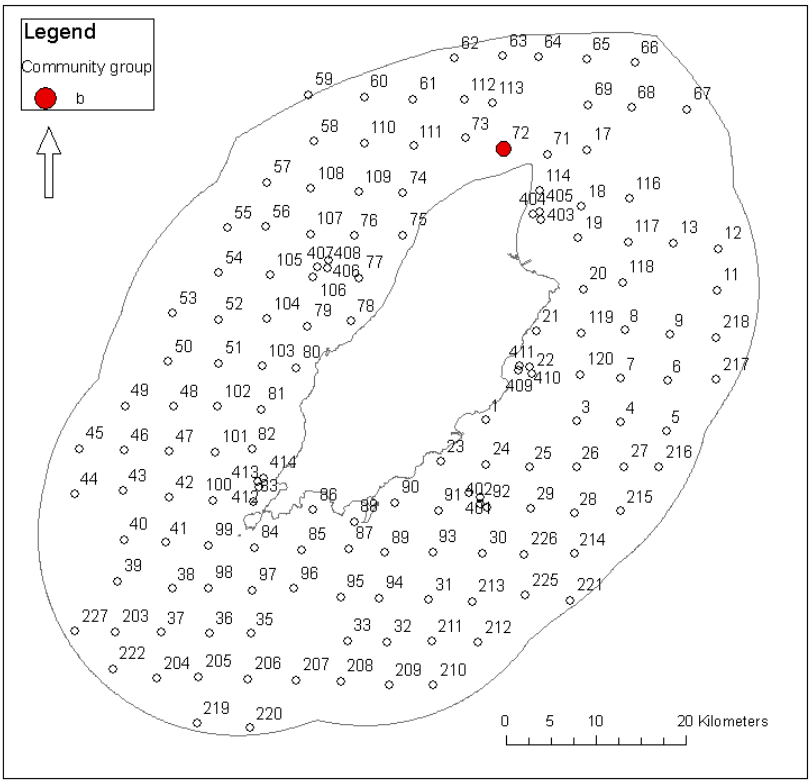

Figure 1. Distribution of stations which comprised community Group b in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the abundances m^{-2} for the taxa which were recorded at the station characterized by this group. A SIMPER analysis could not be conducted to identify the characterizing taxa as the community was represented by only one station.

Species	Abundance/m^2
Calliostoma zizyphinum	0.11
Alcyonidium diaphanum	1.21

No fished species or taxa of conservation concern were recorded for this community.

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 20-35 m

SUBSTRATUM:

Medium sand with intermittent pebbles, cobbles, and shell.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group b	EUNIS	Similarity %	Fit
SS.SSa.IFiSa.ScupHyd	A5.232	16.67	Reasonable

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group b	EUNIS
SS.SMx.CMx	A5.44

REPRESENTATIVE IMAGES:

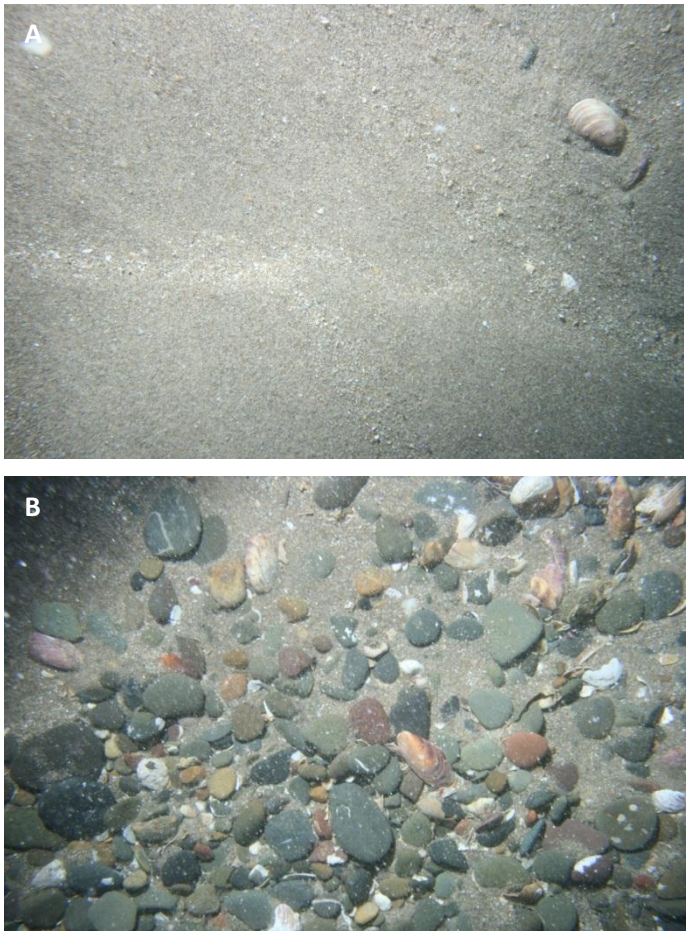

Plate 1. A) Station 72, B) pebbles, cobbles and shell occurred intermittently at station 72.

Group c (1 station)

STATIONS: 17

COMMUNITY DESCRIPTION:

This faunally impoverished community was observed on a sandy substratum. Small hydroid tufts and algae occurred occasionally at the sediment surface. The only other conspicuous fauna included a single hermit crab *Pagurus* sp., an unidentified ascidian and the sea snail *Rissoa* sp. One observation of polychaete cast on the sediment surface was made. The community at this station may have been better characterized by its infaunal component, for which the data were not available.

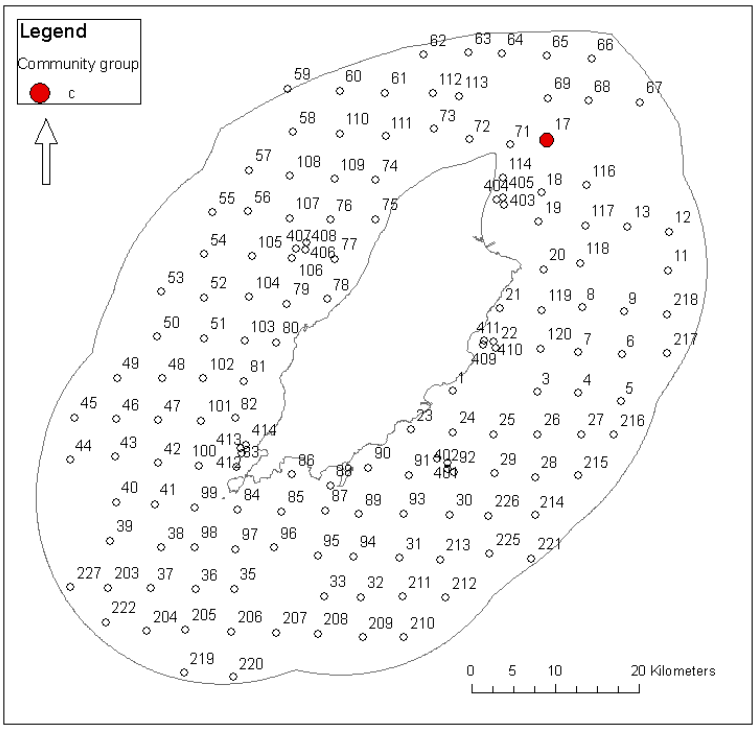

Figure 1. Distribution of stations which comprised community Group c in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the abundances m^{-2} for the taxa which were recorded at the station characterized by this group. A SIMPER analysis could not be conducted to identify the characterizing taxa as the community was represented by only one station.

Species	Abundance/m^2
Rissoa spp.	0.10
Pagurus spp.	0.10
Ascidian unid.	0.10

No fished species or taxa of conservation concern were recorded for this community.

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 5-30 m

SUBSTRATUM:

Predominately clean medium sand, sometimes forming waves or ripples, occasionally with scattered stones, shell, or shell gravel.

BIOTOPE CLASSIFICATION:

Table 3. Presented is the broader habitat classification for the listed group according to the Marine Habitat Classification for Britain and Ireland Version 04.05. Due to limitations in the available data, broader classifications were more appropriate than classification at the biotope level. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group c	EUNIS
SS.SSa	A5.2

REPRESENTATIVE IMAGES:

Plate 1. Station 17.

Group d (3 stations)

STATIONS: 49, 117, 218

COMMUNITY DESCRIPTION: These stations were grouped with very low similarity (26.82%), based on the presence of the soft coral *Alcyonium digitatum* and the low occurrence of other organisms. Station 49 was best characterized as a deep mud habitat. Although the observation of epifauna was low at this station, the mud was heavily bioturbated with predominately large, but also small, burrows. This indicated the prevalence of burrowing megafauna at this station. Stations 117 and 218 did not occur at great depths and were characterized by clean sand. The presence of *Alcyonium digitatum* and the starfish *Astropecten irregularis* linked these stations, which were also faunally impoverished. However, extremely low numbers of the queen scallop *Aequipecten opercularis,* the starfish *Asterias rubens,* the anemone *Cerianthus lloydii,* and hydroid occurred in station 218.

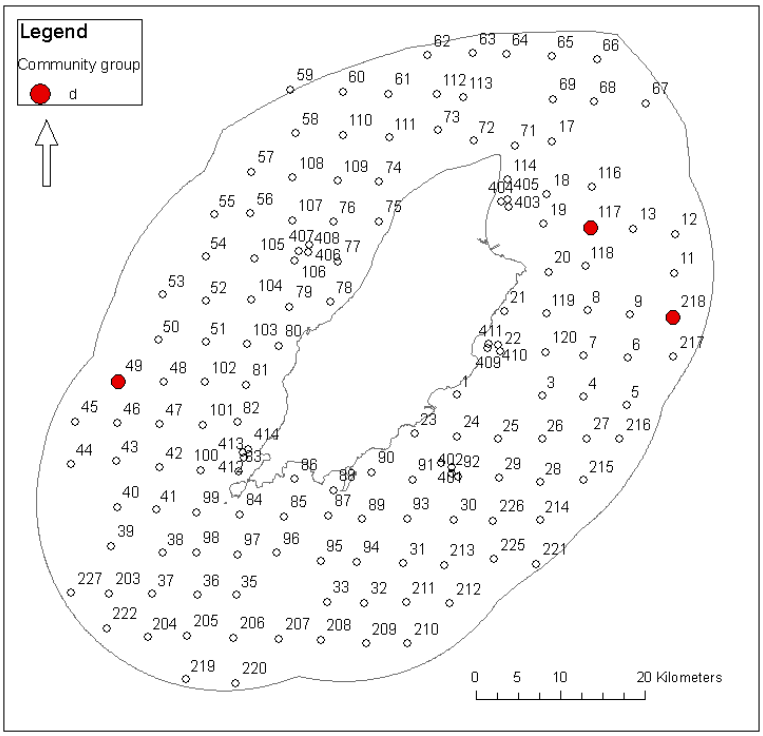

Figure 1. Distribution of stations which comprised community Group d in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Alcyonium digitatum	20.31	4.62	75.73	0.25
Astropecten irregularis	6.51	0.58	24.27	0.10

Table 2. Presented are the average abundances m^{-2} for fished species These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group.

Fished species	Av. Abundance/m^2
Aequipecten opercularis	0.07

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: Station 49 (40- 70 m), Stations 117 and 218 (5-30 m)

SUBSTRATUM:

This community occurred on two different types of substratum, which are described separately.

Substratum Group d-1 (49): deep mud/fine sand; megafaunal burrows abundant.

Substratum Group d-2 (117, 218): clean fine to medium sand.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group d-1	**EUNIS**	**Similarity %**	**Fit**
SS.SMu.CFiMu.MegMax	A5.362	37.5	Good physical, reasonable biological
SS.SMu.CFiMu.SpnMeg	A5.361	25	Good physical, poor biological
SS.SMu.CFiMu.BlyrAchi	A5.363	0	Good physical, reasonable biological*
SS.SMu.OMu.LevHet	-	-	Good physical
SS.SMu.OMu.MyrPo	-	-	Reasonable physical
SS.SMu.OMu.PjefThyAfil	-	-	Reasonable physical
Broader classification Group d-2			
SS.SSa	A5.2		Good

***Selected representative**

Table 4. Presented are the broader habitat classifications for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group d-1	**EUNIS**
SS.SMu.CFiMu	A5.36
Broader classification Group d-2	
SS.SSa	A5.2

REPRESENTATIVE IMAGES:

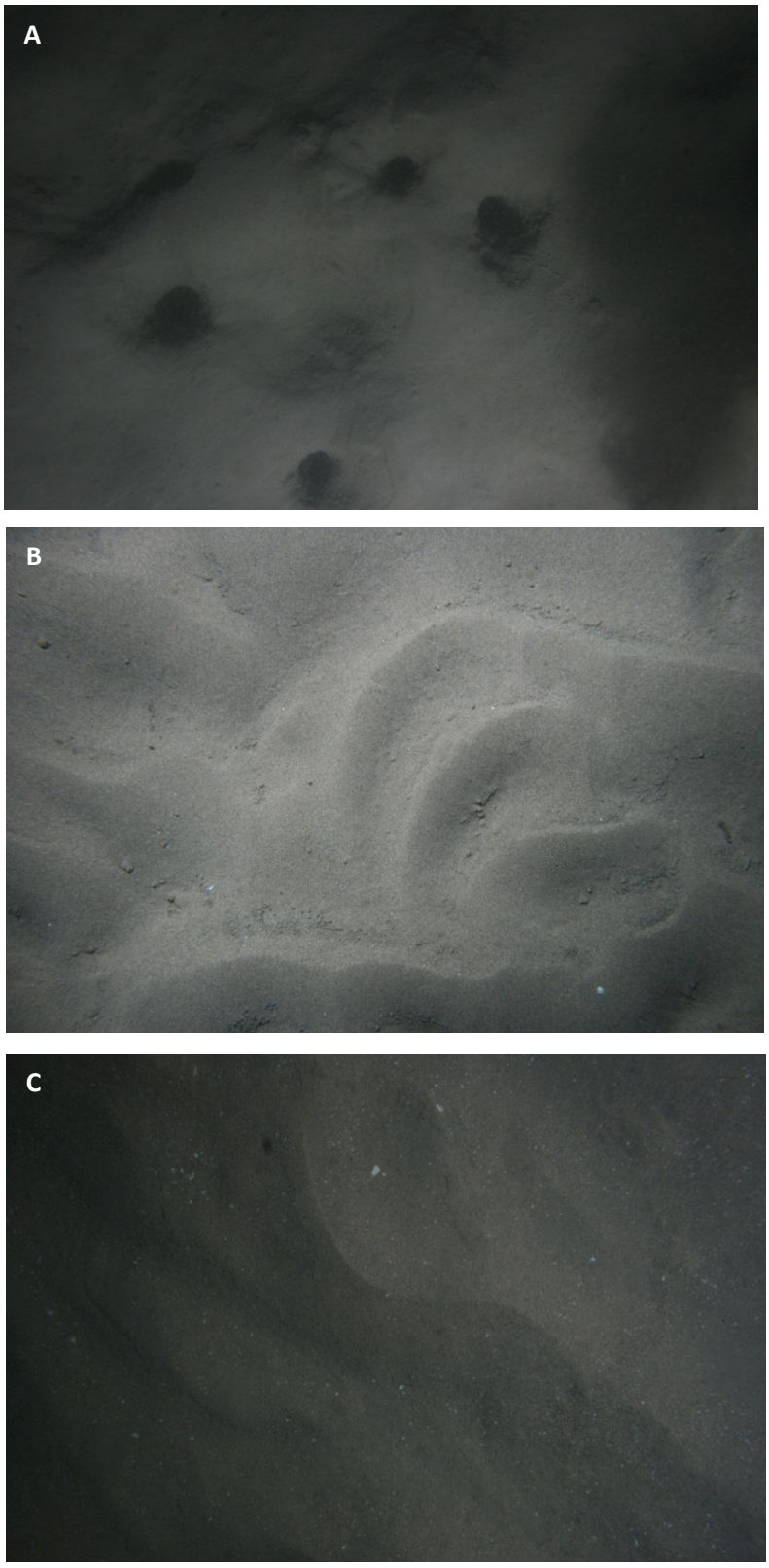

Plate 1. A) Group d-1; station 49, Group d-2; B) station 117, C) station 218.

Group e (2 stations)

STATIONS: 86, 112

COMMUNITY DESCRIPTION:

This community was observed at two stations with very different types of substratum, each of which supported a very high abundance of the bryozoan *Alcyonidium diaphanum.* The occurrence of the bryozoan *Flustra foliacea,* the starfish *Asterias rubenes,* and the anemone *Sagartia elegans* also characterized this community. Both stations also supported hydroids in high numbers.

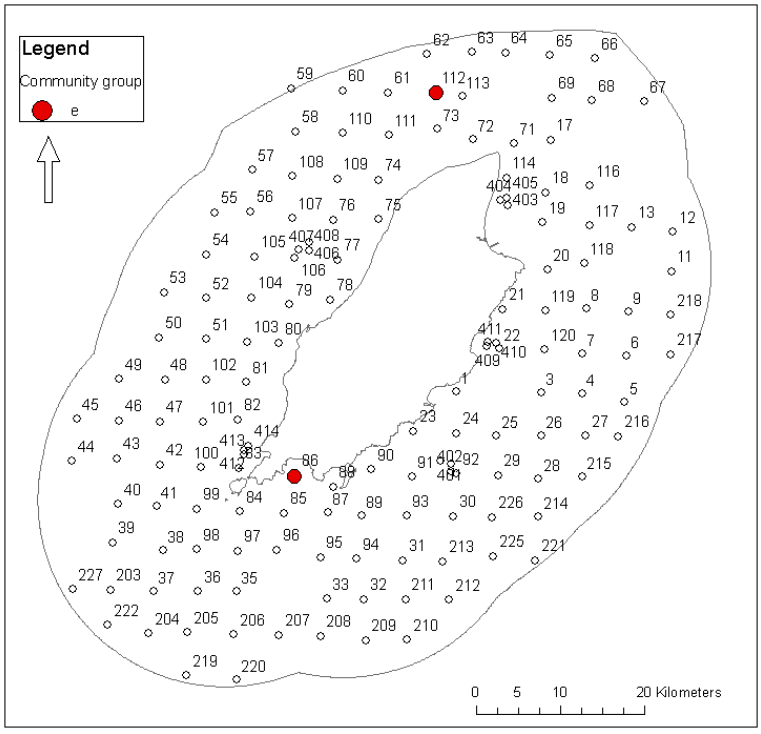

Figure 1. Distribution of stations which comprised community Group e in Manx territorial waters. Map generated using ArcGIS.

Under closer examination these stations had very different community types. Station 86 occurred on infralittoral rock and was an algae-dominated station. Kelp *Laminaria* spp.*,* and red and brown seaweeds were a dominant part of the community at station 86. Low numbers of the soft coral *Alcyonium digitatum,* the top-shells *Gibbula* sp.*,* the feather star *Antedon bifida,* the byrozoan *Membranipora membranacea,* and the hydroid *Tubularia indivisa* occurred at this station. The community at station 112 occurred on a sandy substratum with a high surficial shell component. The anemones *Urticina* spp. were commonly observed at this station, and the hermit crabs *Pagurus* spp. occurred in low numbers.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Alcyonidium diaphanum	30.29	-	65.3	19.08
Anemone unid.	2.35	-	5.07	1.26
Asterias rubens	2.85	-	6.14	0.39
Flustra foliacea	5.7	-	12.29	1.95
Sagartia elegans	2.85	-	6.14	0.49

No fished species or taxa of conservation concern were recorded for this community.

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: Station 86 (5-25 m) Station 112 (20-40 m)

SUBSTRATUM:

This community occurred on two different types of substratum, which are described separately.

Substratum Group e-1 (86):

Bedrock, gravel, cobbles, boulders with coarse sand.

Substratum Group e-2 (112):

Coarse sand with a high amount of shell, often with some pebbles and/or cobbles lying on the surface.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Broader classification Group e-1	**EUNIS**	**Similarity %**	**Fit**
IR	A3		Good
Biotope Group e-2			
SS.SMx.IMx.CreAsAn	A5.431	32.26	Poor
SS.SSa.IFiSa.ScupHyd	A5.232	32.26	Reasonable physical, good biological*
SS.SCS.CCS.Blan	A5.135	0.00	Reasonable physical
SS.SCS.OCS.GlapThyAmy	-	-	Reasonable physical

***Selected representative**

Table 4. Presented are the broader habitat classifications for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group e-1	**EUNIS**
IR	A3
Broader classification Group e-2	
SS.SCS.CCS/ SS.SMx.CMx	A5.13/ A5.44

REPRESENTATIVE IMAGES:

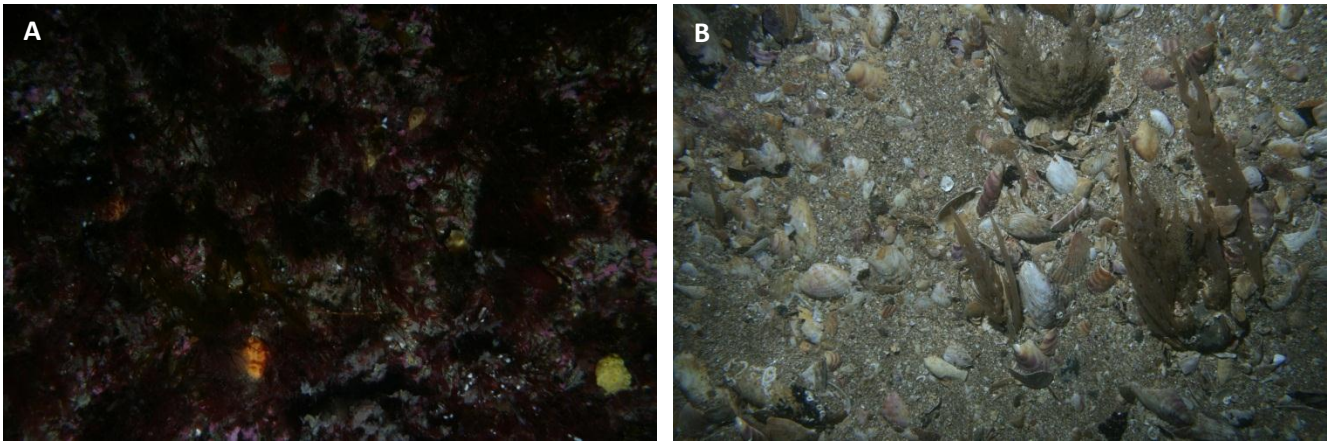

Plate 1. A) Group e-1; station 86, B) Group e-2; station 112

Group f (2 stations)

STATIONS: 73, 111

COMMUNITY DESCRIPTION:

This community was faunally impoverished. Station 111 was characterized by barren plains of sand and shell gravel, however the occurrence of boulders appeared favorable for the establishment of anemones *Urticina* spp., which was the most conspicuous taxon at this station. Only four images were analyzed for station 73, but these images suggested a prevalence of hydroids interspersed amongst high quantities of shell gravel with a high prevalence of the encrusting tubes of the worm *Pomatoceros* sp. *Urticina* spp. was also present at station 73. The low faunal abundance and the presence of *Urticina* spp. contributed to the similarity of the communities at these stations.

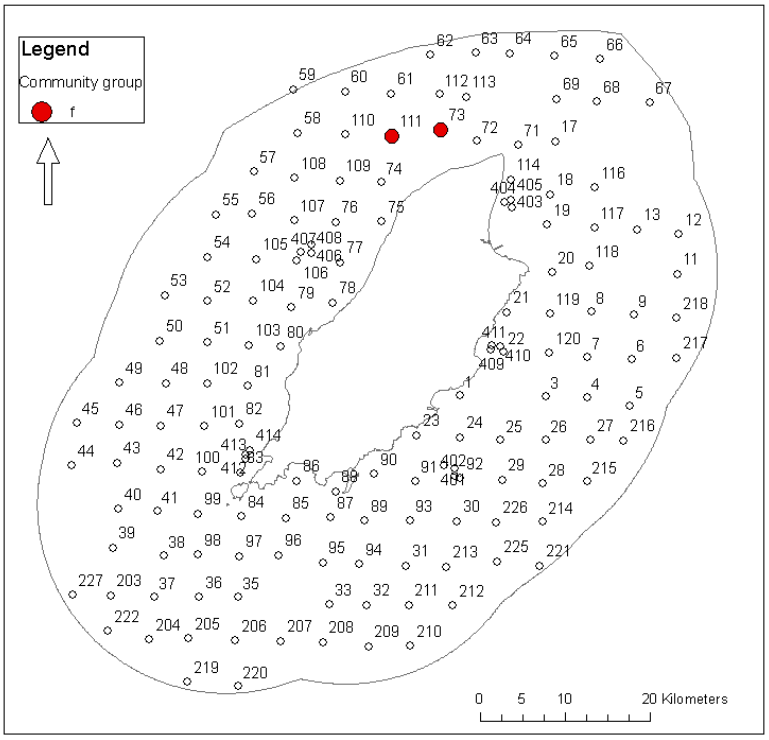

Figure 1. Distribution of stations which comprised community Group f in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Urticina spp.	44.95	-	100	2.33

No fished species or taxa of conservation concern were recorded for this community.

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 20-50 m

SUBSTRATUM:

Shell gravel overlying coarse sand with some stone (gravel, pebbles, and cobbles).

Qualifying comments:

Station 111 had many images with sand and shell gravel, but the substratum graded into small boulders interspersed with coarse sand and shell.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group f	EUNIS	Similarity %	Fit
SS.SSa.IFiSa.ScupHyd	A5.232	42.86	Reasonable biological, poor physical
CR.MCR.EcCr.UrtScr	A4.213	36.36	Good biological, poor physical
SS.SMx.CMx.FluHyd	A5.444	30.00	Reasonable*
SS.SCS.CCS.Nmix	A5.134	28.57	Reasonable physical, poor biological
SS.SMx.IMx.CreAsAn	A5.431	28.57	Reasonable

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group f	EUNIS
SS.SMx.CMx	A5.44

REPRESENTATIVE IMAGES:

Plate 1. A) Station 86, B) station 112, C) station 112.

Group g (2 stations)

STATIONS: 11, 80

COMMUNITY DESCRIPTION:

These stations were grouped with a low similarity (26.39%) based on the occurrence and low abundance of the brittlestar *Ophiura albida* and the anemone *Cerianthus lloydii* at each of the stations. While a low number of small burrows in the sediment, hydroids, and emergent polychaete tubes were common to both stations, the stations were examined separately in terms of faunal composition. Neither station supported a high abundance of organisms, however station 11, a clean sand habitat, was distinguished by the occurrence of the urchin *Psammechinus miliaris,* the sea snail *Aporrhais pespelecani,* and the starfish *Astropecten irregularis*. Station 112, a sandy environment with a coarser component on the sediment surface, was more faunally scarce. The worm *Tubulanus annulatus*, and other evidence of polychaetes, in the form of polychaete cast and a single *Lanice conchilega* tube, were observed at this station.

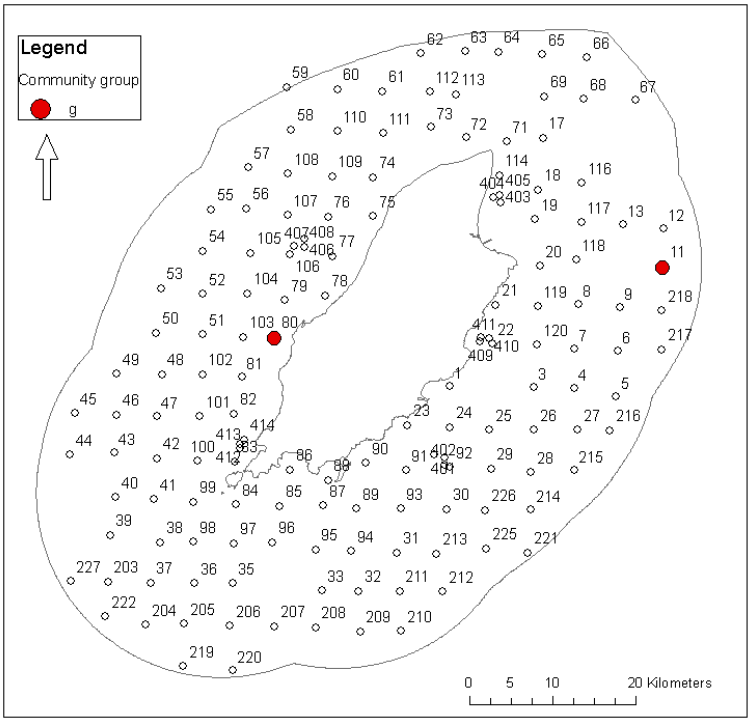

Figure 1. Distribution of stations which comprised community Group g in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Ophiura albida	15.44	-	58.58	0.42
Cerianthus lloydii	10.92	-	41.42	0.14

Table 2. Presented are the average abundances m^{-2} for fished species These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group.

Fished species	Av. Abundance/m^2
Pecten maximus	0.04

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 10-30 m

SUBSTRATUM:

Medium to coarse sand typically with varied amounts of shell and shell fragments scattered across the surface, and occasionally with high amounts of gravel.

BIOTOPE CLASSIFICATION:

Table 3. Presented is the broader habitat classification for the listed group according to the Marine Habitat Classification for Britain and Ireland Version 04.05. Due to limitations in the available data, broader classifications were more appropriate than classification at the biotope level. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group g	EUNIS
SS.SCS.CCS/SS.SMx.CMx	A5.13/ A5.44

REPRESENTATIVE IMAGES:

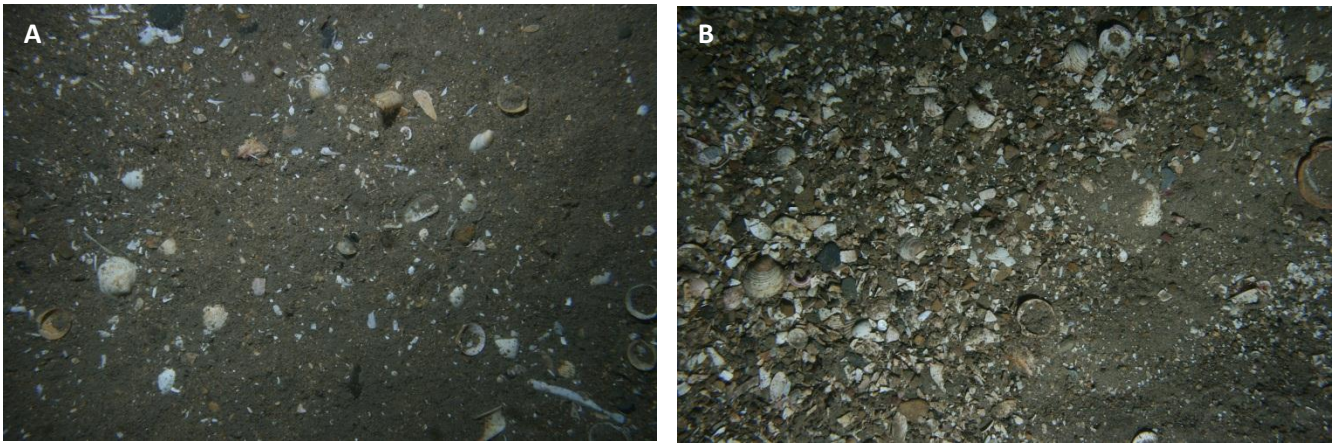

Plate 1. A) Station 11, B) station 80.

Group h (1 station)

STATIONS: 79

COMMUNITY DESCRIPTION:

This community occurred on a stony substratum and was dominated by red algae, with occasional brown seaweeds. The kelp *Laminaria* sp. was also commonly observed in this community. The bryozoan *Cellaria* sp., squat lobster *Galathea* sp., the shrimp *Pandalus* sp., hydroids, and ascidians were widespread in this community. Occurring less frequently were sponges, often encrusting stones, the shrimp *Crangon sp*., the crabs *Liocarcinus* sp*., Macropodia* sp., and *Ebalia* sp., fish from the Gobiidae family, and the bryozoan *Alcyonidium diaphanum.*

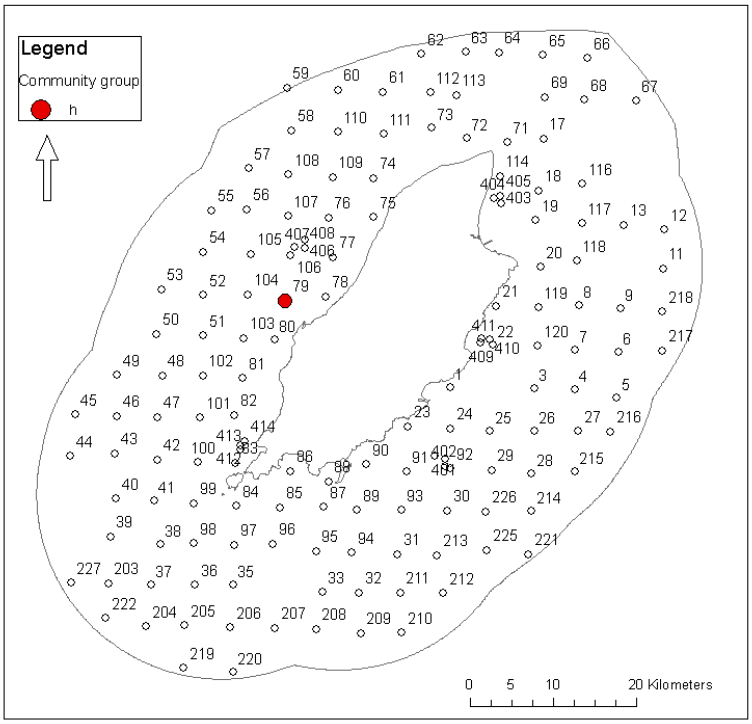

Figure 1. Distribution of stations which comprised community Group h in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the abundances m^{-2} for the taxa which were recorded with an abundance of 5 or greater at the station characterized by this group. A SIMPER analysis could not be conducted to identify the characterizing taxa as the community was represented by only one station.

Species	Abundance/m^2
Cellaria patches	22.37
Galathea sp.	3.92
Pandalus sp.	3.20
Ascidian unid.	2.89
Porifera unid.	1.75
Crangon sp.	0.52

No fished species or taxa of conservation concern were recorded for this community.

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 15-30 m

SUBSTRATUM:

Gravel, pebbles, and cobbles overlying sand.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group h	EUNIS	Similarity %	Fit
SS.SMp.KSwSS.LsacR	A5.521	14.81	Reasonable physical, poor biological
SS.SMp.KSwSS.LsacR.CbPb	A5.5211	6.90	Reasonable*

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group h	EUNIS
SS.SMp.KSwSS	A5.52

REPRESENTATIVE IMAGES:

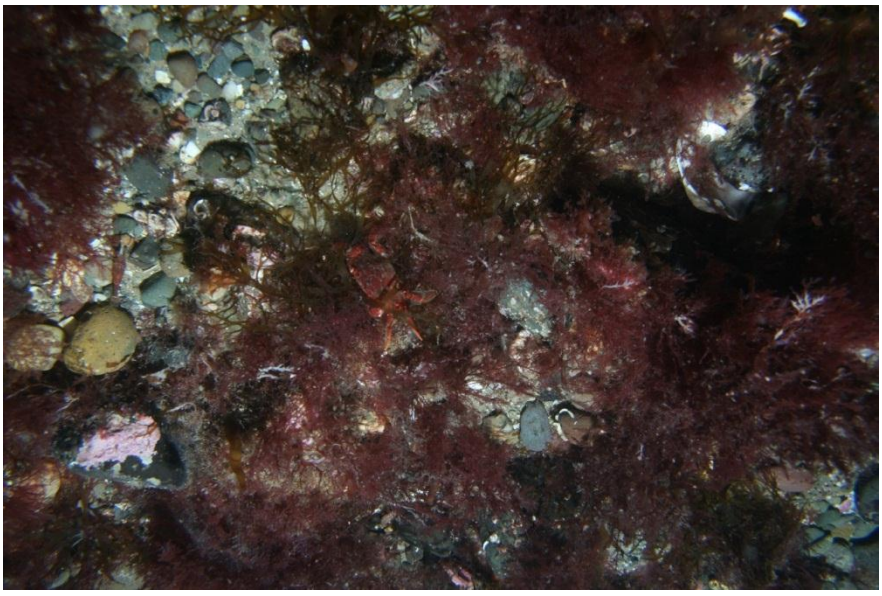

Plate 1. Station 79.

Group i (3 stations)

STATIONS: 75, 77, 78

COMMUNITY DESCRIPTION:

This was an algae dominated community which occurred on sand with stones. The kelp *Laminaria* sp. was prevalent at these stations. *Chorda filum* was also commonly observed amongst other brown and red seaweeds. The anemone *Anthopleura ballii* occurred in high numbers across these stations. Other characterizing species which occurred with lower abundance per station were anemones, including *Sagartia elegans* and *Urticina* spp., top-shells *Gibbula* spp., hydroids, and the bryozoan *Cellaria* sp. Emergent tubes constructed by the polychaete *Lanice conchilega* also occurred with low abundance at these stations.

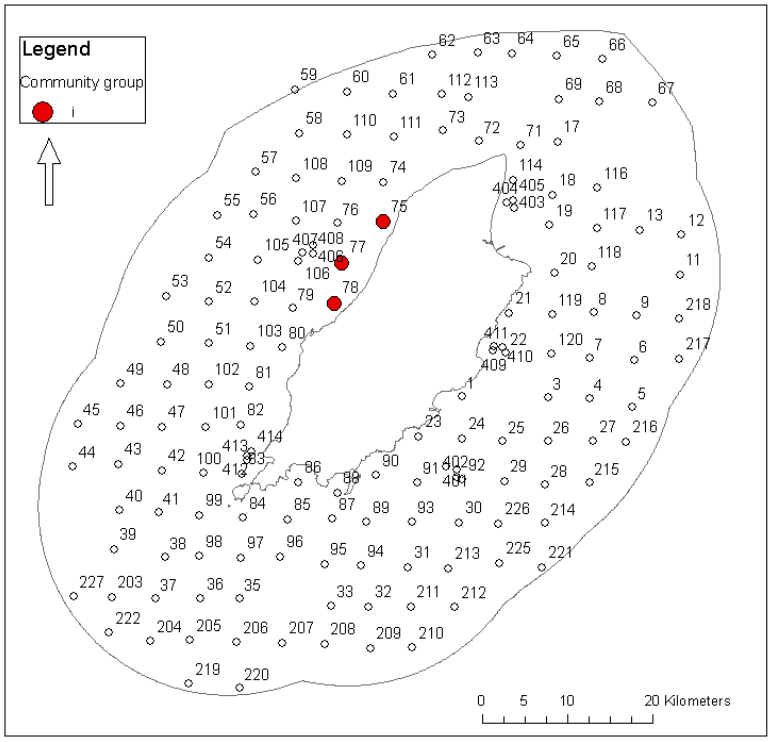

Figure 1. Distribution of stations which comprised community Group i in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Anthopleura ballii	14.39	5.97	31.25	4.71
Ascidian unid.	8.83	2.01	19.18	10.86
Anemone unid.	5.51	4.58	11.97	1.17
Urticina spp.	4.13	4.22	8.98	0.21
Cellaria patches	2.92	4.22	6.35	0.17
Gibbula sp.	2.92	4.22	6.35	0.21
Sagartia elegans	2.92	4.22	6.35	0.17

Table 2. Presented are the average abundances m^{-2} for taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Taxa of conservation concern	Av. Abundance/m^2
Edwardsia sp. (Station 78)	0.03

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 5-30 m

SUBSTRATUM:

Medium to coarse sand with gravel, pebbles, small cobbles.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group i	EUNIS	Similarity %	Fit
SS.SMp.KSwSS.LsacGraFS	A5.524	32.56	Reasonable
SS.SMp.KSwSS.LsacR.Gv	A5.5212	20.51	Reasonable*
SS.SMp.KSwSS.LsacR.Sa	A5.5213	18.18	Reasonable
SS.SMp.KSwSS.LsacR.Mu	A5.5214	15.69	Reasonable
SS.SMp.KSwSS.LsacCho	A5.522	10.26	Reasonable

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group i	EUNIS
SS.SMp.KSwSS	A5.52

REPRESENTATIVE IMAGES:

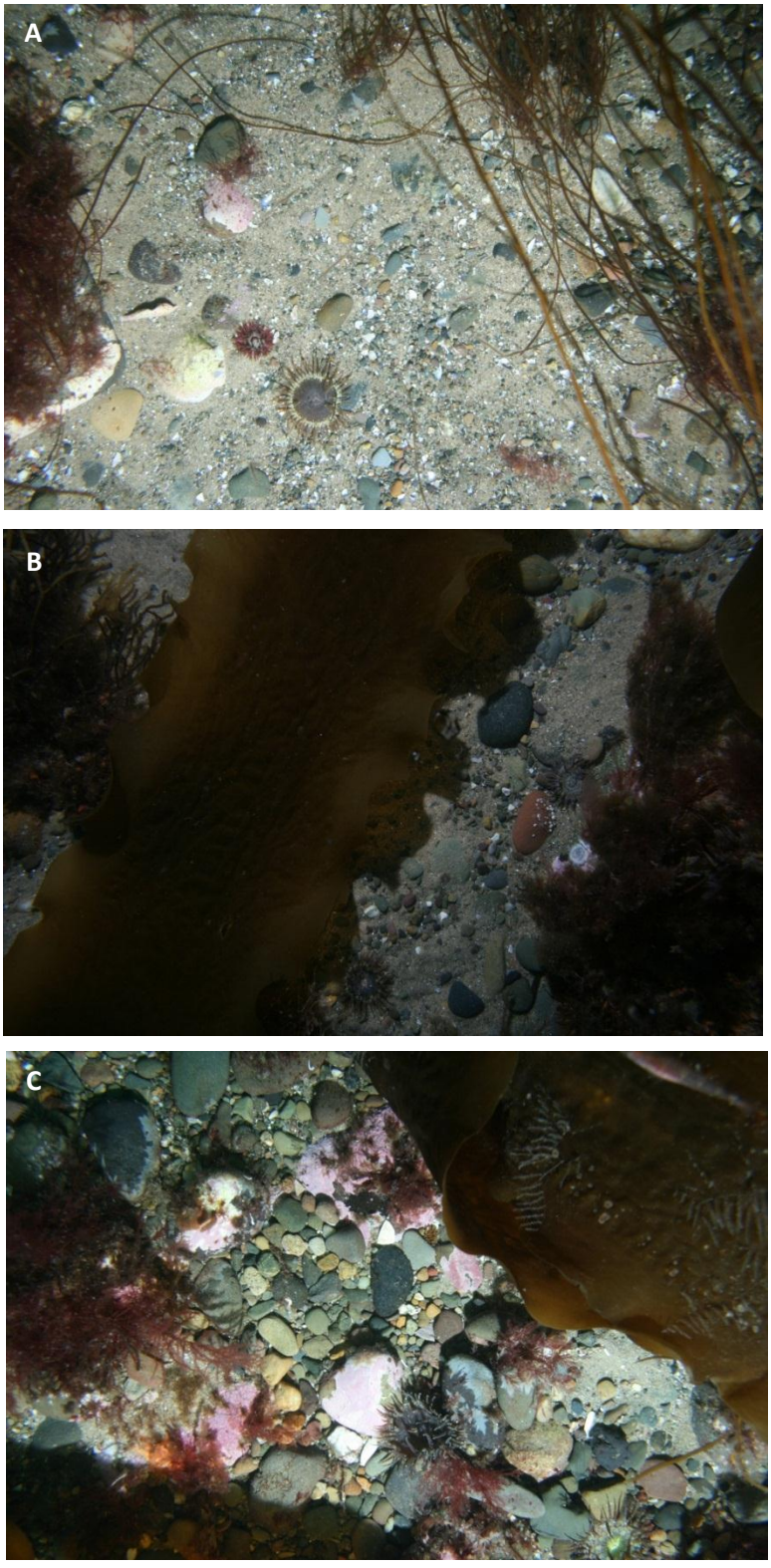

Plate 1. A) Station 78, B) station 75, C) station 77.

Group j (6 stations)

STATIONS: 12, 13, 43, 47, 67, 104

COMMUNITY DESCRIPTION:

This community was found in sandy habitats where the observed taxa, including *Sagartia elegans* and unidentified bivalves, generally occurred in low numbers per station, although hermit crabs *Pagurus* spp*.,* the brittlestar *Ophiura ophiura,* and hydroids occurred at some stations with a higher abundance. The hydroids *Nemertesia ramosa* and *Nemertesia antennina* and patches of the bryozoan *Cellaria* sp. also occurred in this group and were observed in low numbers across the stations. Small burrows and emergent polychaete tubes were commonly observed in the sediment.

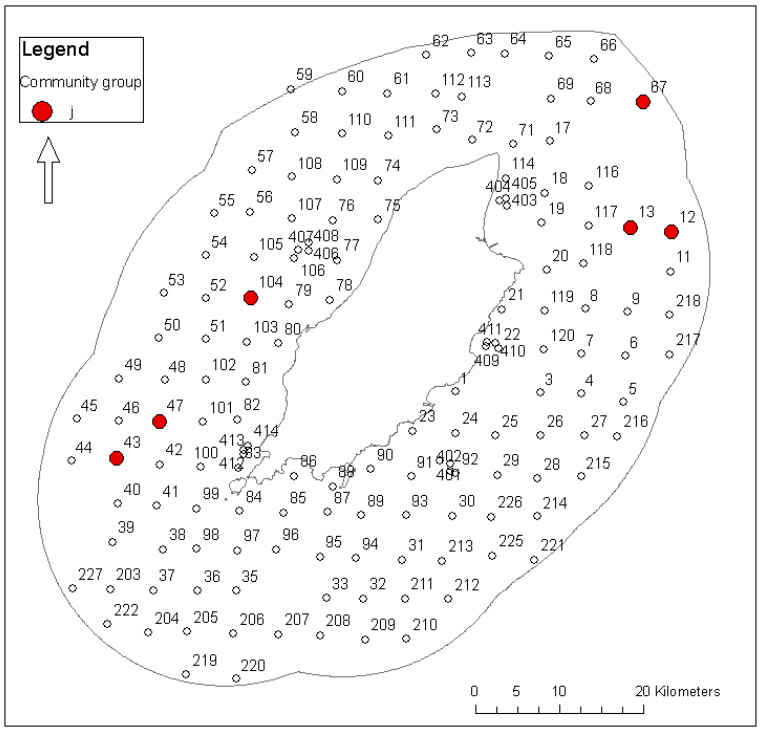

Figure 1. Distribution of stations which comprised community Group j in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Pagurus spp.	8.1	2.23	34.58	1.35
Ophiura ophiura	4.91	0.74	20.95	1.10
Sagartia elegans	2.76	0.77	11.79	0.22
Cellaria patches	1.82	0.76	7.77	0.11
Nemertesia antennina	1.58	0.47	6.75	0.28
Bivalvia unid.	1.39	0.48	5.92	0.12
Nemertesia ramosa	0.69	0.48	2.93	0.09

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Aequipecten opercularis	0.02
Pecten maximus	0.05
Nephrops norvegicus	0.02
Taxa of conservation concern	
Edwardsia sp. (Station 104)	0.04

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 20-80 m

SUBSTRATUM:

This community occurred on two different types of substratum, which are described separately.

Substratum Group j-1**:** (12, 13, 43, 47, 104)

Fine to medium sands, possibly sandy mud, small burrows prevalent.

Qualifying comments:

Small surficial shell fragments observed at stations 43 and 47.

Substratum Group j-2: (67)

Medium sand frequently with surficial gravel.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group j-1	**EUNIS**	**Similarity %**	**Fit**
SS.SMu.CSaMu.VirOphPmax	A5.354	47.89	Reasonable*
SS.SMu.CSaMu.VirOphPmax.Has	A5.3541	45.33	Reasonable biological, poor physical
SS.SMu.CFiMu.SpnMeg	A5.361	19.23	Reasonable
SS.SMu.CFiMu.BlyrAchi	A5.363	12.77	Poor
SS.SSa.CMuSa.AalbNuc	A5.261	12	Poor biological, reasonable physical
Biotope Group j-2			
SS.SCS.CCS/ SS.SMx.CMx	A5.13/ A5.44		

***Selected representative**

Table 4. Presented are the broader habitat classifications for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group j-1	**EUNIS**
SS.SSa.CMuSa/SS.SMu.CSaMu	A5.26/A5.35
Broader classification Group j-2	
SS.SCS.CCS/SS.SMx.CMx	A5.13/ A5.44

REPRESENTATIVE IMAGES:

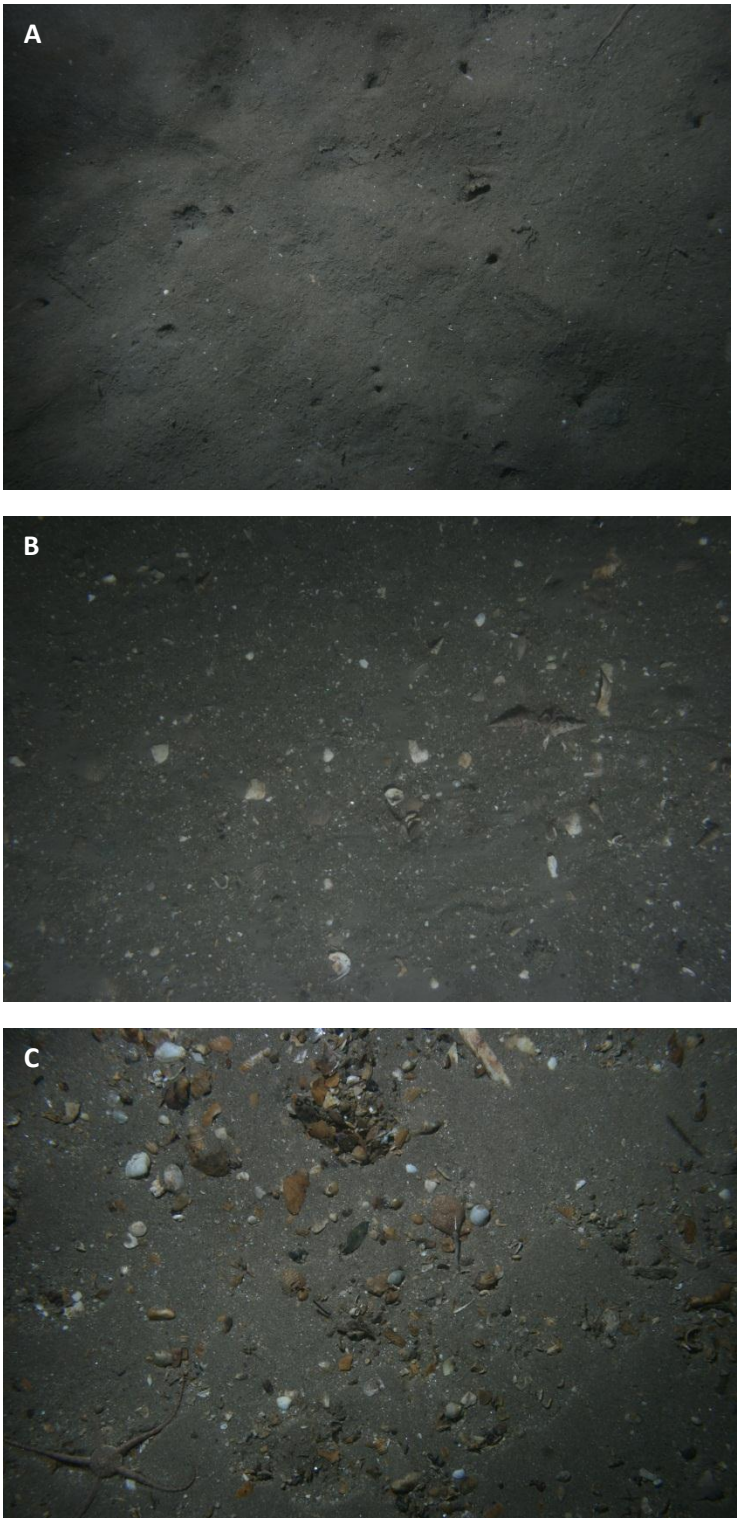

Plate 1. Group j-1; A) station 13, B) station 43, C) Group j-2; station 67.

Group k (5 stations)

STATIONS: 120, 408, 404, 403, 405

COMMUNITY DESCRIPTION:

This community was observed on three types of substratum; maerl scattered amongst sand and stone, gravel, and sand with fine stone and shell gravel. The light-bulb sea squirt *Clavelina lepadiformis* occurred typically in high numbers across the stations. Small burrows and emergent polychaete tubes and encrusting *Pomatoceros* sp. tubes were also commonly observed at each of the stations within this group. The anemone *Cerianthus lloydii* occurred in high numbers at some of these stations, and the gelatinous bryozoan *Alcyonidium diaphanum* was abundant at two of the maerl supporting stations at Ramsey. Also characteristic of this community, but observed in low numbers and only at some stations, were the starfish *Asterias rubens* and *Leptasterias muelleri*, the brittlestar *Ophiura albida,* the top-shells *Calliostoma zizyphinum* and *Gibbula* sp., unidentified bivalves, hydroids, and fish, often of the family Gobiidae. The community composition at the stations at Ramsey were markedly different from the other stations in this group due to the presence of maerl, kelp *Laminaria* sp., and a variety of red and brown seaweeds.

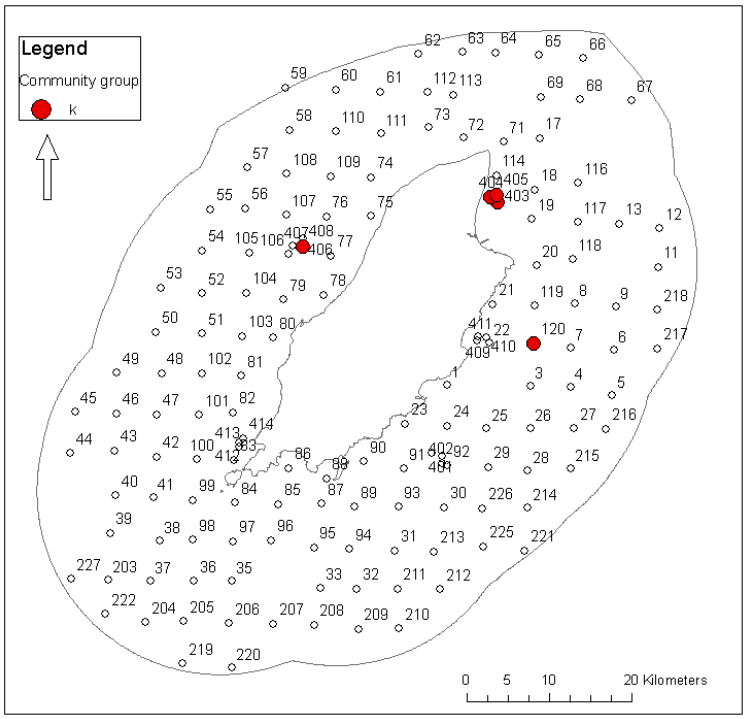

Figure 1. Distribution of stations which comprised community Group k in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Clavelina lepadiformis	11.76	1.21	29.89	31.11
Cerianthus lloydii	10.12	1.02	25.72	8.72
Asterias rubens	2.22	1.1	5.65	0.66
Anemone unid.	1.87	1.08	4.76	0.23
Leptasterias muelleri	1.82	1.13	4.62	0.19
Pisces unid.	1.67	1.12	4.26	0.16
Gibbula sp.	1.47	1.14	3.75	0.37
Gobiidae unid.	1.4	0.62	3.56	0.23
Alcyonidium diaphanum	1.23	0.32	3.13	1.30
Ophiura albida	0.79	0.62	2.01	0.12
Calliostoma zizyphinum	0.71	0.62	1.81	0.27
Bivalvia unid.	0.65	0.61	1.65	0.08

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Pecten maximus	0.02
Aequipecten opercularis	0.16
Taxa of conservation concern	
Maerl (Stations 403, 404, 405, scarce station 120)	Present

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 5-40 m; Ramsey sites 5-15 m (403,404,405)

SUBSTRATUM:

This community occurred on three different types of substratum, which are described separately.

Substratum Group k-1 (403, 404, 405):

> Maerl (mostly live) overlying a sandy substratum with stones; predominately pebbles with occasional large cobbles or boulders.

Substratum Group k-2 (120):

Medium to coarse sand with fine gravel, shell gravel, and scarce (mostly dead) maerl .

Substratum Group k-3 (408):

Gravel habitat with some surficial shell and small pebbles.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group k -1	**EUNIS**	**Similarity %**	**Fit**
SS.SMp.Mrl.Pcal.Nmix	A5.5112	40.74	Reasonable
SS.SMp.Mrl.Pcal	A5.511	32.65	Reasonable*
SS.SMp.Mrl.Pcal.R	A5.5111	26.92	Reasonable physical, poor biological
Biotope Group k-2			
SS.SCS.CCS.Nmix	A5.134	29.17	Good physical, poor biological*
SS.SMx.OMx.PoVen	A5.451	12.24	Reasonable physical
SS.SCS.CCS.MedLumVen	A5.132	9.30	Good physical
SS.SCS.CCS.Blan	A5.135	4.88	Good physical
SS.SCS.CCS.Pkef	A5.133	0.00	Good physical
SS.SCS.ICS.MoeVen	A5.123	0.00	Reasonable physical
Biotope Group k-3			
SS.SMx.CMx.ClloMx.Nem	A5.4411	40.74	Reasonable*
SS.SMx.CMx.ClloMx	A5.441	32.00	Reasonable physical, poor biological
SS.SCS.CCS.Nmix	A5.134	29.17	Reasonable physical, poor biological
SS.SCS.CCS.MedLumVen	A5.132	9.30	Reasonable physical
SS.SMx.CMx.MysThyMx	A5.443	4.55	Reasonable physical
SS.SCS.OCS.GlapThyAmy	-	-	Reasonable physical

***Selected representative**

Table 4. Presented are the broader habitat classifications for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group k-1	**EUNIS**
SS.SMp.Mrl	A5.51
Broader classification Group k-2	
SS.SCS.CCS	A5.13
Broader classification Group k-3	
SS.SCS.CCS/SS.SMx.CMx	A5.13/A5.44

REPRESENTATIVE IMAGES:

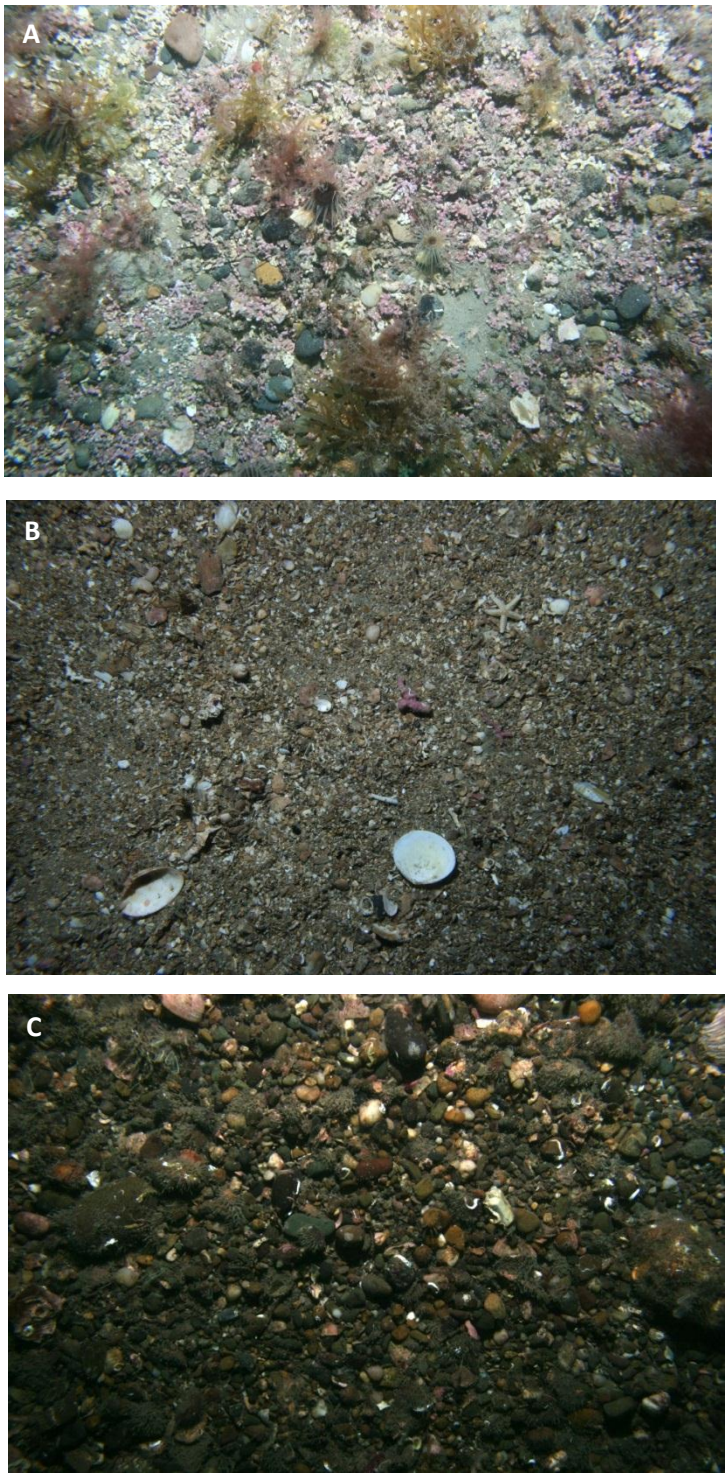

Plate 1. A) Group k-1; station 404, B) Group k-2; station 120, C) Group k-3; station 408.

Group I (2 stations)

STATIONS: 205, 219

COMMUNITY DESCRIPTION:

This community was observed on sandy substrata and was dominated by the high abundance of the tube-building worm *Sabellaria spinulosa.* Aggregations of *Sabellaria* tubes occurred in clumps scattered over the sediment surface, rather than forming a dense reef. Still, the matrix of tubes provided a coarse element to the substratum, which allows for the settlement of sessile epifauna (Connor et al., 2004).

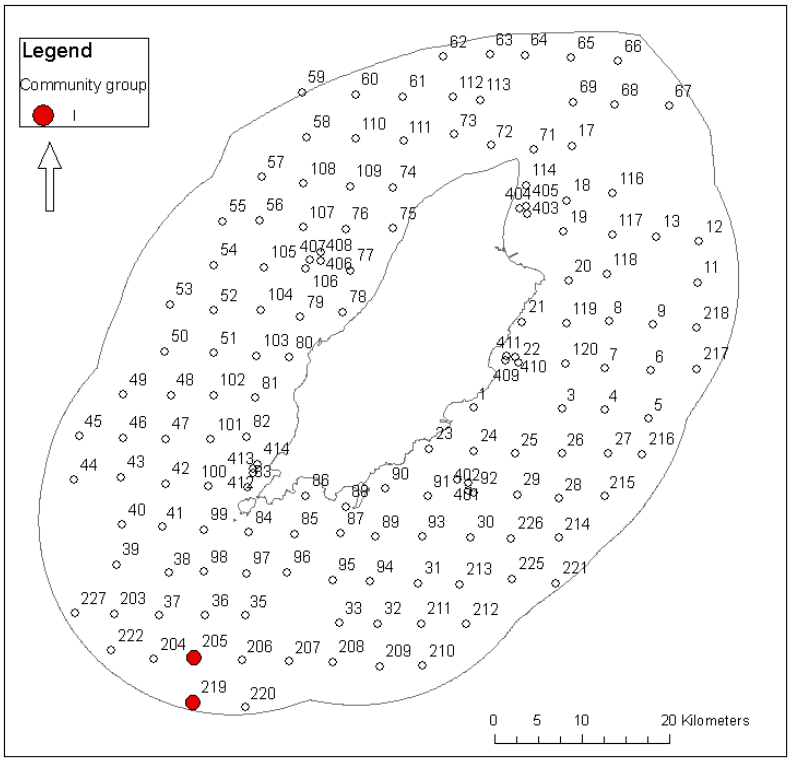

Figure 1. Distribution of stations which comprised community Group I in Manx territorial waters. Map generated using ArcGIS.

Also observed in high numbers were the queen scallop *Aequipecten opercularis,* often encrusted by the sponge *Pseudosuberites sulphureus,* hydroids, and the brittlestar *Ophiura albida.* The soft coral *Alycyonium digitatum* was commonly observed at these stations. The squat lobster *Munida rugosa,* hermit crabs *Pagurus* spp*.,* and the king scallop *Pecten maximus* occurred with lower abundances at these stations.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Sabellaria spinulosa	42.67	-	57.75	244.40
Ophiura albida	6.53	-	8.83	6.59
Aequipecten opercularis	5.66	-	7.66	10.11
Alcyonium digitatum	3.93	-	5.31	6.64
Pseudosuberites sulphureus	2.72	-	3.68	2.49
Munida rugosa	1.81	-	2.45	0.48
Palliolum tigerinum	1.48	-	2.01	0.34
Pagurus spp.	1.28	-	1.74	0.29
Pecten maximus	1.28	-	1.74	0.29

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Pecten maximus	0.29
Aequipecten opercularis	10.11
Taxa of conservation concern	
Sabellaria spinulosa (all)	244.40

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 50-100 m

SUBSTRATUM:

Medium and medium to coarse sand with a somewhat muddy appearance.

Qualifying comments:

Station 219 had some surficial gravel and pebbles.

BIOTOPE CLASSIFICATION:

Table 3. Presented is the broader habitat classification for the listed group according to the Marine Habitat Classification for Britain and Ireland Version 04.05. Due to limitations in the available data, broader classifications were more appropriate than classification at the biotope level. The habitat type is listed with the corresponding 2004 EUNIS code.

Group l	**EUNIS**
SS.SSa	A5.2

REPRESENTATIVE IMAGES:

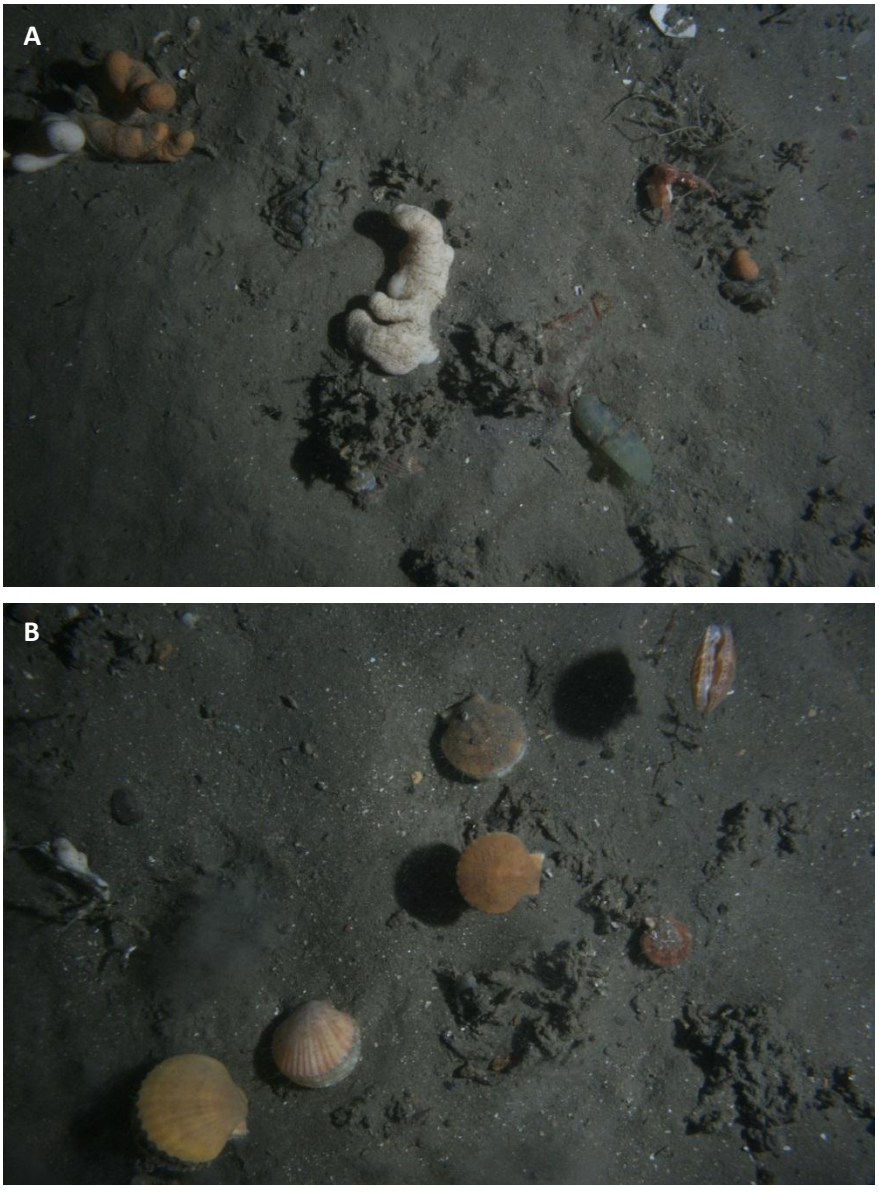

Plate 1. A) Station 205, B) station 219.

Group m (4 stations)

STATIONS: 42, 56, 82, 101

COMMUNITY DESCRIPTION:

This community was observed on mixed sandy substrata and was characterized by the high abundance of the brittlestar *Ophiura albida.* Bryozoans *Cellaria* sp.*,* the hermit crabs *Pagurus* spp., and hydroids were also commonly observed across these stations. Observed with low abundance at these stations were the queen scallop *Aequipecten opercularis,* fish from the Gobiidae family, dragonets *Callionymus* spp., the brittlestar *Ophiura ophiura,* ascidians, including *Ascidiella aspersa,* occasional sponges, and the crab *Inachus* sp. Small burrows and emergent polychaete tubes were commonly observed features of the substratum.

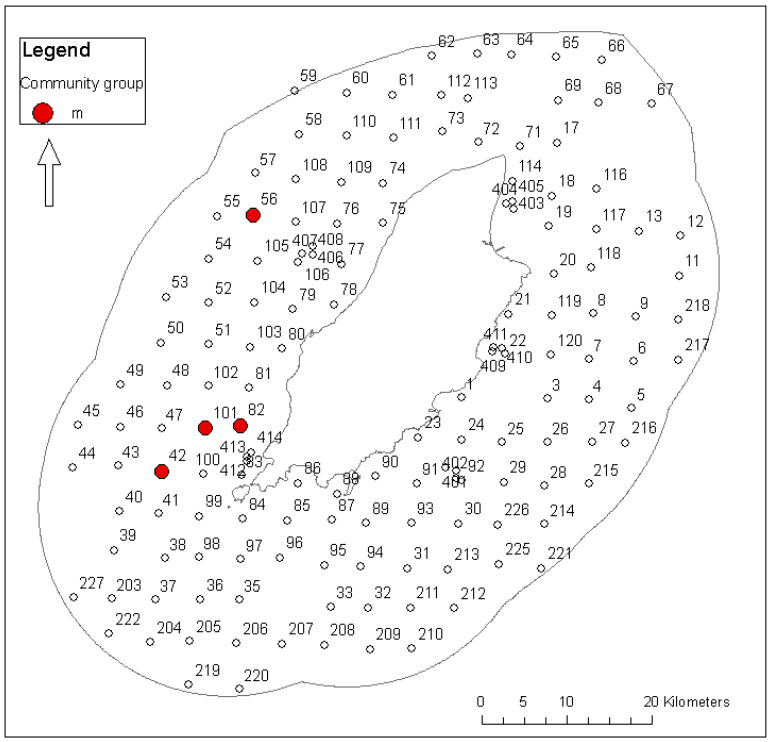

Figure 1. Distribution of stations which comprised community Group m in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Aequipecten opercularis	4.28	9.22	8.35	0.33
Ascidian unid.	1.64	0.84	3.21	0.23
Ascidiella aspersa	1.65	0.89	3.22	0.19
Callionymus spp.	1.25	0.9	2.44	0.16
Cellaria patches	10.68	6.95	20.83	2.50
Gobiidae unid.	3.38	4.07	6.6	0.50
Inachus sp.	1.22	0.91	2.38	0.14
Ophiura albida	12.27	2.24	23.93	5.65
Ophiura ophiura	3.25	3.69	6.34	0.44
Pagurus spp.	4.9	2.17	9.55	0.76
Porifera unid.	1.9	0.9	3.71	0.23

Table 2. Presented are the average abundances m^{-2} for fished species that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group.

Fished species	Av. Abundance/m^2
Pecten maximus	0.10
Aequipecten opercularis	0.33

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 30-50 m

SUBSTRATUM:

This community occurred on two different types of substratum, which are described separately.

Substratum Group m-1: (42, 82, 101)

Medium sand with gravel and/or broken shell scattered across the surface.

Substratum Group m-2: (56)

Fine sand.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the broader habitat classifications for the listed group according to the Marine Habitat Classification for Britain and Ireland Version 04.05. Due to limitations in the available data, broader classifications were more appropriate than classification at the biotope level. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group m-1	**EUNIS**
SS.SCS.CCS/SS.SMx.CMx	A5.13/ A5.44
Broader classification Group m-2	
SS.SSa	A5.2

REPRESENTATIVE IMAGES:

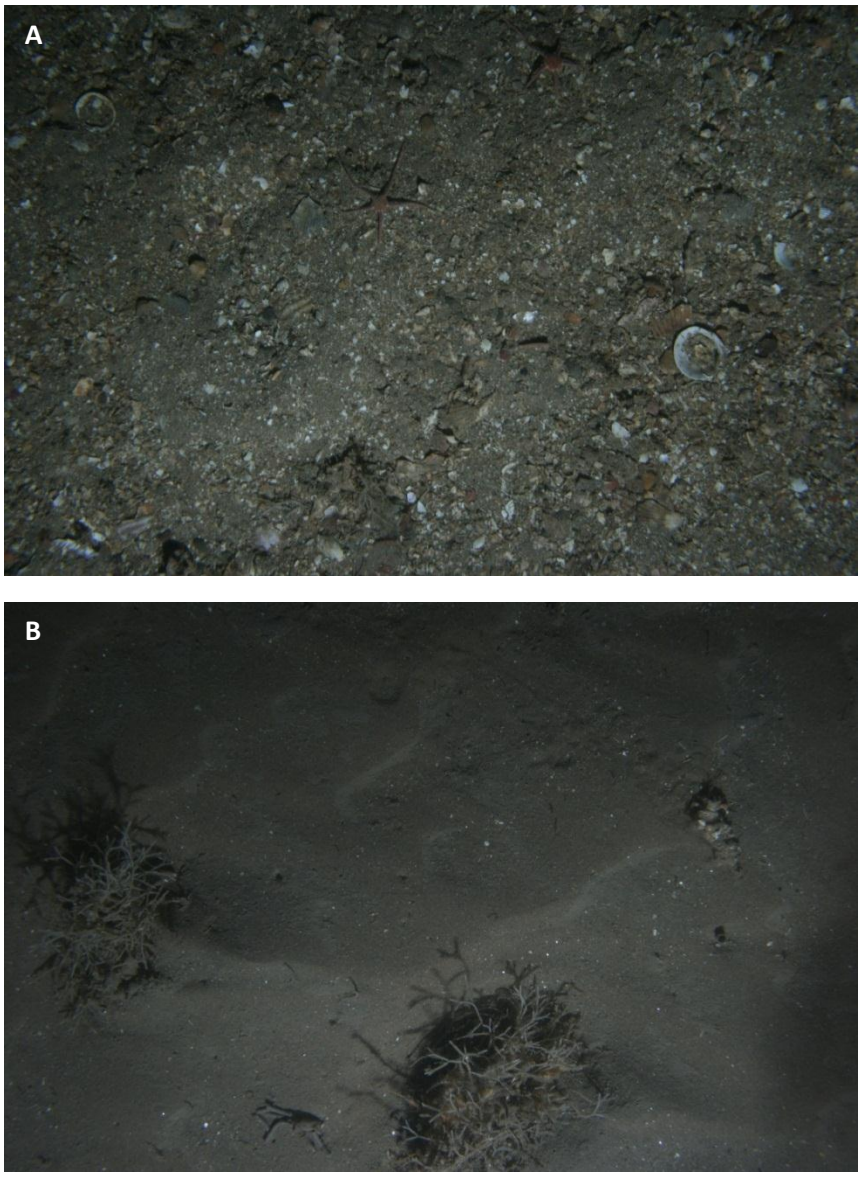

Plate 1. A) Group m-1; station 82, B) Group m-2; station 56.

Group n (4 stations)

STATIONS: 57, 103, 105, 108

COMMUNITY DESCRIPTION:

This community was observed on sandy substrata and was characterized by the prevalence and abundance of the brittlestar *Ophiura albida*. A high abundance of hydroids also characterized this community, including *Nemertesia antennina* and *Nemertesia ramosa,* although the abundances of these particular species varied by station. Patches of the bryozoan *Cellaria* sp. were also commonly observed at the stations characterized by this community. Hermit crabs *Pagurus* spp., the soft coral *Alcyonium digitatum,* sponges, and fish in the Gobiidae family occurred with relatively low abundances per station. Polychaete tubes emerging from the sediment were also commonly observed across these stations.

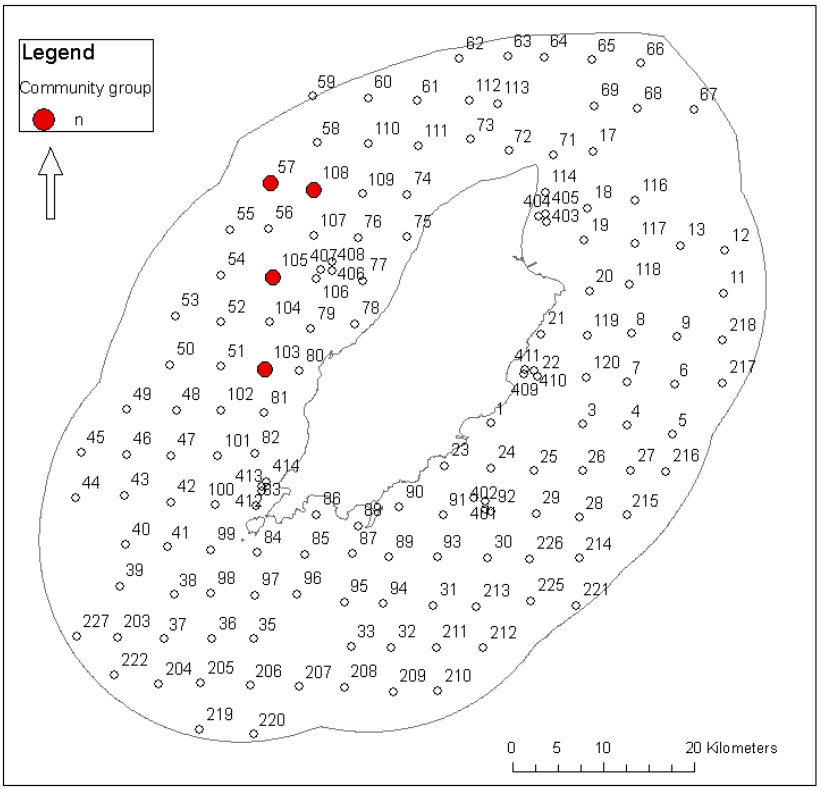

Figure 1. Distribution of stations which comprised community Group n in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Ophiura albida	10.67	5.69	21.62	1.59
Cellaria patches	9.45	5.85	19.15	1.46
Nemertesia antennina	6.77	3.82	13.72	1.38
Nemertesia ramosa	5.32	2.19	10.78	0.46
Pagurus spp.	4.61	4.12	9.35	0.30
Alcyonium digitatum	4.39	7.92	8.9	0.20
Porifera unid.	1.92	0.91	3.9	0.10
Gobiidae unid.	1.88	0.91	3.81	0.09

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Aequipecten opercularis	0.03
Taxa of conservation concern	
Modiolus modiolus (Station 108)	0.02

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 20-60 m

SUBSTRATUM:

This community occurred on two different types of substratum, which are described separately.

Substratum Group n-1 (57, 103, 108):

Medium sand with some shell and, in some cases, small stones scattered across the surface.

Qualifying comments:

Station 103 had a coarser appearance with a higher broken shell content.

Substratum Group n-2 (105):

Clean fine sand.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the broader habitat classifications for the listed group according to the Marine Habitat Classification for Britain and Ireland Version 04.05. Due to limitations in the available data, broader classifications were more appropriate than classification at the biotope level. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group n-1	**EUNIS**
SS.SCS.CCS/SS.SMx.CMx	A5.13/ A5.44
Broader classification Group n-2	
SS.SSa	A5.2

REPRESENTATIVE IMAGES:

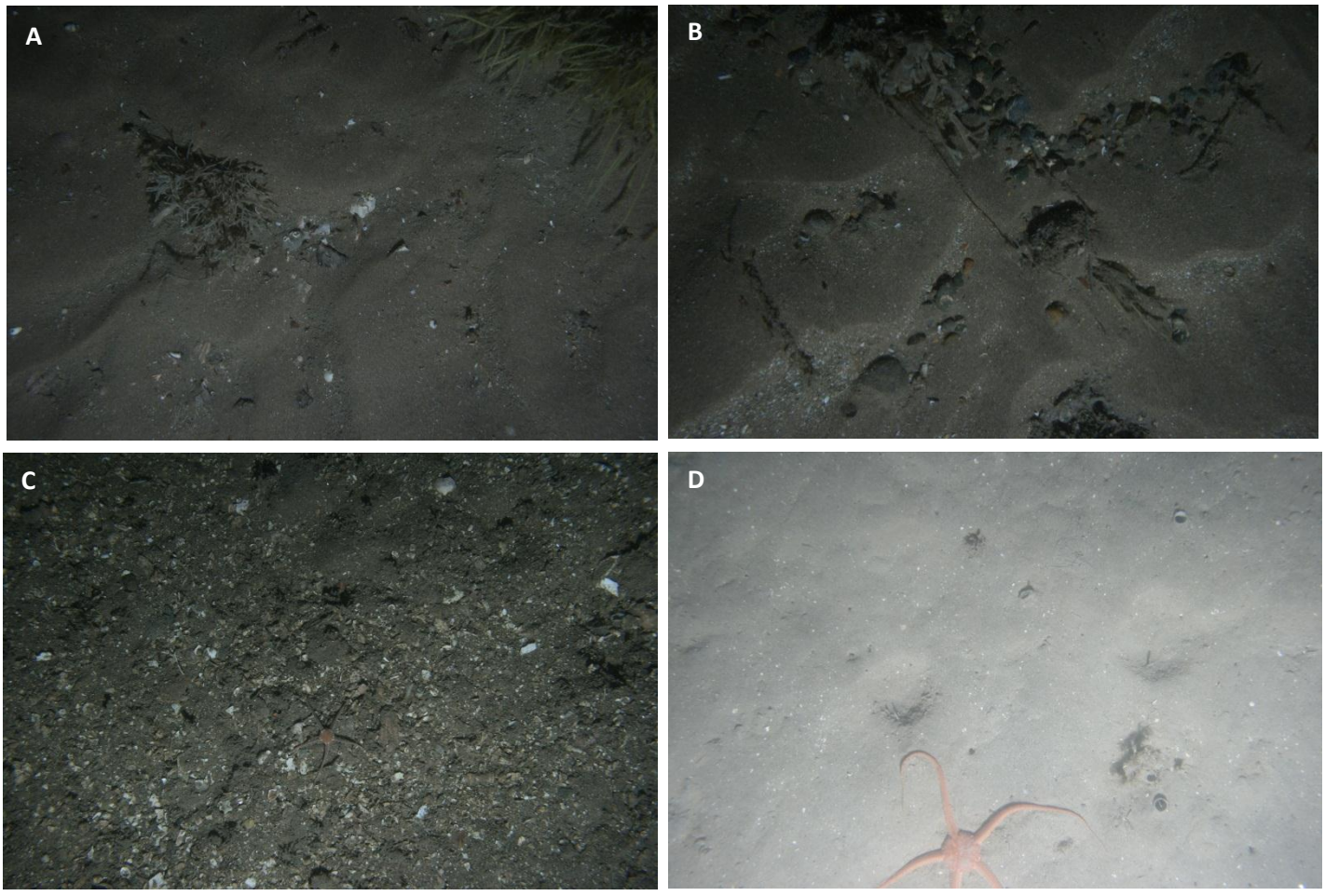

Plate 1. Group n-1; A) station 57, B) station 108, C) station 103, D) Group n-2; station 105.

Group o (3 stations)

STATIONS: 20, 81, 106

COMMUNITY DESCRIPTION:

This community was observed on sandy substrata with stone and/or shell gravel scattered across the surface. The brittlestar *Ophiura albida* was commonly observed across the stations characterized by this community. Hydroids were also common in this community. Observed with low abundances throughout these stations were the light-bulb sea-squirt *Clavelina lepadiformis,* the starfish *Asterias rubens,* hermit crabs *Pagurus* spp.*,* and the queen scallop *Aequipecten opercularis.* The brittlestars *Ophiocomina nigra* and *Ophiura ophiura,* the anemone *Cerianthus lloydii,* and the ascidian *Ascidiella aspersa* were also observed in this community, although presence and abundance varied by station. Solitary emergent polychaete tubes and small burrows also occurred with varied abundances.

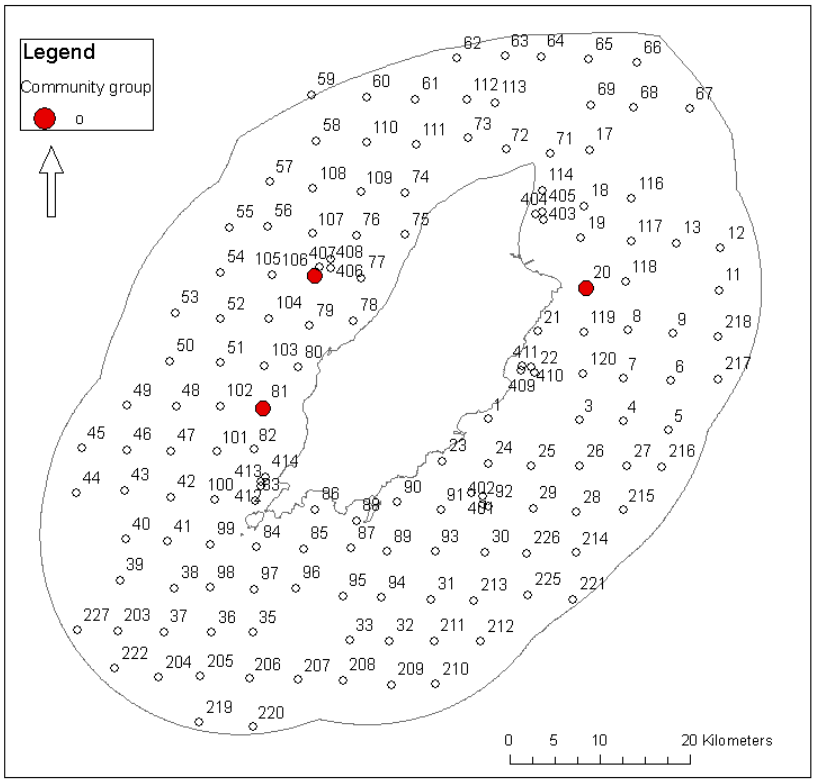

Figure 1. Distribution of stations which comprised community Group o in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Aequipecten opercularis	2.81	17.72	6.84	0.14
Ascidian unid.	5.15	8.7	12.56	1.27
Ascidiella aspersa	1.96	0.58	4.77	1.20
Asterias rubens	3.22	4.34	7.86	0.31
Cerianthus lloydii	1.65	0.58	4.04	0.41
Clavelina lepadiformis	4.59	4.12	11.2	0.87
Ophiocomina nigra	2.92	0.58	7.13	1.98
Ophiura albida	10.12	10.8	24.69	1.59
Ophiura ophiura	1.72	0.58	4.2	0.47
Pagurus spp.	3.17	6.69	7.73	0.20

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Aequipecten opercularis	0.14
Pecten maximus	0.17
Taxa of conservation concern	
Edwardsia sp. (Station 106)	0.03

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 15-40 m

SUBSTRATUM:

Medium sand with small broken shell fragments and some gravel scattered across the surface.

BIOTOPE CLASSIFICATION:

Table 3. Presented is the broader habitat classification for the listed group according to the Marine Habitat Classification for Britain and Ireland Version 04.05. Due to limitations in the available data, broader classifications were more appropriate than classification at the biotope level. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group o	EUNIS
SS.SCS.CCS/SS.SMx.CMx	A5.13/ A5.44

REPRESENTATIVE IMAGES:

Plate 1. A) Station 20, B) station 81, C) station 106.

Group p (3 stations)

STATIONS: 412, 413, 414

COMMUNITY DESCRIPTION:

This community characterized the stations which occurred in the Port Erin closed area, where the substratum was sandy with some small stones and broken shell on the surface. The brittlestar *Ophiura albida* was a dominant member of this community. Other commonly observed organisms included patches of the bryozoan *Cellaria* sp., the queen scallop *Aequipecten opercularis,* and the sea-snail *Aporrhais pespelecani.*

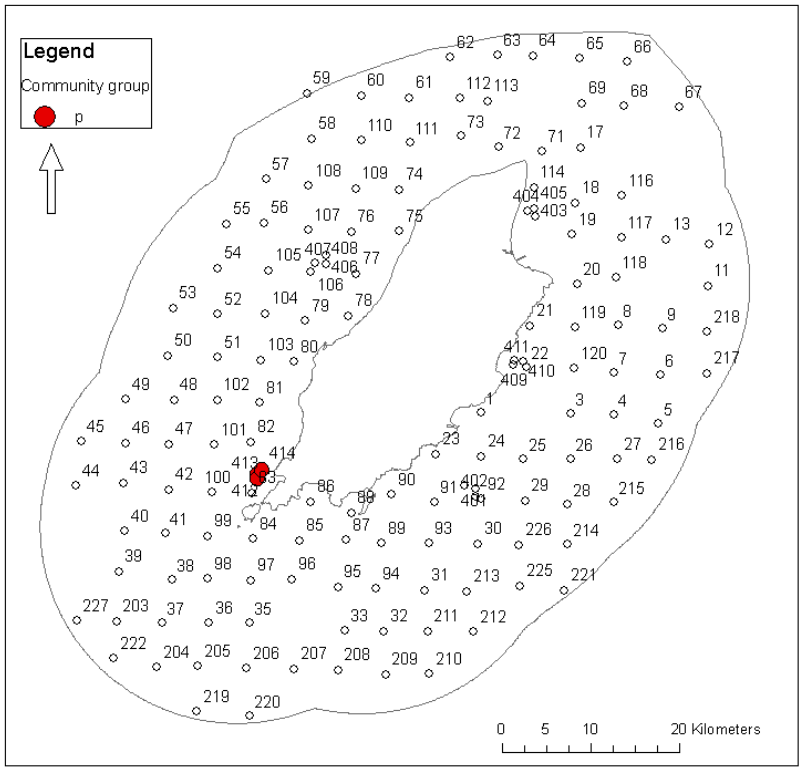

Figure 1. Distribution of stations which comprised community Group p in Manx territorial waters. Map generated using ArcGIS.

The tusk shell *Antalis entalis,* gastropods including *Turritella communis,* dragonets *Callionymus* spp*.,* and hydroids occurred with lower abundances at these stations. The brittlestar *Ophiura ophiura* was observed at two of the stations, although its abundance varied. *Pomatoceros* sp. tubes were often observed encrusting broken shell and stones scattered across the sediment surface.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Ophiura albida	24.36	9.21	36.59	20.45
Cellaria patches	9.89	7.19	14.86	2.03
Aporrhais pespelecani	7.55	30.24	11.35	2.10
Aequipecten opercularis	5.71	7.19	8.58	0.69
Antalis entalis	3.68	4.96	5.52	0.31
Gastropod unid.	3.63	21.6	5.46	0.27
Callionymus spp.	2.41	11.22	3.61	0.14
Turritella communis	2.41	11.22	3.61	0.17
Ophiura ophiura	1.26	0.58	1.89	0.41

Table 2. Presented are the average abundances m^{-2} for fished that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group.

Fished species	Av. Abundance/m^2
Pecten maximus	0.14
Aequipecten opercularis	0.69

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 20-35 m

SUBSTRATUM:

Slightly silty sand with some surficial gravel, pebbles, and broken shell content.

BIOTOPE CLASSIFICATION:

Table 3. Presented is the broader habitat classification for the listed group according to the Marine Habitat Classification for Britain and Ireland Version 04.05. Due to limitations in the available data, broader classifications were more appropriate than classification at the biotope level. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group p	EUNIS
SS.SCS.CCS/SS.SMx.CMx	A5.13/ A5.44

REPRESENTATIVE IMAGES:

Plate 1. Station 414.

Group q (3 stations)

STATIONS: 21, 409, 411

COMMUNITY DESCRIPTION:

This community occurred on sandier substrata with maerl, or scarce dead maerl. This community was characterized by the high prevalence and abundance of the brittlestar *Ophiura albida*. Also common within these stations was the queen scallop *Aequipecten opercularis.* Hydroids were also commonly observed and, at stations 409 and 411, east of Laxey, scattered tufts of hydroid and unidentified algae were prevalent. The anemone *Cerianthus lloydii* also characterized this community, although its abundance varied greatly by station. Sponges, including *Suberites* spp., and the brittlestar *Ophiura ophiura* were also observed with relatively low abundance per station.

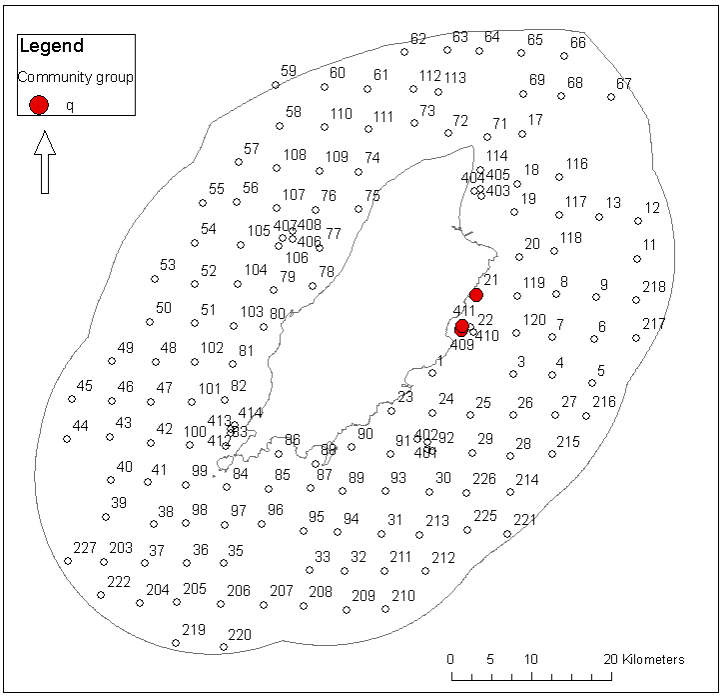

Figure 1. Distribution of stations which comprised community Group q in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Ophiura albida	28.9	11.23	50.98	13.26
Aequipecten opercularis	7.04	11.6	12.42	1.10
Cerianthus lloydii	5.8	1.09	10.22	3.61
Porifera unid.	4.98	11.6	8.78	0.62
Suberites spp.	2.73	223.41	4.82	0.41
Ophiura ophiura	2.03	0.58	3.58	0.38

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av.Abundance/m^2
Aequipecten opercularis	1.10
Taxa of conservation concern	
Maerl (Stations 409 and 411, scarce dead maerl 21)	Present

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 5-25 m

SUBSTRATUM:

This community occurred on two different types of substratum, which are described separately.

Substratum Group q-1**:** (21)

Scarce dead maerl and small shells scattered over sand.

Substratum Group q-2: (409, 411)

Maerl gravel (live and dead) and shell scattered over sand; did not form a dense bed.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group q-1	EUNIS	Similarity %	Fit
SS.SSa	A5.2		
Biotope Group q-2			
SS.SMp.Mrl.Pcal.Nmix	A5.5112	25.64	Good biological, reasonable physical*
SS.SMp.Mrl.Pcal	A5.511	23.53	Reasonable
SS.SMx.CMx.MysThyMx	A5.443	13.79	Reasonable

***Selected representative**

Table 4. Presented are the broader habitat classifications for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group q-1	**EUNIS**
SS.SSa	A5.2
Broader classification Group q-2	
SS.SMp.Mrl	A5.51

REPRESENTATIVE IMAGES:

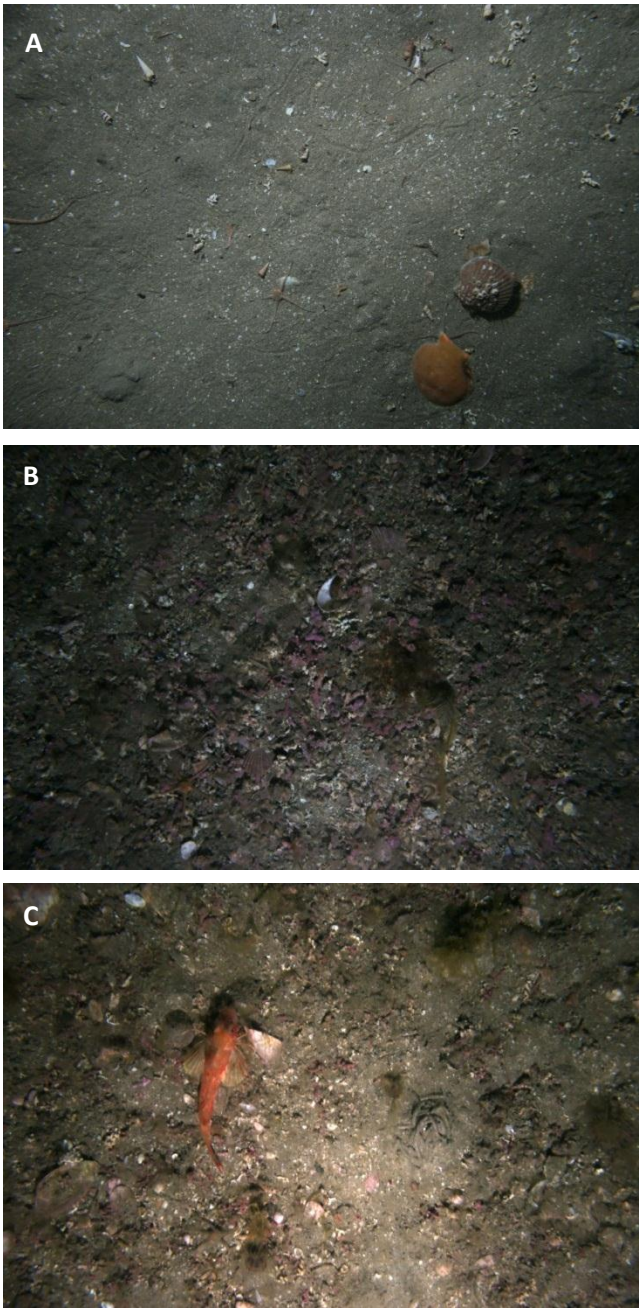

Plate 1. A) Group q-1; station 21, Group q-2; B) station 409, C) station 411.

Group r (21 stations)

STATIONS: 9, 22, 25, 26, 28, 35, 37, 38, 41, 76, 83, 97, 98, 107, 109, 206, 207, 215, 220, 406, 407

COMMUNITY DESCRIPTION:

This community was predominately observed on gravelly substrata, but was also observed on sand and in a habitat which supported maerl. This community was characterized by the high prevalence and abundance of the brittlestar *Ophiura albida* and the queen scallop *Aequipecten opercularis,* which was often encrusted by the sponge *Pseudosuberites sulphureus.*

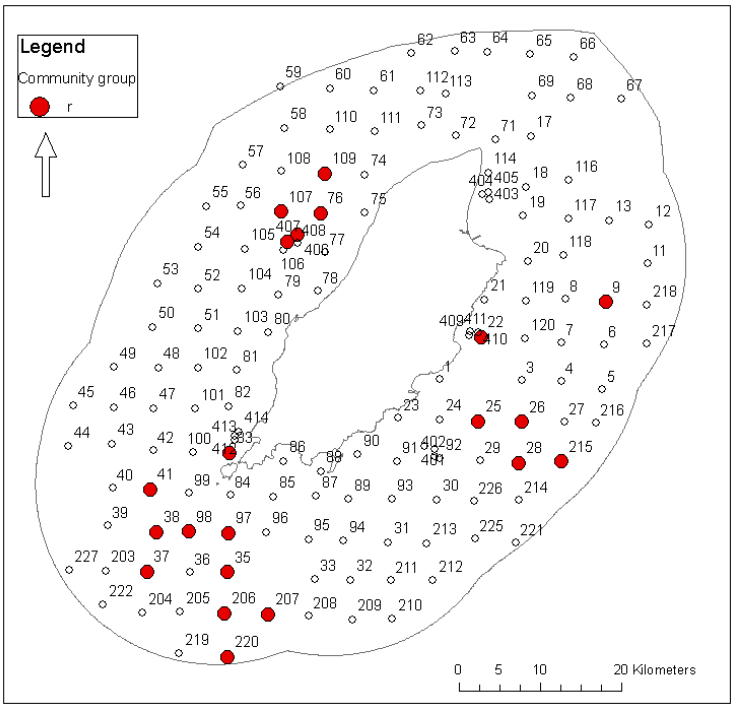

Figure 1. Distribution of the stations which comprised community Group r in Manx waters. Map was generated using ArcGIS.

Hermit crabs *Pagurus* spp. and the king scallop *Pecten maximus* also occurred consistently throughout these stations. The soft coral *Alcyonium digitatum*, the tube anemone *Cerianthus lloydii* and the starfish *Asterias rubens* were also characteristic of this community.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Ophiura albida	8.68	1.92	19.98	8.12
Aequipecten opercularis	7.31	2.77	16.82	3.54
Alcyonium digitatum	4.19	1.21	9.65	2.09
Pseudosuberites sulphureus	3.21	1.3	7.39	1.78
Pagurus spp.	2.89	1.76	6.66	0.38
Pecten maximus	2.49	1.59	5.73	0.41
Cerianthus lloydii	2.38	0.61	5.49	2.61
Asterias rubens	1.83	1.13	4.22	0.34
Nemertesia antennina	1.05	0.72	2.43	0.27
Ebalia sp.	1.02	0.8	2.34	0.37
Porifera unid.	0.98	0.59	2.26	0.57
Gibbula sp.	0.85	0.57	1.96	0.49
Ophiura ophiura	0.68	0.56	1.57	0.16
Calliostoma zizyphinum	0.64	0.65	1.47	0.11
Palliolum tigerinum	0.54	0.48	1.25	0.21
Bivalvia unid.	0.49	0.57	1.13	0.08

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Pecten maximus	0.41
Aequipecten opercularis	3.54
Taxa of conservation concern	
Edwardsia sp. (Stations 9, 83, 215)	0.05
Maerl (Station 22)	Present

HABITAT DESCRIPTION

ESTIMATED DEPTH RANGE: 25-100 m

SUBSTRATUM:

This community occurred on three different types of substratum, which are described separately.

Substratum Group r-1 (9, 25, 26, 28, 35, 38, 41, 76, 83, 97, 98, 109, 206, 207, 215, 220, 406, 407):

Medium to coarse sand underlying varied amounts of gravel and small pebbles. Surficial shells comprised a minor feature of the substratum, overall.

Qualifying comments:

Substrata at stations 41, 109, 220, 406, and 407 were predominately sand with surficial gravel.

Station 83 had high surficial shell gravel content.

Substrata at the stations at Targets (406 and 407) had a noticeably silty appearance.

Broken maerl gravel occurred at Station 25.

Substratum Group r-2 (22):

Appreciable quantities of live and dead maerl overlying medium sand. The maerl did not form a thick bed at this station.

Substratum Group r-3 (37, 107):

Medium to fine sand; surficial stones were scarce or absent.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group r-1	**EUNIS**	**Similarity %**	**Fit**
SS.SMx.CMx.ClloMx.Nem	A5.4411	28.28	Good biological, reasonable physical*
SS.SMx.CMx.ClloMx	A5.441	23.16	Reasonable
SS.SCS.CCS.Nmix	A5.134	21.51	Reasonable
SS.SCS.CCS.MedLumVen	A5.132	9.09	Reasonable physical
SS.SCS.CCS.Blan	A5.135	4.65	Reasonable physical
Biotope Group r-2			
SS.SMp.Mrl.Pcal.Nmix	A5.5112	26.26	Good*
SS.SCS.CCS.Nmix	A5.134	21.51	Reasonable
SS.SMp.Mrl.Pcal	A5.511	19.15	Good physical
Biotope Group r-3			
SS.SSa	A5.2		

***Selected representative**

Table 4. Presented are the broader habitat classifications for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group r-1	**EUNIS**
SS.SCS.CCS/SS.SMx.CMx	A5.13/A5.44
Broader classification Group r-2	
SS.SMp.Mrl	A5.51
Broader classification Group r-3	
SS.SSa	A5.2

REPRESENTATIVE IMAGES:

Plate 1. Group r-1; A) station 26, B) station 109, c) station 41, D) station 407.

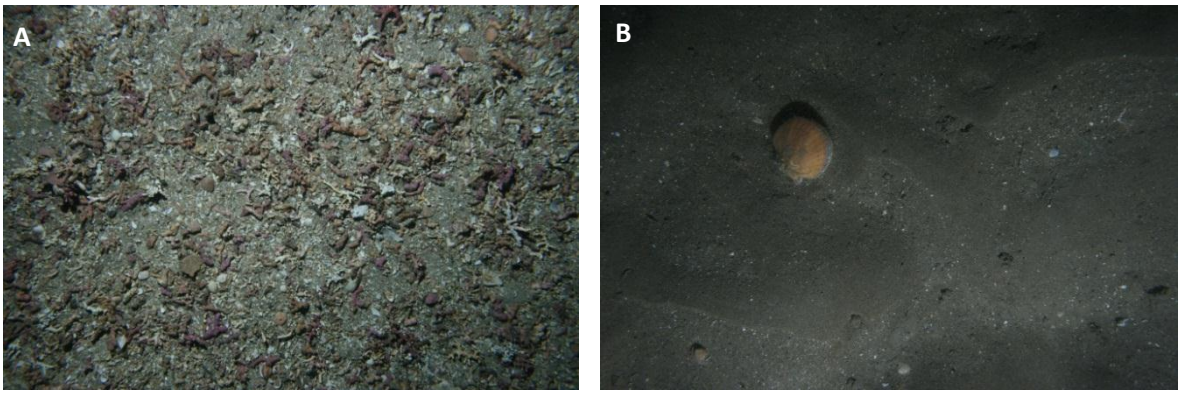

Plate 2. A) Group r-2; station 22, B) Group r-3; station 37.

Group s (11 stations)

STATIONS: 4, 5, 6, 7, 27, 36, 118, 119, 204, 216, 217

COMMUNITY DESCRIPTION:

Species which occurred consistently throughout these stations were the queen scallop *Aequipecten opercularis,* often encrusted by the sponge *Pseudosuberites sulphureus,* and hermit crabs *Pagurus* spp.*,* sometimes in symbiosis with the cloak anemone *Adamsia carciniopados*. Polychaete tubes and small burrows were commonly observed in the sediment at these stations. Hydroids were prevalent and included the distinctive *Nemertesia antennina*, which typically had a low abundance per station.

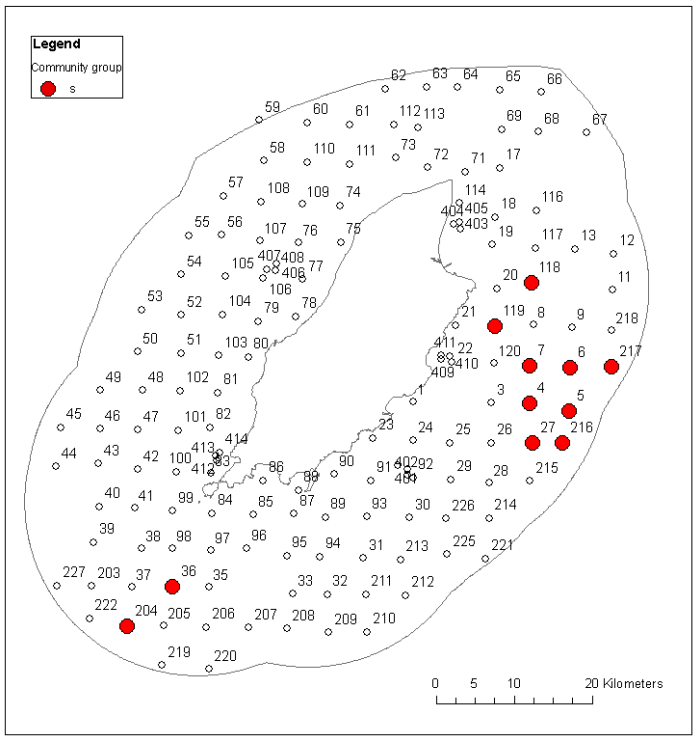

Figure 1. Distribution of stations which comprised community Group s in Manx territorial waters. Map generated using ArcGIS

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Aequipecten opercularis	9.31	2.09	22.86	1.06
Pagurus spp.	8.41	4.17	20.64	0.73
Pseudosuberites sulphureus	4.66	1.58	11.44	0.43
Alcyonium digitatum	3.02	0.88	7.42	0.25
Adamsia carciniopados	2.66	0.85	6.54	0.21

Table 1 continued.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Ophiura albida	2.64	0.88	6.49	0.37
Asterias rubens	1.76	0.73	4.32	0.10
Bivalvia unid.	1.28	0.57	3.14	0.16
Nemertesia antennina	1.16	0.58	2.85	0.13
Anemone unid.	0.69	0.45	1.7	0.06
Inachus sp.	0.63	0.47	1.54	0.05
Cerianthus lloydii	0.62	0.31	1.53	0.25

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Aequipecten opercularis	1.06
Pecten maximus	0.01
Taxa of conservation concern	
Modiolus modiolus (Station 6)	0.02

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 20-80 m

SUBSTRATUM:

This community occurred on two different types of substratum, which are described separately.

Substratum Group s-1 (4, 5, 6, 7, 27, 36, 119, 216):

Medium sand with fine gravel, some surficial gravel, or shell gravel.

Qualifying comments:

Stations 4 and 27 characterized by coarse sand instead of medium sand.

Susbtratum Group s-2 (118, 204, 217):

Clean medium or fine sand.

Qualifying comments:

Station 118 fine sand.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the broader habitat classifications for the listed group according to the Marine Habitat Classification for Britain and Ireland Version 04.05. Due to limitations in the available data, broader classifications were more appropriate than classification at the biotope level. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group s-1	**EUNIS**
SS.SCS.CCS/SS.SMx.CMx	A5.13/ A5.44
Broader classification Group s-2	
SS.SSa	A5.2

REPRESENTATIVE IMAGES:

Plate 1. Group s-1; A) station 6, B) station 4, C) station 27, D) station 119, Group s-2; E) station 118, F) station 204.

Group t (2 stations)

STATIONS: 88, 100

COMMUNITY DESCRIPTION:

This community occurred at stations with two very different types of substratum. Station 88 was characterized by a rock habitat which supported a high abundance of red seaweed, whereas station 100 was characterized by a sandy substratum with a mixture of stones and shells on the surface. Due to the large differences in the nature of the substratum, the community compositions for these stations are described separately.

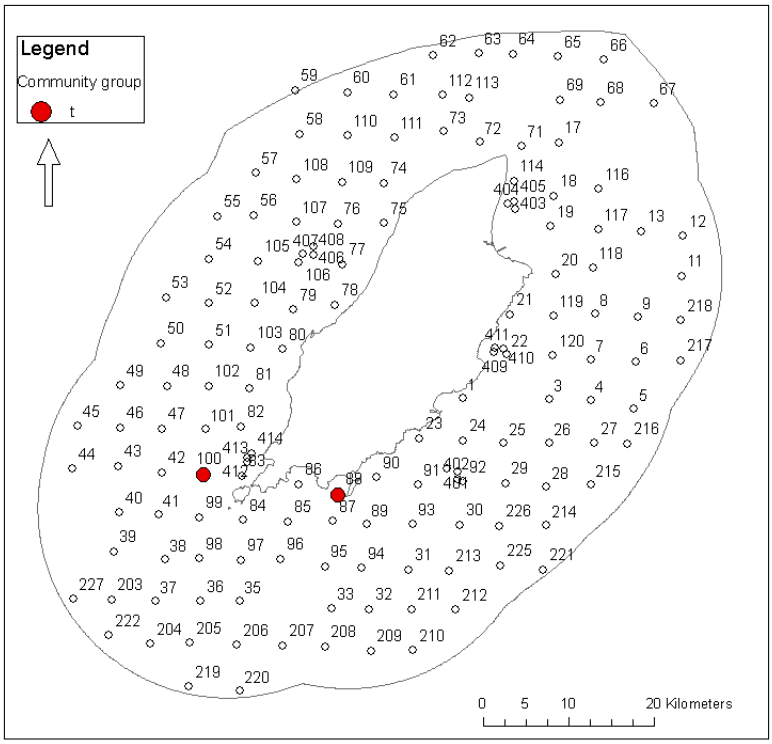

Figure 1. Distribution of stations which comprised community Group t in Manx territorial waters. Map generated using ArcGIS.

Hydroids, the brittlestar *Ophiura albida,* the bryozoan *Alcyonidium diaphanum,* top-shells *Gibbula* sp., and the anemones *Cerianthus lloydii* and *Epizoanthus couchii* occured with high abundances at station 88. In particularly high abundance were sponges, many of which occurred in small patches on the surface of the rock. Other species which occurred in lower abundances at this station included the painted top-shell *Calliostoma zizyphinum,* the light-bulb sea quirt *Clavelina lepadiformis,* the urchin *Echinus esculentus,* the anemone *Edwardsia* sp., and unidentified ascidians. In contrast, the community at station 100 was dominated by the bryozoan *Cellaria* sp., which was observed over much of the sediment surface amidst a bryozoan turf. The bryozoan *Flustra foliacea* was also observed within this community. Hydroids were commonly observed including *Nemertesia antennina*, but these did not occur in high numbers. Other species which occurred in this community with low abundance were the

anemone *Epizoanthus couchii,* the starfish *Asterias rubens* and *Henricia oculata,* the crab *Ebalia* sp.*,*

hermit crabs *Pagurus* spp., and the feather star *Antedon bifida.*

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Cellaria patches	5.24	-	14.14	20.21
Gibbula sp.	4.06	-	10.96	2.94
Epizoanthus couchii	3.51	-	9.49	2.11
Alcyonidium diaphanum	2.03	-	5.48	3.61
Caryophyllia smithii	2.03	-	5.48	0.36
Porifera unid.	2.03	-	5.48	6.96
Alcyonium digitatum	1.66	-	4.47	0.26
Calliostoma zizyphinum	1.66	-	4.47	0.77
Edwardsia sp.	1.66	-	4.47	0.52
Henricia oculata	1.66	-	4.47	0.31
Nemertesia antennina	1.66	-	4.47	1.03
Porania pulvillus	1.66	-	4.47	0.21
Flustra foliacea	1.17	-	3.16	0.57
Inachus sp.	1.17	-	3.16	0.10
Nudibranchia unid.	1.17	-	3.16	0.15
Sabellidae unid.	1.17	-	3.16	0.15

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Pecten maximus	0.05
Aequipecten opercularis	0.05
Taxa of conservation concern	
Edwardsia sp. (all)	0.52
Modiolus modiolus (Station 100)	0.05

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: Station 88 (10-30 m), Station 100 (35-60 m)

SUBSTRATUM:

This community occurred on two different types of substratum, which are described separately.

Substratum Group t-1 (88):

Mixture of gravel, pebbles, cobbles, and boulders.

Substratum Group t-2 (100):

Mixture of medium to coarse sand with gravel, pebbles, and some shell.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group t-1	**EUNIS**	**Similarity %**	**Fit**
CR.MCR.EcCr.CarSp.PenPcom	A4.2122	48.00	Poor physical, reasonable biological*
CR.MCR.EcCr.FaAlCr.Car	A4.2146	48.00	Poor physical, reasonable biological
CR.MCR.EcCr.CarSp	A4.212	47.37	Poor
SS.SMx.CMx.FluHyd	A5.444	34.92	Reasonable physical, poor biological
Biotope Group t-2			
SS.SMx.CMx.ClloMx.Nem	A5.4411	44.44	Good physical, poor biological*
SS.SMx.CMx.FluHyd	A5.444	34.92	Reasonable physical, poor biological
SS.SMx.CMx.ClloMx	A5.441	33.90	Reasonable physical, poor biological
SS.SCS.CCS.MedLumVen	A5.132	15.38	Reasonable physical
SS.SCS.CCS.Blan	A5.135	8.00	Reasonable physical
SS.SCS.OCS.GlapThyAmy	-	-	Reasonable physical

***Selected representative**

Table 4. Presented are the broader habitat classifications for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group t-1	**EUNIS**
CR	A4
Broader classification Group t-2	
SS.SCS.CCS/ SS.SMx.CMx	A5.13/ A5.44

REPRESENTATIVE IMAGES:

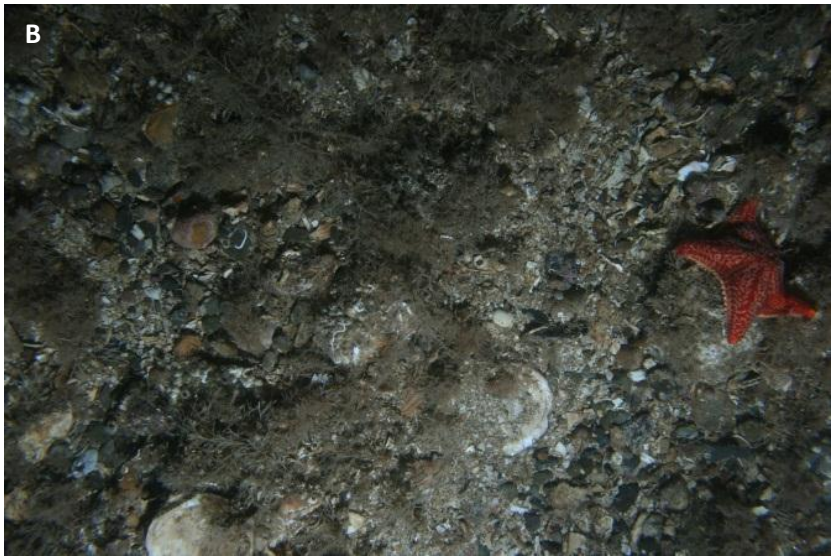

Plate 1. A) Group t-1; station 88, B) Group t-2; station 100.

Group u (2 stations)

STATIONS: 32, 99

COMMUNITY DESCRIPTION:

This community was observed on coarse substrata with high shell content. Top-shells *Gibbula* sp. and hydroids were commonly observed in this community. Low abundances of the starfish *Asterias rubens,* the painted top-shell *Calliostoma zizyphinum,* hermit crabs *Pagurus* spp., and the crab *Liocarcinus* sp. were observed.

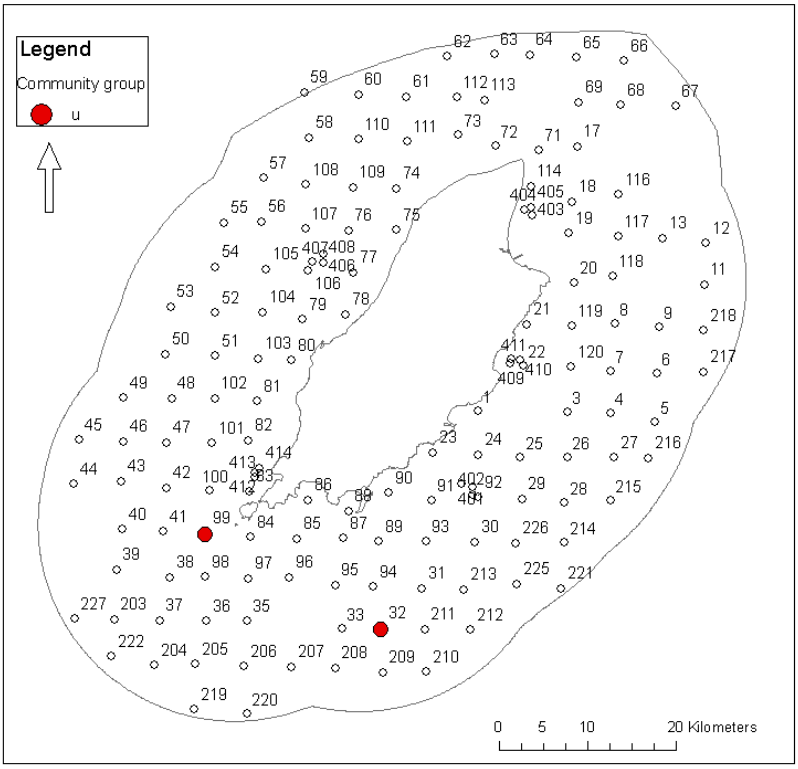

Figure 1. Distribution of stations which comprised community Group u in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Asterias rubens	5.88	-	13.72	0.31
Calliostoma zizyphinum	5.88	-	13.72	0.36
Gibbula sp.	16.07	-	37.52	6.19
Liocarcinus sp.	3.39	-	7.92	0.10
Pagurus spp.	4.8	-	11.2	0.41
Urticina spp.	3.43	-	8	0.15

Table 2. Presented are the average abundances m^{-2} for fished species that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group.

Fished species	Av. Abundance/m^2
Aequipecten opercularis	0.05

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 35-65 m

SUBSTRATUM:

Coarse mixed substrata of cobbles, pebbles, gravel, and shell overlying coarse sand.

Qualifying comments:

Station 99 more gravelly with mussel shells.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Group u	EUNIS	Similarity %	Fit
SS.SMx.CMx.ClloMx	A5.441	43.24	Reasonable physical, poor biological
SS.SMx.CMx.ClloMx.Nem	A5.4411	39.02	Reasonable physical, poor biological*
SS.SMx.CMx.FluHyd	A5.444	34.15	Reasonable physical, poor biological
SS.SCS.CCS.Nmix	A5.134	28.57	Reasonable physical, poor biological
SS.SCS.CCS.Blan	A5.135	14.29	Reasonable physical
SS.SCS.CCS.MedLumVen	A5.132	13.33	Reasonable physical
SS.SCS.OCS.GlapThyAmy			Reasonable physical

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification	EUNIS
SS.SCS.CCS/ SS.SMx.CMx	A5.13/ A5.44

REPRESENTATIVE IMAGES:

Plate 1. A) Station 32, B) station 99.

Group v (3 stations)

STATIONS: 18, 71, 114

COMMUNITY DESCRIPTION:

This community was observed at two stations which supported maerl and at one station with stony sediments, which did not support maerl. With the exclusion of maerl, the community which occurred at these stations was characterized by the prevalence and abundance of the anemones *Cerianthus llodyii* and *Sagartia elegans.* The top-shells *Gibbula* sp. as well as the light-bulb sea squirt *Clavelina lepadiformis* were also typically observed with high abundance per station. The horse mussel *Modiolus modiolus* was also observed at these stations, but did not occur in high enough densities to form beds. Other species which were commonly observed included the anemones *Urticina* spp., the painted top-shell *Calliostoma zizyphinum,* the soft coral *Alcyonium digitatum,* and hydroids. Also characterizing this community at relatively low abundances per station were hermit crabs *Pagurus* spp., anemones, the urchin *Echinus esculentus,* squat lobsters *Galathea* sp., the starfish *Asterias rubens,* the crab *Liocarcinus* sp., dragonets *Callionymus* spp., bivalves, and feather duster worms of the Sabellidae family. Emergent polychaete tubes were observed at these stations in low numbers. Red and brown algae were also observed at these stations.

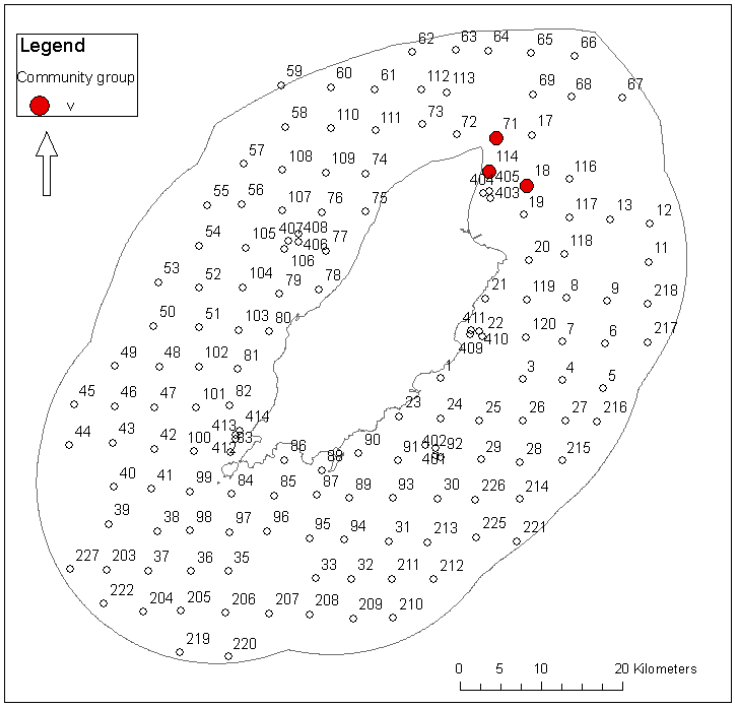

Figure 1. Distribution of stations which comprised community Group v in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Cerianthus lloydii	6.63	2.77	15.53	4.80
Sagartia elegans	6.15	5.62	14.42	3.69
Modiolus modiolus	3.16	1.99	7.4	1.78
Urticina spp.	3.12	15.74	7.3	2.11
Gibbula sp.	2.88	0.99	6.74	2.62
Pagurus spp.	2.46	15.97	5.77	0.81
Calliostoma zizyphinum	2.24	2.38	5.26	1.23
Anemone unid.	2.11	8.33	4.95	0.75
Echinus esculentus	2.02	2.68	4.72	0.59
Clavelina lepadiformis	1.66	0.58	3.9	1.22
Galathea sp.	1.51	2.82	3.54	0.47
Asterias rubens	1.41	3.89	3.3	0.27
Alcyonium digitatum	1.11	0.58	2.6	0.96
Liocarcinus sp.	0.74	0.58	1.74	0.26
Callionymus spp.	0.61	0.58	1.42	0.16
Bivalvia unid.	0.6	0.58	1.4	0.23
Sabellidae unid.	0.54	0.58	1.26	0.17

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Pecten maximus	0.07
Aequipecten opercularis	0.03
Taxa of conservation concern	
Edwardsia sp. (Station 114)	0.13
Modiolus modiolus (all)	1.78
Maerl (Stations 18 and 114)	Present

HABITAT DESCRIPTION

ESTIMATED DEPTH RANGE: 5-30 m

SUBSTRATUM:

This community occurred on different types of substratum, which are described separately.

Substratum Group v-1 (18, 114):

Station 18: coarse sand with gravel, *Modiolus* shells and maerl gravel (mostly dead, some live).

Station 114: coarse sand with appreciable amounts of shell and maerl (live interspersed with large amounts of dead).

Substratum Group v-2 (71):

Sand underlying gravel, pebbles, and small cobbles.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group v-1	EUNIS	Similarity %	Fit
SS.SMp.Mrl.Pcal.Nmix	A5.5112	34.29	Reasonable*
SS.SMp.Mrl.Pcal	A5.511	27.69	Reasonable
SS.SCS.CCS.Nmix	A5.134	25.00	Reasonable
Group v-2			
SS.SMx.CMx.FluHyd	A5.444	40	Reasonable*
SS.SSa.IFiSa.ScupHyd	A5.232	28.125	Reasonable

***Selected representative**

Table 4. Presented are the broader habitat classifications for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group v-1	EUNIS
SS.SMp.Mrl	A5.51
Broader classification Group v-2	
SS.SMx.CMx	A5.44

REPRESENTATIVE IMAGES:

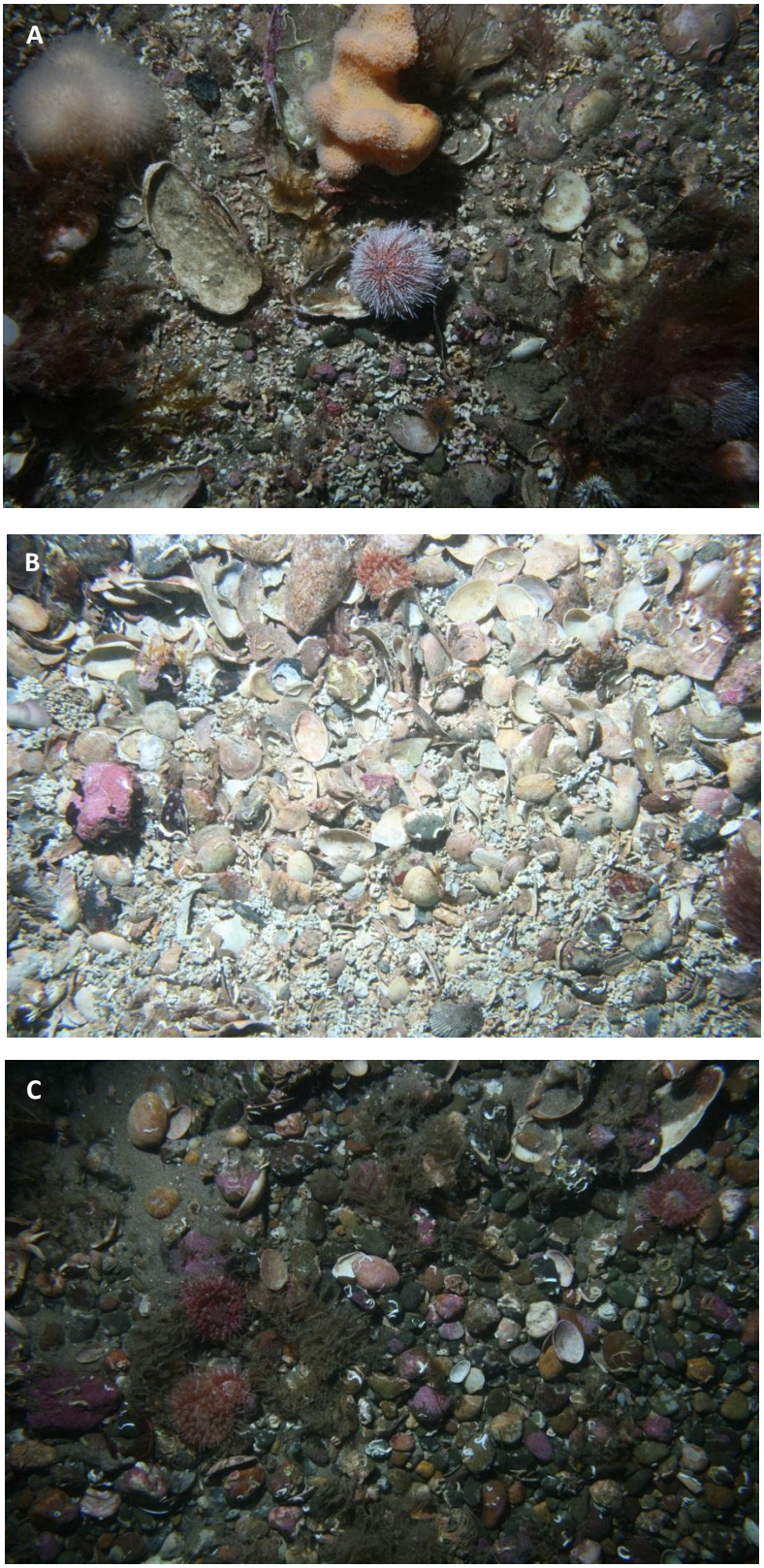

Plate 1. Group v-1; A) station 18, B) station 114, C) Group v-2; station 71.

Group w (2 stations)

STATIONS: 1, 90

COMMUNITY DESCRIPTION:

This community was observed in habitats which supported maerl and was characterized by the high abundance of the top-shells *Gibbula* sp. Hydroids were commonly observed and hermit crabs *Pagurus* spp., the crab *Liocarcinus* sp., the starfish *Henricia oculata,* decapods of the infraorder Caridea, and the painted top-shell *Calliostoma zizyphinum* were observed with low numbers at each station. At station 1 only, the keyhole limpet *Emarginula* sp. and the bivalve *Glycymeris glycymeris* occurred with high abundance.

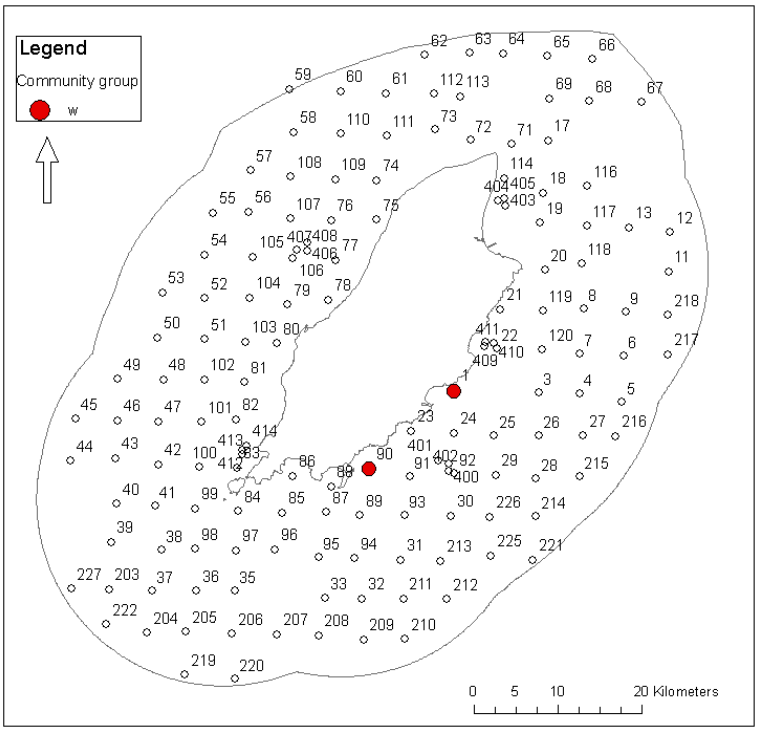

Figure 1. Distribution of stations which comprised community Group w in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Emarginula sp.	15.97	-	33.43	12.15
Gibbula sp.	7.2	-	15.06	2.63
Glycymeris glycymeris	4.3	-	9	1.63
Pagurus spp.	3.33	-	6.97	0.53
Bivalvia unid.	2.72	-	5.69	0.42
Liocarcinus sp.	2.72	-	5.69	0.26
Calliostoma zizyphinum	1.92	-	4.02	0.21
Echinus esculentus	1.92	-	4.02	0.16
Henricia oculata	1.92	-	4.02	0.16
Caridea unid.	1.92	-	4.02	0.21

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av.Abundance/m^2
Aequipecten opercularis	0.21
Taxa of conservation concern	
Edwardsia sp. (Station 1)	0.05
Modiolus modiolus (Station 90)	0.11
Maerl (all)	Present

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 10-30 m

SUBSTRATUM:

Mixed maerl.

Qualifying comments:

Station 1: Dense maerl gravel and shell overlying coarse sand.

Station 90: maerl and shell overlying coarse sand, gravel, and pebbles, or interspersed between the stones.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group w	EUNIS	Similarity %	Fit
SS.SMp.Mrl.Pcal.R	A5.5111	29.17	Reasonable
SS.SMp.Mrl.Pcal	A5.511	26.67	Reasonable*
SS.SMp.Mrl.Pcal.Nmix	A5.5112	24.00	Reasonable

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group w	EUNIS
SS.SMp.Mrl	A5.51

REPRESENTATIVE IMAGES:

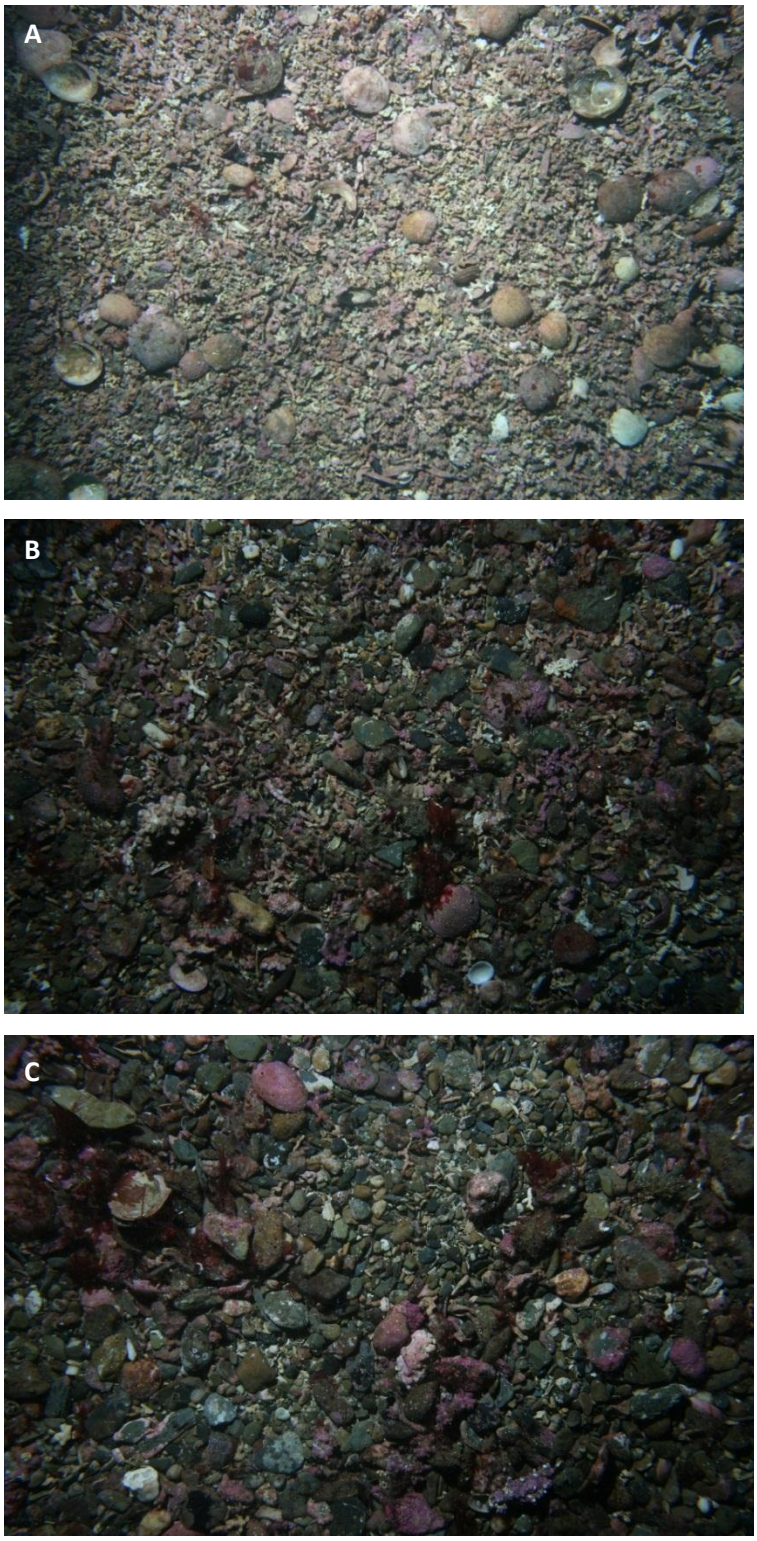

Plate 1. A) Station 1, B) an area where maerl was more prevalent at station 90, C) an area where maerl was less prevalent at station 90.

Group x (1 station)

STATIONS: 84

COMMUNITY DESCRIPTION:

This station occurred on a coarse stony substratum. Squat lobsters *Galathea* sp., the bivalve *Glycymeris glycymeris,* and the painted top-shell *Calliostoma zizyphinum* were the most abundant fauna in this community. Also commonly observed were the top-shells *Gibbula* sp., the soft coral *Alcyonium digitatum,* and the encrusting sponge *Pseudosuberites sulphureus.* The bryozoan *Alcyonidium diaphanum,* the starfish *Asterias rubens,* and hydroids occurred with low abundaces at this station.

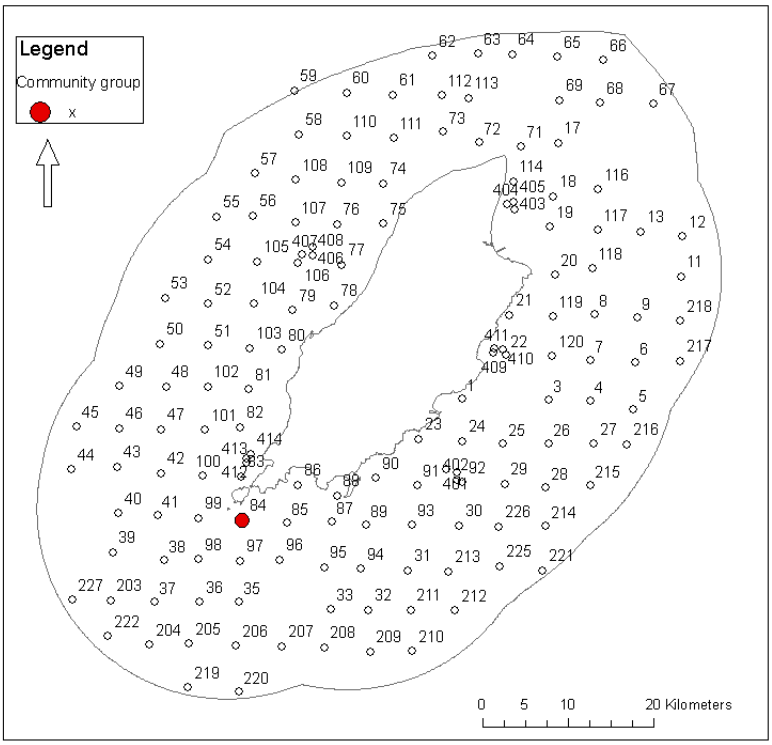

Figure 1. Distribution of stations which comprised community Group x in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the abundances m^{-2} for the taxa which were recorded with an abundance of 5 or greater at the station characterized by this group. A SIMPER analysis could not be conducted to identify the characterizing taxa as the community was represented by only one station.

Species	Abundance/m^2
Galathea sp.	19.24
Glycymeris glycymeris	15.46
Calliostoma zizyphinum	8.93
Gibbula sp.	6.53
Pseudosuberites sulphureus	4.47
Alcyonium digitatum	4.47

Table 2. Presented are the abundances m^{-2} for taxa of conservation concern that occurred in this group.

Taxa of conservation concern	Abundance/m^2
Modiolus modiolus	0.34

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 30-50 m

SUBSTRATUM:

Cobbles with gravel and pebbles overlying coarse sand.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group x	EUNIS	Similarity %	Fit
CR.MCR.EcCr.FaAlCr.Pom	A4.2145	41.03	Poor physical, reasonable biological*
CR.MCR.EcCr.FaAlCr.Bri	A4.2144	40.91	Reasonable physical, poor biological
SS.SMx.CMx.FluHyd	A5.444	36.84	Reasonable physical, poor biological
CR.MCR.EcCr.FaAlCr	A4.214	35.56	Poor Physical, reasonable biological
SS.SMx.CMx.OphMx	A5.445	25.81	Reasonable
SS.SCS.OCS.GlapThyAmy	-	-	Reasonable physical

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group x	EUNIS
CR	A4

REPRESENTATIVE IMAGES:

Plate 1. Station 84.

Group y (4 stations)

STATIONS: 91, 92, 93, 95

COMMUNITY DESCRIPTION:

This community was observed on substrata comprised of small stones, predominately gravel, and shell. This community was characterized by the bivalve *Glycymeris glycymeris* and top-shells *Gibbula* sp.*,* which were prevalent throughout the stations. Also commonly observed in this community, but in lower numbers per station, were squat lobsters *Galathea* sp., the queen scallop *Aequipecten opercularis,* and emergent tubes of the polychaete *Lanice conchilega.* Hydroids also characterized this community, including *Nemertesia antennina* and *Hydrallmania* sp.*,* which each had low abundances per station. Hermit crabs *Pagurus* spp., decapods of the infraorder Caridea, feather duster worms of the Sabellidae family, anemones, including *Sagartia elegans,* the starfish *Asterias rubens,* and the ascidian *Ascidia conchilega* also occurred at low abundances per station.

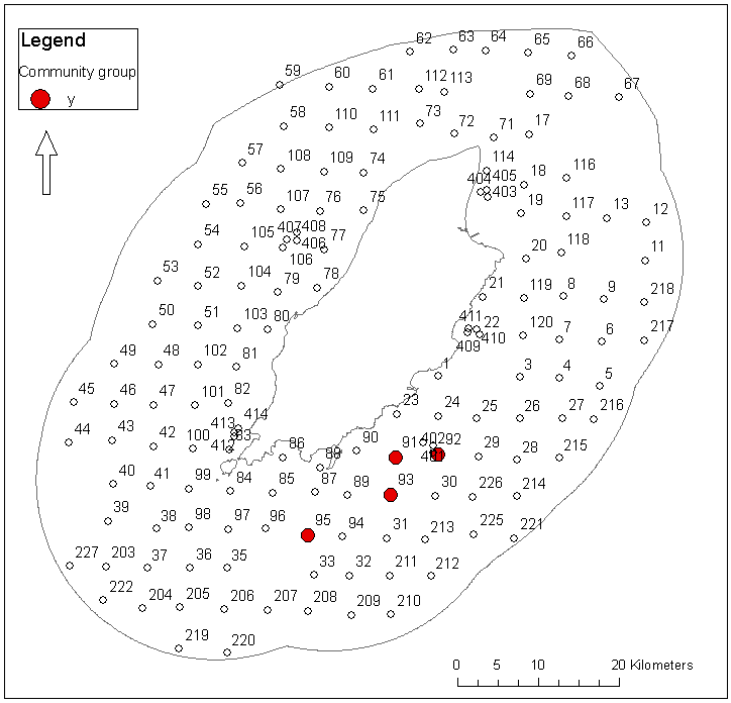

Figure 1. Distribution of stations which comprised community Group y in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the taxa which contributed up to 90% of the similarity of the group, as identified using the SIMPER procedure in the PRIMER v6 software package (Clarke & Gorley, 2006). Average similarity (Av.Sim), the precentage contribution of each taxon to the similarity of the group (Contribution %) and similarity/standard deviation (Sim/SD) are derived from the SIMPER output. Taxa with a high Sim/SD "typified" the group, as a high value indicated a consistent abundance across the stations within a group (Clarke & Warwick, 2001). The average abundance m^{-2} for each taxon is presented and was determined by taking the mean of the abundance m^{-2} across the stations within the group.

Species	Av.Sim	Sim/SD	Contribution%	Av. Abundance/m^2
Glycymeris glycymeris	13.23	7.15	23.63	3.62
Gibbula sp.	12.35	3.9	22.06	3.71
Nemertesia antennina	4.34	5.36	7.75	0.50
Pagurus spp.	4.03	2.44	7.19	0.47
Sabellidae unid.	3.01	5.54	5.37	0.18
Anemone unid.	2.53	6.89	4.51	0.13
Galathea sp.	2.14	0.7	3.82	0.78
Hydrallmania sp.	2.1	0.9	3.76	0.42
Aequipecten opercularis	1.81	0.78	3.24	0.80
Asterias rubens	1.36	0.9	2.43	0.13
Sagartia elegans	1.34	0.9	2.39	0.13
Caridea unid.	1.22	0.9	2.19	0.10
Ascidia conchilega	1.22	0.9	2.17	0.08

Table 2. Presented are the average abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group. These were determined by taking the mean of the abundance m^{-2} for each taxon across the stations within the group. The stations in which the listed taxa of conservation interest occurred are denoted in parentheses.

Fished species	Av. Abundance/m^2
Pecten maximus	0.03
Aequipecten opercularis	0.80
Taxa of conservation concern	
Modiolus modiolus (Station 93)	0.03

HABTIAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 30- 50 m

SUBSTRATUM:

Gravel and shells overlying medium to coarse sand, some pebbles and cobbles.

Qualifying comments:

Station 95 had a very high surficial shell content.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group y	EUNIS	Similarity %	Fit
SS.SMx.CMx.FluHyd	A5.444	42.11	Poor physical, reasonable biological
SS.SMx.CMx.ClloMx.Nem	A5.4411	38.60	Reasonable
SS.SMx.CMx.ClloMx	A5.441	37.74	Reasonable
SS.SCS.CCS.Nmix	A5.5112	27.45	Good physical, reasonable biological*
SS.SCS.CCS.MedLumVen	A5.132	13.04	Good physical, reasonable biological*
SS.SCS.OCS.GlapThyAmy	-	-	Reasonable physical

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group y	EUNIS
SS.SCS.CCS	A5.13

REPRESENTATIVE IMAGES:

Plate 1. A) Station 91, B) Station 95.

Group z (1 station)

STATIONS: 24

COMMUNITY DESCRIPTION:

This community was observed in a maerl habitat and was characterized by the high abundance of the bivalve *Glycymeris glycymeris.* Other highly abundant taxa included top-shells *Gibbula* sp.*,* the crab *Liocarcinus* sp., and the encrusting tubes of *Pomatoceros* sp. Hydroids were also commonly observed and included *Hydrallmania sp., Nemertesia antennina,* as well as *Halecium halecium.* The queen scallop *Aequipecten opercularis* was also characteristic of the community at this station.

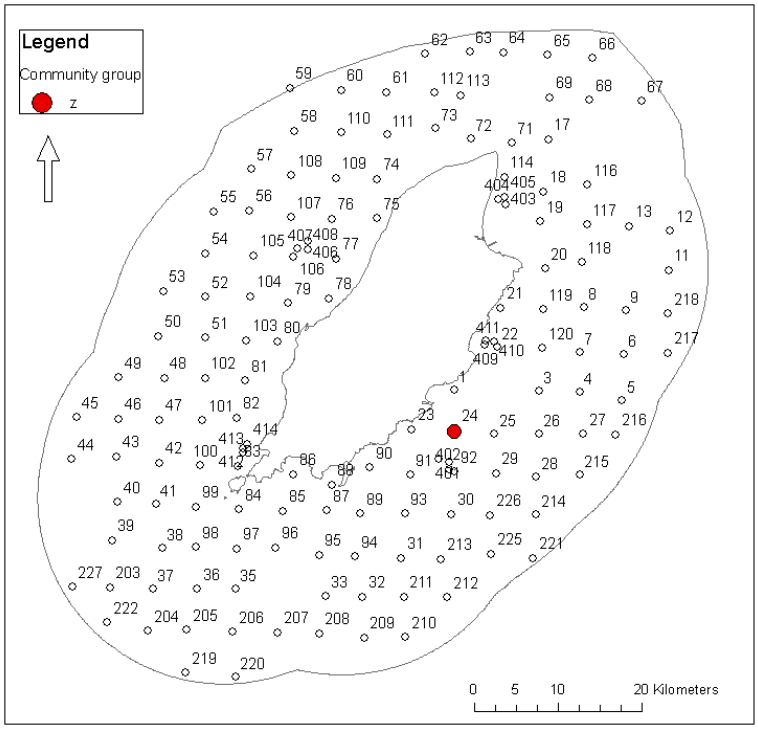

Figure 1. Distribution of stations which comprised community Group z in Manx territorial waters. Map generated using ArcGIS.

Table 1. Presented are the abundances m^{-2} for the taxa which were recorded with an abundance of 5 or greater at the station characterized by this group. A SIMPER analysis could not be conducted to identify the characterizing taxa as the community was represented by only one station.

Species	Abundance/m^2
Glycymeris glycymeris	19.18
Gibbula sp.	5.46
Liocarcinus sp.	5.36
Hydrallmania sp.	0.72
Nemertesia antennina	0.62
Aequipecten opercularis	0.62
Halecium halecinum	0.52

Table 2. Presented are the abundances m^{-2} for fished species and taxa of conservation concern that occurred in this group.

Fished species	Abundance/m^2
Pecten maximus	0.21
Aequipecten opercularis	0.62
Taxa of conservation concern	
Maerl	Present

HABITAT DESCRIPTION:

ESTIMATED DEPTH RANGE: 30-40 m

SUBSTRATUM:

Maerl gravel and shell overlying coarse sand and some gravel.

BIOTOPE CLASSIFICATION:

Table 3. Presented are the top potential biotope matches for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05., based on habitat and community composition. Listed are the codes corresponding with the classification scheme, the 2004 EUNIS code assigned to each habitat, the Bray-Curtis similarity between the Isle of Man community with the listed biotope, based on presence/absence community data, and a qualification of the fit of each biotope to the community.

Biotope Group z	EUNIS	Similarity %	Fit
SS.SMp.Mrl.Pcal	A5.511	34.29	Reasonable*
SS.SMp.Mrl.Pcal.Nmix	A5.5112	30.00	Reasonable
SS.SMp.Mrl.Pcal.R	A5.5111	26.32	Reasonable

***Selected representative**

Table 4. Presented is the broader habitat classification for the listed community group, according to the Marine Habitat Classification for Britain and Ireland Version 04.05. The habitat type is listed with the corresponding 2004 EUNIS code.

Broader classification Group z	EUNIS
SS.SMp.Mrl	A5.51

REPRESENTATIVE IMAGES:

Plate 1. Station 24.

7.4 Comments on biotope classification for each community

Table 1. Biotope classifications for the benthic community groups identified in Manx territorial waters, as defined in the Marine Habitat Classification for Britain and Ireland Version 04.05. Comparisons in community composition between defined biotopes and the Isle of Man communities was primarily based on comparisons with the biotope descriptions, and secondarily with reference to the *Bioscribe* tool available on the JNCC website. The data were collected during visual habitat surveys conducted within the 12 nautical mile limit of the Isle of Man 2008. The survey stations which correspond with each group, or sub-group, are presented, along with the biotope/habitat code, EUNIS code, and comments qualifying the fit of the selected classification. The number of stations are presented in parentheses.

Group	Stations	Biotope classification (2004 EUNIS code)	Comments
a	39, 40, 44, 45, 46, 48, 50, 51, 52, 53, 54, 55, 102, 203, 222, 227 (16)	SS.SMu.CFiMu.BlyrAchi (A5.363)	*Sagartia troglodytes* was not important in this biotope but was a dominating species in Group a. Group a was not characterized by *Amphiura chiajei* which was characteristic of this biotope. The overall description for this biotope was the most applicable to this community, which made particular reference to the northern Irish Sea (Connor et al., 2004).
aa	31, 85, 87, 89	SS.SMx.CMx.FluHyd (A5.444)	Not the best fit biologically; *Gibbula* sp. and *Glycymeris glycymeris* did not exhibit a high prevalence in the records for this biotope although these were characteristic species in Group aa. *Flustra foliacea* and *Hydrallmania falcata* characterized this biotope, which did not apply to Group aa.
ab	30, 33	SS.SCS.CCS.Nmix/SS.SCS.CCS.MedLumVen (A5.134/A5.132)	*Neopentadactyla mixta* and *Pecten maximus,* which characterized this biotope, were not characteristic of Group ab.
ac	94	SS.SMx.CMx.FluHyd (A5.444)	Many species which characterized this biotope were not characteristic of Group ac. *Glycymeris glycymeris* and *Gibbula* sp., which characterized this community, were recorded with low prevalence in this biotope.
ad	400, 401, 402	SS.SCS.CCS.Nmix/SS.SCS.CCS.MedLumVen (A5.134/A5.132)	*Neopentadactylaa mixta* and *Pecten maximus* were not characteristic of Group ad.

Table 1 continued.

Group	Stations	Biotope classification (2004 EUNIS code)	Comments
ae	23	SS.SBR.SMus.ModCvar/SS.SMp.Mrl.Pcal.Nmix (A5.624/A5.5112)	The *Modiolus* bed at station 23 was not characterized by large numbers of *Chlamys varia*, nor did it occur on muddy sediments (Mod). *Neopentadactyla mixta* was not characteristic of Group ae. While maerl was characteristic of the Isle of Man habitat, it did not form a thick bed and was better considered as maerl gravel (maerl).
af	62, 63, 64, 208, 211	CR.HCR.XFa.SpNemAdia (A4.135)	This biotope's sediment description might have been too coarse to describe the substrata at these stations. Group af may not have characterized by a "faunal turf" as described, however many of the characterizing species matched with this biotope.
ag	209, 210	SS.SMx.CMx.ClloMx.Nem (A5.4411)	Reasonable fit with the description of the substratum, however Group ag did not seem to occur on gravel with a muddy component. *Cerianthus lloydii* and *Nemertesia antennina,* which characterized this biotope, were not characteristic of Group ag.
ah	221, 225, 226	SS.SMx.CMx.ClloMx.Nem (A5.4411)	Fitting description of the substratum, however Group ah didn't seem to occur on gravel with a muddy component. *Cerianthus lloydii* was not frequent in Group ah.
ai-1	59, 61, 65, 66, 110, 113	SS.SMx.CMx.FluHyd (A5.444)	*Gibbula* sp. which was characteristic of Group ai was not important in this biotope. *Flustra foliacea* and *Hydrallmania falcata* which were characteristic of this biotope were not important in Group ai, however this biotope has the best physical fit for the group.
ai-2	58	SS.SMx.CMx.ClloMx (A5.441)	*Gibbula* sp. which was characteristic of st. 58 was not important in this biotope. *Cerianthus lloydii,* which occurred frequently in this biotope, did not occur frequently in st. 58.

Table 1 continued.

Group	Stations	Biotope classification (2004 EUNIS code)	Comments
aj	116	SS.SSa (A5.2)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
ak	69	SS.SMx.CMx.OphMx (A5.445)	The substratum described for this biotope was more fitting than for other biotopes that supported high abundances of brittlestars.
al	19, 29, 68, 74	SS.SMx.CMx.OphMx (A5.445)	Physcially fitting for these stations. However, *Cerianthus lloydii* and *Sagartia elegans*, which characterized Group al, showed low prevalences in the records of this biotope.
am-1	3, 8, 214	SS.SMx.CMx.OphMx (A5.445)	Fitting, however the brittlestars did not occur in high enough abundance to form very dense brittlestar beds.
am-2	410	SS.SMp.Mrl.Pcal.Nmix (A5.5112)	*Neopentadactyla mixta* was important in this biotope, but did not characterize Group am. While maerl was characteristic of the habitat at thi stations, it did not form thick beds.
an	60, 96, 212, 213	SS.SMx.CMx.OphMx (A5.445)	Group an was characterized by high abundances of brittlestars, although not forming dense brittlestar beds. The physical description seemed inclusive of each of the types of substrata found at these stations.
b	72	SS.SSa.IFiSa.ScupHyd (A5.232)	Group b was impoverished and occurred at depths that might have been beyond the infralittoral zone, which is the zone characteristic of this biotope.
c	17	SS.SSa (A5.2)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.

Table 1 continued.

Group	Stations	Biotope classification (2004 EUNIS code)	Comments
d-1	49	SS.SMu.CFiMu.BlyrAchi (A5.363)	The biotope description doesn't mention megafaunal burrows, which were prevalent at station 49, however direct reference was made to the *Nephrops* grounds in the northern Irish Sea in the biotope description(Connor et al., 2004).
d-2	117, 218	SS.SSa (A5.2)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
e-1	86	IR (A3)	Not classified to the biotope level as the species of kelp and seaweed which characterized the community could not accurately be determined and data for the energy of the rock habitat were unavailable.
e-2	112	SS.SSa.IFiSa.ScupHyd (A5.232)	Station 112 occurred in deeper waters than the characteristic depth band for this biotope, additionally coarse sand would be more applicable to station 112 than fine sand.
f	73, 111	SS.SMx.CMx.FluHyd (A5.444)	*Flustra foliacea* did not characterize this faunally impoverished community, although it did occur in one of the stations. The physical description of this biotope did not take enough account of the high amounts of shell gravel at these stations, however it was a reasonable fit.
g	11, 80	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
h	79	SS.SMp.KSwSS.LsacR.CbPb (A5.211)	There was uncertainty concerning the fit of the seaweeds described for this biotope with those at station 79. Additionally the substrata for this biotope were described as being seasonally disturbed, for which there was no information at station 79.

Table 1 continued.

Group	Stations	Biotope classification (2004 EUNIS code)	Comments
i	75, 77, 78	SS.SMp.KSwSS.LsacR.Gv (A5.212)	The sediment characteristic of this biotope might not be as coarse as some of the sediment occurring at the Group i stations. The seaweed *Chorda filum* seemed more important in Group i than in this biotope.
j-1	12, 13, 43, 47, 104	SS.SMu.CSaMu.VirOphPmax (A5.354)	Group j was not characterized by *Virgularia mirabilis* or *Pecten maximus*, which were important in this biotope. Sagartia elegans and *Cellaria* sp., important in Group j, were recorded with very low prevalence in this biotope. The depth range of Group j stations might fall outside the depth band documented for this biotope.
j-2	67	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
k-1	403, 404, 405	SS.SMp.Mrl.Pcal (A5.511)	Group k-1 occurred on substrata that occasionally had stones larger than those described for this biotope.
k-2	120	SS.SCS.CCS.Nmix (A5.134)	Group k was not characterized by *Neopentadactyla mixta*, which characterized this biotope. Also, *Clavelina lepadiformis,* which was important in Group k, was recorded with low prevalence in this biotope.
k-3	408	SS.SMx.CMx.ClloMx.Nem (A5.4411)	Station 408 was not characterized by surficial cobbles, which was included in the description of the substratum for this biotope. *Nemertesia* spp., which was characteristic of this biotope, did not characterize station 408.
l	205, 219	SS.SSa (A5.2)	Aggregations of *Sabellaria* tubes occurred in clumps scattered over the sediment surface, rather than forming a dense reef. Thus, these stations were classified as a sand habitat rather than a biogenic reef.

Table 1 continued.

Group	Stations	Biotope classification (2004 EUNIS code)	Comments
m-1	42, 82, 101	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
m-2	56	SS.SSa (A5.2)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
n-1	57, 103, 108	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
n-2	105	SS.SSa (A5.2)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
o	20, 81, 106	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
p	412, 413, 414	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
q-1	21	SS.SSa (A5.2)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
q-2	409, 411	SS.SMp.Mrl.Pcal.Nmix (A5.5112)	*Neopentadactyla mixta* was important in this biotope but did not characterize Group q. While maerl was characteristic of the habitat in these stations, it did not form thick beds.

Table 1 continued.

Group	Stations	Biotope classification (2004 EUNIS code)	Comments
r-1	9, 25, 26, 28, 35, 38, 41, 76, 83, 97, 98, 109, 206, 207, 215, 220, 406, 407 (18)	SS.SMx.CMx.ClloMx.Nem (A5.4411)	Some stations occurred outside of the 10-30 m depth range described for this biotope. The substrata at these stations were characterized more by sand with surficial gravel and pebbles than "sandy muddy gravel with pebbles, cobbles, and shell." *Nemertesia* spp. was not as important in Group r-1 as it seemed to be in the description of this biotope.
r-2	22	SS.SMp.Mrl.Pcal.Nmix (A5.5112)	*Neopentadactyla mixta* was important in this biotope but did not characterize Group r. While maerl was characteristic of the habitat at this station, it did not form thick beds.
r-3	37, 107	SS.SSa (A5.2)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
s-1	4, 5, 6, 7, 27, 36, 119, 216	SS.SCS.CCS/SS.SMx.CMx (A5.13/A5.44)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
s-2	118, 204, 217	SS.SSa (A5.2)	Not classified to the biotope level because many sandy biotopes were distinguished by their infauna, for which the data were unavailable.
t-1	88	CR.MCR.EcCr.CarSp.PenPcom (A4.2122)	The description of the substratum for this biotope might have been too coarse to describe the substratum at this station. *Caryophyllia smithii was* not a dominant species at Station 88, although it did occur with low abundance. Some species dominant at station 88 were not characteristic of this biotope (e.g. *C. lloydii, Gibbula* sp.).

Table 1 continued.

Group	Stations	Biotope classification (2004 EUNIS code)	
t-2	100	SS.SMx.CMx.ClloMx.Nem (A5.4411)	The sediment at station 100 was not characterized by cobbles, which was included in the description of the substratum for this biotope. *Cerianthus lloydii* and *Pecten maximus* did not occur at station 100, but were characteristic of this biotope.
u	32, 99	SS.SMx.CMx.ClloMx.Nem (A5.4411)	*Cerianthus lloydii* was important in this biotope, but was not characteristic of Group u.
v-1	18, 114	SS.SMp.Mrl.Pcal.Nmix (A5.5112)	*Neopentadactyla mixta* was important in this biotope but did not characterize Group v. While maerl was characteristic of the habitat in these stations, it did not form thick beds, rather it occurred as maerl gravel.
v-2	71	SS.SMx.CMx.FluHyd (A5.444)	Seemed like a good fit, both physically and biologically, although *Flustra foliacea,* characteristic of this biotope, was not highly abundant at this station.
w	1, 90	SS.SMp.Mrl.Pcal (A5.511)	
x	84	CR.MCR.EcCr.FaAlCr.Pom (A4.2145)	The description of the substratum for this biotope might have been too coarse to describe the substratum at station 84. *Glycymeris glycymeris wa*s characteristic of the Isle of Man community, but was not important in this biotope.
y	91, 92, 93, 95	SS.SCS.CCS.Nmix/SS.SCS.CCS.MedLumVen (A5.134/A5.132)	*Neopentadactyla mixta* and *Pecten maximus* which characterize this biotope were not characteristic of Group ab.
z	24	SS.SMp.Mrl.Pcal (A5.511)	