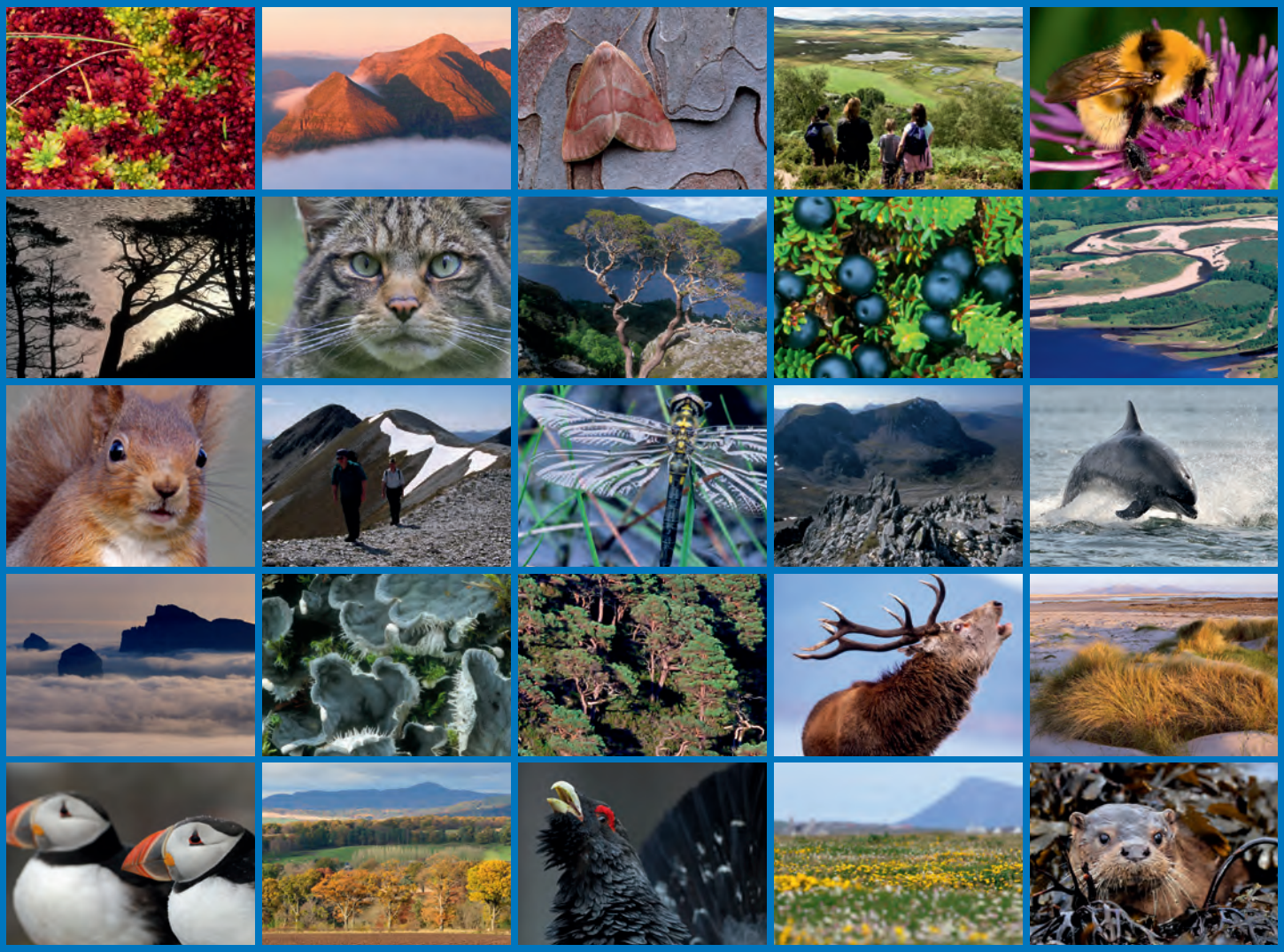
Scottish Natural Heritage
Commissioned Report No. 807

2014 site condition monitoring survey of marine sedimentary habitats in the Sound of Arisaig SAC



Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

COMMISSIONED REPORT

Commissioned Report No. 807

2014 site condition monitoring survey of marine sedimentary habitats in the Sound of Arisaig SAC

For further information on this report please contact:

Laura Steel
Scottish Natural Heritage
Great Glen House
INVERNESS
IV3 8NW
Telephone: 01463 725236
E-mail: laura.steel@snh.gov.uk

This report should be quoted as:

Moore, C.G., Harries, D.B., Cook, R.L., Saunders, G.R., Atkinson, R.J.A. & Sanderson, W.G. 2015. 2014 site condition monitoring survey of marine sedimentary habitats in the Sound of Arisaig SAC. *Scottish Natural Heritage Commissioned Report No. 807*.

COMMISSIONED REPORT

Summary

2014 site condition monitoring survey of marine sedimentary habitats in the Sound of Arisaig SAC

Commissioned Report No. 807
Project No: 14988
Contractor: Heriot-Watt University
Year of publication: 2015

Keywords

Benthos; monitoring; condition; sediment; biotope; maerl; eelgrass; sandbanks.

Background

The Sound of Arisaig Special Area of Conservation (SAC) was established to afford protection for the marine feature 'sandbanks which are slightly covered by seawater all the time'. The chief reasons for the selection of this site are an unusually high diversity of representative sublittoral sediment habitats within a relatively small area and extensive maerl beds which harbour very rich associated communities.

The principal purpose of the current study was to carry out site condition monitoring (SCM) of the site, which is mandatory for SACs, in order to identify any deterioration in the condition of the feature and to form a judgement on its current condition. SCM was inaugurated at this site in 2003, which provides a baseline for the current study. The approach taken to achieve this aim was to perform an extensive drop-down video survey and a grab survey of the component habitats of the feature, together with more detailed surveying of selected maerl beds. This approach addressed the prescription for SCM detailed in the Site Attribute Table for the SAC, which defines condition targets for different attributes of the feature. A further aim of the work was to validate the presence of the MPA search feature 'inshore deep mud with burrowing heart urchins' (**SS.SMu.CFiMu.BlyrAchi**) which has been reported close to the SAC. This investigation was carried out by means of video, grab and dredge surveys in muddy areas within the SAC and in adjacent regions, including sites of historical records of the habitat.

Main findings

- There was no evidence for temporal change in the extent or topography of the sublittoral sandbank feature.

- For the key biotopes identified by the site attribute table, three firm examples of distributional change were recorded during the video survey at 137 sites. This involved localised changes in biotopes in the outer region of Loch Ailort, due to changes in sediment structure. This was considered to be probably due to temporal variation in wave conditions and was not regarded as indicative of deterioration in condition.

- No reduction in the extent of the maerl or eelgrass biotopes was recorded. A slight increase in the number of maerl records in 2014 was considered to result from better video quality, compared to that of the 2003 baseline study, and an increase in eelgrass records from a slight locational difference in sampling at one site.

- The grab survey of representative sediment biotopes revealed no temporal changes in species richness, species composition or sediment composition that could be considered indicative of deterioration of the habitat. A halving of species richness at one eelgrass site was believed to be possibly due to the patchiness of the habitat.

- Detailed surveys of five maerl beds revealed apparent temporal differences in the composition of the maerl species. *Phymatolithon calcareum* was the dominant species at all sites in 2014, whereas in 2003 *Lithothamnion glaciale* was recorded as dominant at one site and *L. corallioides* present at another site. These differences are believed to probably result from misidentification of taxa in the earlier survey. A reduction in the abundance of living maerl was recorded at one site in Loch Moidart, but this was considered to be possibly due to patchiness. Reductions in infaunal taxon richness, but not diversity, were recorded at two maerl sites, but there is no evidence to believe that such changes do not fall within the natural range of temporal variability.

- It is concluded from the overall condition assessment of the feature, that the site should be assigned to the condition category "Favourable Maintained".

- No clear evidence for the presence of the inshore deep mud biotope **SS.SMu.CFiMu.BlyrAchi** in the region was revealed. Although the characterising taxa, *Brissopsis lyrifera* and *Amphiura chiajei*, were found in Loch nan Uamh, the sites of previous records here better fit the biotope **SS.SMu.CFiMu.SpnMeg.Fun**. The biotope **SS.SMu.CFiMu.MegMax**, a component of the MPA search feature 'burrowed mud' (as is **SpnMeg.Fun**), was found to be widely distributed in outer Loch nan Uamh and farther south to Loch Ceann Traigh, with a pocket also present in upper Loch Ailort.

For further information on this project contact:
Laura Steel, Scottish Natural Heritage, Great Glen House, Inverness, IV3 8NW.
Tel: 01463 725236 or laura.steel@snh.gov.uk
For further information on the SNH Research & Technical Support Programme contact:
Knowledge & Information Unit, Scottish Natural Heritage, Great Glen House, Inverness, IV3 8NW.
Tel: 01463 725000 or research@snh.gov.uk

Table of Contents **Page**

Acknowledgements

We would like to thank Dr Lisa Kamphausen (SNH), Graham Epstein (SNH) and Kieran Tulbure (HWU) for contributions to the diving fieldwork, Dean Jones (HWU) for assistance with the drop-down video and grab surveys, and Laura Steel (SNH) for her contribution to the planning and management of the survey programme.

1. INTRODUCTION

The Sound of Arisaig SAC (Figure 1) was established to afford protection for the Habitats Directive Annex 1 habitat 'sandbanks which are slightly covered by seawater all the time'. The chief reasons for the selection of this site are an unusually high diversity of representative sublittoral sediment habitats within a relatively small area and extensive maerl beds which harbour very rich associated communities.

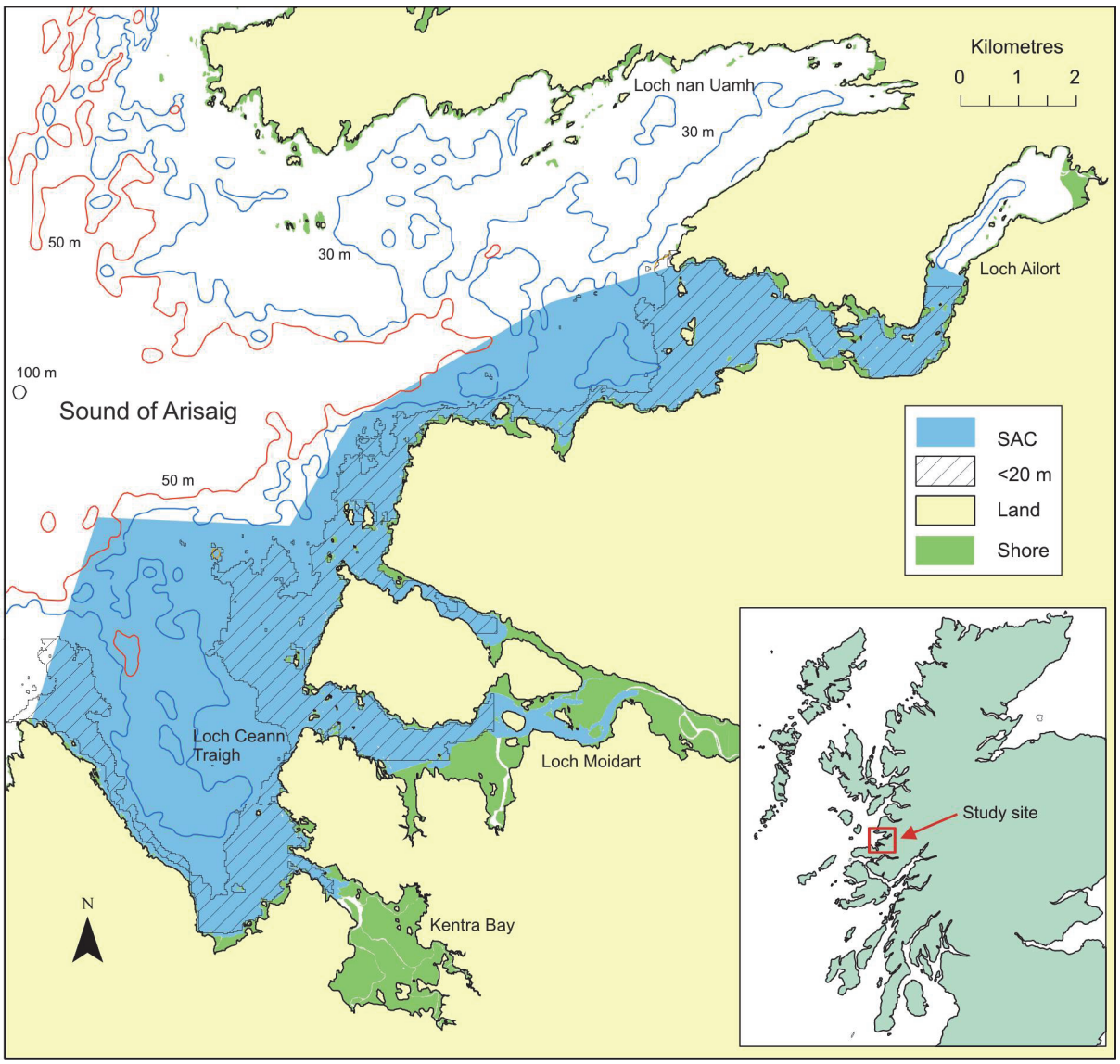


Figure 1. Location of the Sound of Arisaig SAC.

The principal objective of the work described in this report was to carry out site condition monitoring (SCM) of the Sound of Arisaig SAC for the purpose of assessing the condition of the subtidal sandbanks feature. In order to promote a uniform approach to the monitoring of the condition of features, guidance has been drawn up on the general approach to be taken in condition monitoring (JNCC, 1998) and for specific habitats, such as inshore sublittoral sediment (JNCC, 2004). JNCC (2004) lists seven attributes of inshore sublittoral sediment habitats and corresponding targets that could form the basis of SCM (Table 1). These

targets have been incorporated into the monitoring plan for the SAC and are detailed in the Site Attribute Table (SAT) (Annex 6).

Table 1. Generic attributes that should be used in SCM to define the condition of inshore sublittoral sediment features. The first four are mandatory. Targets exclude naturally-induced changes.

Attribute	Target
Extent	No change in extent of inshore sublittoral sediment habitat.
Topography	No alteration in topography of the inshore sublittoral sediment.
Sediment type	No change in composition of sediment types across the feature.
Distribution of biotopes	Maintenance of the distribution of biotopes.
Extent of sub-feature	No change in extent of the inshore sublittoral sediment biotope(s) identified for the site.
Species composition of representative or notable biotopes	No decline in biotope quality as a result of reduction in species richness or removal of notable species.
Species population measures: - population structure of a species	Maintain age/size class structure of a (named) species.
- presence or abundance of specified species	Maintain presence or abundance of positive indicator species.
	No increase in presence or abundance of negative indicator species.

A further aim of the 2014 survey work was to validate the presence of the Marine Protected Area (MPA) search feature 'inshore deep mud with burrowing heart urchins' (**SS.SMu.CFiMu.BlyrAchi**) which has been reported close to this SAC in Loch nan Uamh and in Loch Ailort (Moore and James, 2011).

1.1 Site Condition Monitoring

The establishment of SCM in 2003 (Moore *et al*., 2004) was informed by a number of previous detailed studies of benthic habitats in the area. As part of the Marine Nature Conservation Review, 34 dive sites were surveyed in the area (Howson, 1990), MNCR Phase II survey records are available for all these sites. Broadscale mapping of the seabed was carried out in 1995 by Davies and Hall-Spencer (1996). This RoxAnn acoustic survey was ground truthed by 75 towed video samples, 22 grab samples and detailed investigations at 12 maerl sites, where MNCR Phase II surveys were carried out and core samples taken for analysis of the infaunal community. In 1996 SNH carried out an ROV survey of the biotopes in the middle reaches of Loch Ailort in order to minimise damage to maerl beds from a proposed mussel farm (SNH, 1996). The SAC was also used in a study to assess the relative merits of ROV and SCUBA for biotope monitoring (Howson and Donnan, 2000). Biotopes were recorded from a total of 25 sites, mostly in Loch Ceann Traigh.

The 2003 SCM work (Moore *et al*., 2004) focussed on examination of habitats above the 20 m depth contour, as the protected feature of the SAC, sandbanks, is regarded as generally occurring above this depth (JNCC, 2004). The investigation was divided into three stages. Knowledge of the distribution, diversity and extent of biotopes was gained by performing a stratified random sampling drop-down video survey at 150 sites above the 20 m contour, supplemented by a limited amount of focussed sampling at 54 sites to improve geographical coverage and to afford some examination beyond the 20 m depth limit. Following the categorisation of these sample stations on the basis of biotope, sample stations representative of the different sedimentary biotopes were selected for analysis of the infauna and sediment composition by grab sampling at 20 stations. Five maerl sites were selected for detailed examination of the infauna and epibiota along a 25 m transect. The epibiota was surveyed using MNCR Phase II methods and replicate cores were taken for infaunal and grain size analysis. The areal extent of these maerl beds was also assessed by performing drop-down video surveys around the transects at a total of 59 sites.

The use of random sampling permitted the derivation of extent measures for observed biotopes. Twenty seven biotopes were recorded over the SAC as a whole. The 2003 study employed version 97.06 of the biotope classification scheme (Connor *et al*., 1997) and these are used in Marine Recorder. For the purposes of the 2014 work, all 2003 biotope codes have been converted to version 04.05 (Connor *et al*., 2004).

The shallow inshore area (<20 m) was found to be dominated by sedimentary habitats (72%), with maerl biotopes being amongst the most extensive. Maerl biotopes were estimated to cover 19% of the inshore area or 426 hectares. Three maerl biotopes were recorded. **SS.SMp.Mrl.Pcal** was recorded in the deeper and more exposed locations and supported the lowest abundance and species richness. **SS.SMp.Mrl.Pcal.R** was found extensively in the more sheltered areas such as Loch Ceann Traigh and the outer parts of Lochs Ailort and Moidart, where it tended to display a rich flora of red and often brown algae. Unlike these biotopes that were characterised by *Phymatolithon calcareum*, the third maerl biotope, **SS.SMp.Mrl.Lgla**, was dominated by the maerl species, *Lithothamnion glaciale*. This was only found in the sheltered and possibly slightly reduced salinity conditions in the middle region of Loch Ailort. It also supported a rich community. *Lithothamnion corallioides* was also recorded here in 2003 (Moore *et al*., 2004) and in Lochs Ailort and Moidart by Howson (1990), although the presence of the species in Scotland has been questioned (Hall-Spencer, 1995).

Three percent of the inshore area supported beds of the eelgrass, *Zostera marina* (**SS.SMp.SSgr.Zmar**), the principal area of distribution being shallow waters (<4 m) in the outer part of Loch Ailort.

1.2 Inshore deep mud with burrowing heart urchins

There are currently six records of the biotope **SS.SMu.CFiMu.BlyrAchi** from the Sound of Arisaig area (Figure 2, Table 4.8 in Annex 4). Based on a combination of diving and dredge sampling during a 1989 survey, Howson (1990) recognised a community of "soft mud with *Amphiura* spp. and *Brissopsis lyrifera*", characterised by large numbers of *A. chiajei* and *A. filiformis*, as well as the presence of *B. lyrifera*. Five records were ascribed to this habitat from this survey. In Loch nan Uamh these included sample numbers 101 and 105 (effectively the same site but employing respectively dredging and diving) and 102, with a further site, 104, located in the mouth of Loch Ailort (Figure 2). A fifth site in shallow water (17 m) at the head of Loch Uamh lacked *B. lyrifera* and was only tentatively ascribed to the habitat. The Loch Ailort record, 104, was described as extensively burrowed mud with the megafauna including *Nephrops norvegicus* and probably *Maxmuelleria lankesteri* responsible for small volcanoes. This site has now been referred to **SS.SMu.CFiMu.SpnMeg** in Marine Recorder, with records 101, 102 and 105 regarded as

examples of **SS.SMu.CFiMu.BlyrAchi**. It should be noted that the mud for record 105 was also described as heavily burrowed by megafauna, which possibly included *N. norvegicus* and *M. lankesteri*, and *Virgularia mirabilis* was common.

In 2003 Moore *et al.* (2004) recorded highly uncertain examples of **SS.SMu.CFiMu.BlyrAchi**, based on unclear video imagery of dense ophiuroid arms in unburrowed mud, at three sites in upper Loch Ailort (128 - 130).

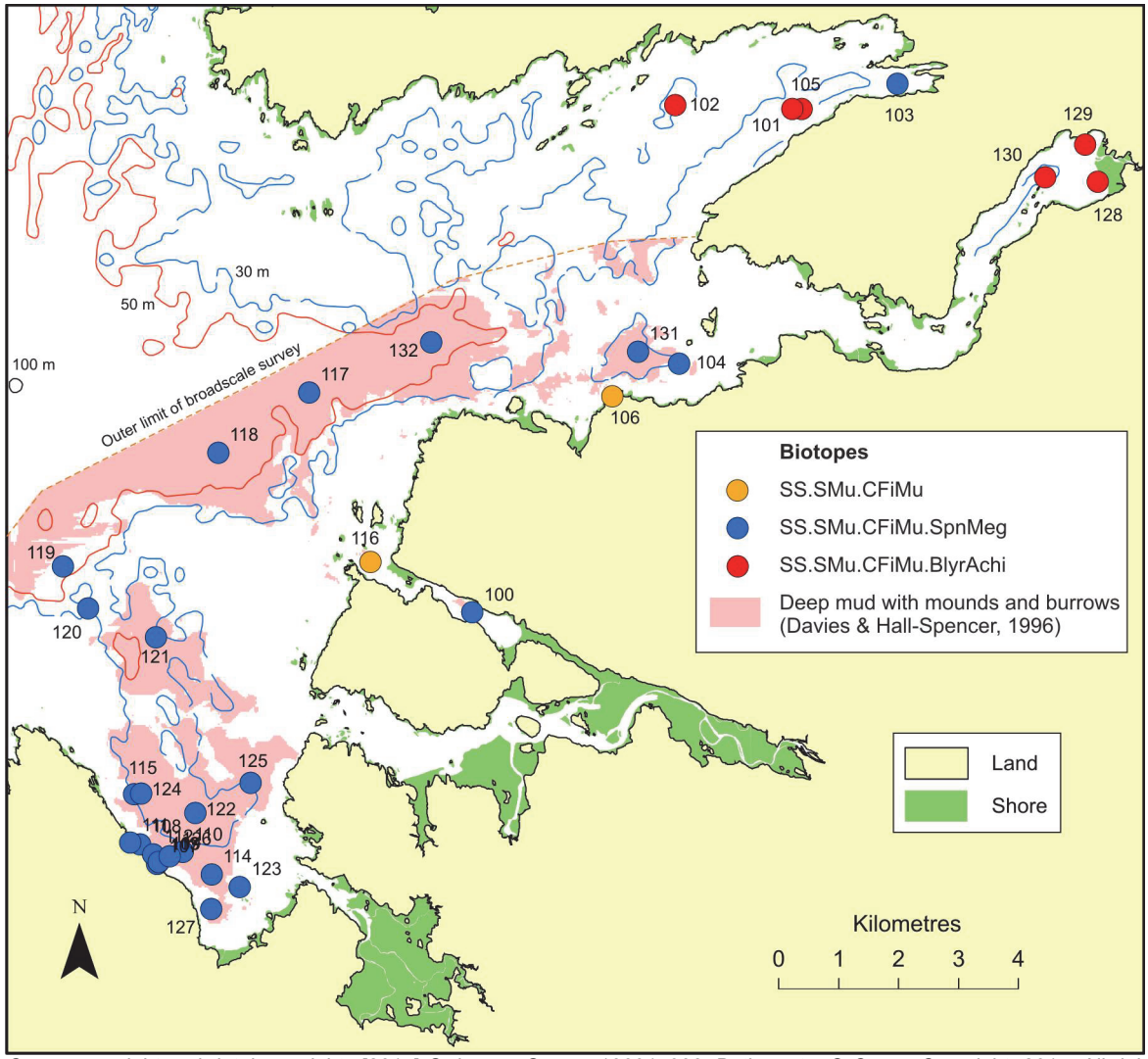


Figure 2. Location of all records of circalittoral fine mud biotopes in the Sound of Arisaig region, as well as broadscale mapping of burrowed mud from Davies and Hall-Spencer (1996).

Although records of **SS.SMu.CFiMu.BlyrAchi** are restricted to Loch nan Uamh and upper Loch Ailort, circalittoral mud habitats are widely distributed in the region. Figure 2 and Table 4.8 (Annex 4) provide details of all records of circalittoral fine mud biotopes in the Sound of Arisaig, as well as the distribution of burrowed mud habitat resulting from the 1995 broadscale mapping study of Davies and Hall-Spencer (1996).

In view of the recording of *Maxmuelleria lankesteri*, with varying degrees of uncertainty, in the Sound of Arisaig, and the widespread observations of hummocked mud (Table 4.8 - Annex 4), it appears possible that areas of circalittoral mud may be referable to the biotope

SS.SMu.CFiMu.MegMax. Although this was not recorded during the 2003 SCM survey, the visibility for much of the relevant video was very poor. While the potentially most promising areas for examination of the presence of **SS.SMu.CFiMu.BlyrAchi** are likely to be Loch nan Uamh and upper Loch Ailort, the 2014 survey extended coverage to the SAC and adjacent region with a view principally to assess the distribution of the biotope, but also to determine the possible presence of the MPA search feature biotope, **SS.SMu.CFiMu.MegMax**.

2. METHODS

2.1 SCM video survey

For the planning of the 2014 survey, all biotope records from the 2003 baseline survey were updated to the 2004 biotope classification (Connor *et al*., 2004), based on a simple translation of codes. Re-inspection of the 2003 video was necessary at this time in a few cases, but was largely deferred until later to facilitate comparison of the footage from both years. Changes in the biotope classification scheme resulted in several stations allocated to reef habitats in 2003 being referred to sediment biotopes under the new classification, and consequently now being considered as components of 'inshore sublittoral sediments'.

The 2014 work focussed on monitoring the designated feature and so concentrated on inshore sediments above the 20 m contour as defined by the bathymetric survey of Davies and Hall-Spencer (1996). Although it was originally intended to resample all 150 of the randomly positioned video sites that formed the basis of the baseline survey, 34 are now referred to reef biotopes and so would not contribute to assessment of a reduction in extent or condition of the designated feature. Consequently, in addition to the 116 random sites allocated to sediment biotopes, 21 of the non-random sedimentary habitat sites from the baseline survey were also selected for resampling.

Site locations are shown in Figure 3 and locational and methodological details provided in Table 1.1 (Annex 1).

For most of the sites the video system used consisted of a Panasonic NV-GS150 3 chip digital video camera within a Seapro housing held within a frame and illuminated by twin 100 watt lamps. A 100 m umbilical cable carried the video signal to a Sony Video Walkman for real-time observation and for recording on miniDV tape. At each station the camera was deployed from a drifting vessel for around 2 - 3 minutes, noting the times, depths and precise positions at the start and end of the drift using dGPS. These data, as well as brief notes on substrates and biota, were entered onto a *pro forma*. The *pro forma* also contained site data (depths and biotopes) from the baseline survey, so that the position could be checked for any likely positional inaccuracies.

A small number of sites could not be accessed from a hard boat, so video material was collected from an inflatable dinghy, using a small drop-down video system, or by diver using a hand-held video camera (Canon Legria HF S30) (see Table 1.1, Annex 1).

The video material from each station was processed in the laboratory, with notes being taken on the substrate and the biota present, where possible employing the SACFOR scale of abundance. In the case of multiple biotopes, the video run was split into time segments based on the time of day, which was overlaid on the video footage. Biotopes were allocated based on the classification scheme of Connor *et al.* (2004).

Where comparison with the video results from the baseline survey indicated a possible temporal difference in the initial biotope recorded, the 2003 footage was re-examined and the baseline biotope updated if necessary. The superior quality of the 2014 video footage facilitated the reanalysis of the historical material.

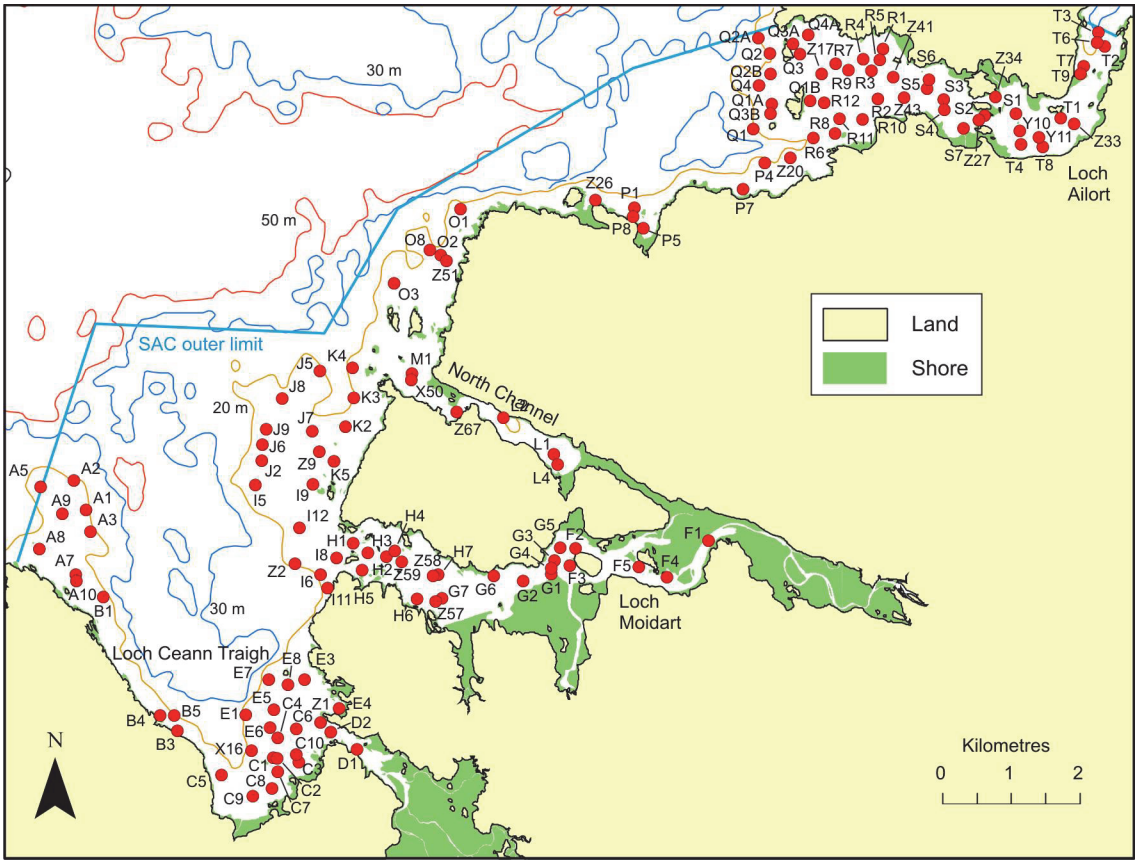


Figure 3. Location of sites for the spot video survey.

2.2 SCM grab survey

Five of the 20 grab sites sampled in 2003 were beyond the 20 m depth contour, so to improve coverage of the main inshore sediment types, in addition to the 15 shallower sites from 2003, five additional inshore sites were selected for the 2014 survey. The locations of these sites are shown in Figure 4 and further sampling details provided in Table 2.1 (Annex 2).

At each station a single 0.1 m^2 Van Veen grab sample was collected from the vessel *RV Serpula*. A subsample of c.150 ml sediment was taken from the surface of the grab contents for particle size analysis and the remaining material sieved on a 1 mm mesh screen, the sievings being retained in borax-buffered 5% formalin.

The infauna from the sievings was sorted, identified and counted by Fugro EMU Ltd (Edinburgh). Species diversity indices for each station were calculated using the Primer statistical package (Primer-E Ltd, Ivybridge).

Sediment samples for grain size analysis were dry sieved using a nest of sieves from -4 to 4 phi at 0.5 phi intervals, following separation and measurement of the silt/clay fraction by puddling the sample of known weight, which had been soaked in sodium hexametaphosphate, through a 63 micron sieve. The sediment grain size parameters, median grain diameter and phi quartile deviation, were obtained by interpolation of the cumulative weight percentage curves.

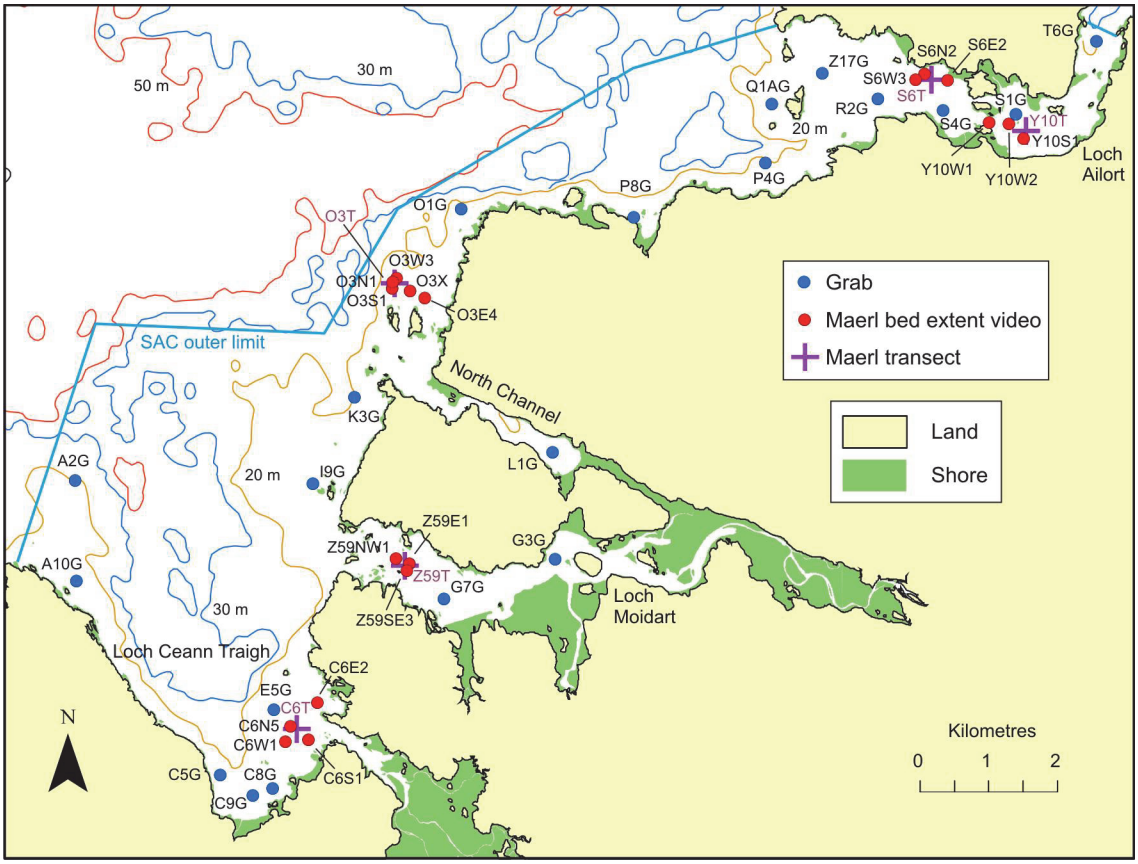


Figure 4. Location of sites for the grab survey, maerl transects and maerl bed extent video survey.

2.3 SCM maerl survey

The five maerl grounds examined in 2003 were resurveyed in 2014 (Figure 4, Table 3.1 - Annex 3).

At each site a diver survey of the area was conducted along a belt transect using MNCR phase 2 methodology. A shot line was deployed marking the location of the site and a 25 m tape transect line was marked out on the seabed by running out a measuring tape from the base of the shot line along the 2003 bearing, and recording the depth at both ends of the tape. A band 2 m either side of the tape was surveyed by the same two surveyors who carried out the work in 2003. They noted the presence, and where possible, estimated the abundance of conspicuous biota, collecting material which needed to be identified in the laboratory, including a representative collection of maerl. To supplement the real-time visual records and collections, the transect band was videoed using a hand-held digital video camera (Canon Legria HF) and photographs taken of the maerl and associated community using two Fuji Finepix S2 Pro digital still cameras with 14 mm wide-angle and 90 mm macro lenses.

Four replicate core samples were taken in areas of living maerl using a 10.3 cm diameter corer to a depth of 20 cm. The macrobenthic infauna was extracted and studied using the same methodology as described above for the grab samples, except that species identification was carried out by Sue Hamilton (Currie, Midlothian) who had processed the equivalent samples from the 2003 survey. An additional 20 cm sediment core of 5 cm

diameter was taken for particle size analysis using the same methodology as described above for the grab samples.

For assessment of the extent of the maerl bed beyond the transect, a drop-down video survey was performed using a similar methodology to that described for the initial drop-down video survey. Site locations were a subset of those used for the same purpose in 2003, with the exclusion of sites not displaying maerl in 2003. A few additional sites were employed. The location of all sites are shown in Figure 4 and detailed in Table 3.8 (Annex 3).

Plotting of the 2003 video site locations on detailed digital charts of the area produced by Antares Charts (www.antaescharts.co.uk) revealed consistent positional errors at three of the maerl grounds. These correspond to the grounds where the SNH RIB was used for the video work. The errors are resolved if it is assumed that the RIB's navigation system was set to the OSGB36 geodetic datum, rather than WGS84. Corrected positions were employed for the 2014 work. The original cited positions for all the 2003 maerl ground extent video runs are given in Table 3.10 (Annex 3), together with corrected values.

The diver species records and those derived from the study of the collected epibiota and imagery in the laboratory were collated to produce a species list for the transect band with, where possible, SACFOR abundance estimates.

Infaunal diversity measures were calculated using Primer, which was also employed for examination of spatial and temporal differences in species composition using non-metric multidimensional scaling (MDS) and analysis of similarities (ANOSIM). Temporal change in abundance and species diversity measures at the transect sites were assessed using General Linear Model analysis of variance and Tukey multiple comparison testing.

In addition to the derivation of an overall estimate of live and dead maerl percentage cover along the transect, carried out during the MNCR phase 2 surveying, live and dead maerl cover within the transect band was also assessed using diver estimates of percentage cover within random 0.25 m^2 quadrats. Quadrats were positioned along the transect using tape distances derived from random numbers (constrained by the avoidance of non-overlapping quadrats). The location of the quadrat perpendicular to the tape was determined randomly using single integer random numbers between 1 and 4, where 1 was alongside the tape, 2 was 50 cm from the tape (i.e. the width of the quadrat) etc. Two surveyors were employed, one on each side of the tape, where they each deployed 10 quadrats. In order to assess the degree of inter-worker variability, for the first site worked (C6T), where there was no time limitation set by the duration of slack water, both surveyors derived independent estimates of cover within the same 20 quadrats. Several of the quadrats were also photographed to support post-dive discussion of inter-worker variability reduction. At the other four transect sites maerl cover at 8 - 12 of the 20 quadrat locations was assessed independently by both surveyors.

2.4 Inshore deep mud with burrowing heart urchins survey

Drop-down video footage was obtained along runs at seven sites in upper Loch Ailort and 18 sites on mud grounds in Loch nan Uamh and south to Loch Ceann Traigh (Figure 5, Table 4.1 - Annex 4). These included all sites with historical records of the habitat. The methodology followed that for the spot video survey described in section 2.1, except that the runs were generally longer in duration. In order to determine the presence of the characterising burrowing heart urchins and *Amphiura* species, multiple grab samples (3 - 5) were collected at 12 promising sites, including all those with historical records of the biotope, and the contents sieved on a 0.7 cm mesh (Figure 5, Table 4.3 - Annex 4). In order to determine the condition of likely examples of the habitat and to better characterise it, single quantitative grab samples were also taken at four of these sites. This included all sites with

historical records of the habitat, apart from two sites in upper Loch Ailort, where the previous sampling revealed that the habitat clearly did not occur. Subsamples were taken for particle size analysis and the fauna extracted and analysed as described for the main grab survey (section 2.2). The presence of burrowing heart urchins was also investigated using a naturalist dredge at five of the most promising sites (Figure 5, Table 4.3 - Annex 4).

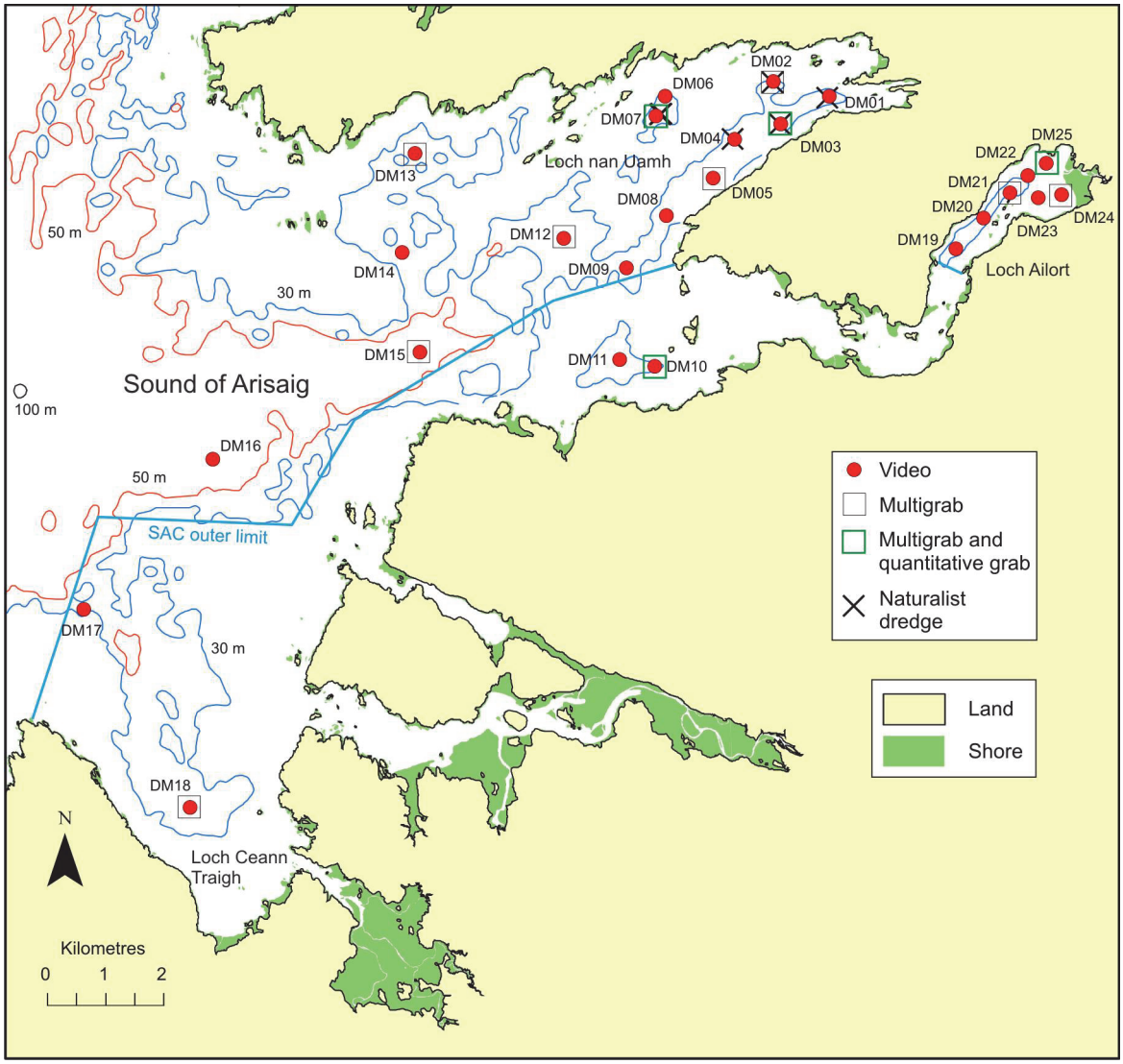


Figure 5. Location of sample sites for survey of inshore deep mud with burrowing sea cucumbers, showing sampling gear used.

3. RESULTS

3.1 SCM video survey

The results from the analysis of the 137 video survey sites are provided in Table 1.1 (Annex 1) (positional, temporal and depth data) and Table 1.2 (Annex 1) (habitat and community data). Annex 3 (Tables 3.8 and 3.9) provide equivalent data for the additional 19 sites examined to assess maerl extent at the five locations where MNCR phase 2 surveys were carried out. The distribution of the initial biotopes recorded at all these sites (the first biotope recorded on any given video run; multiple biotopes were present at a small number of sites - see overleaf for further details) is illustrated in Figures 6 - 7 and the frequencies of these biotopes are given in Table 2.

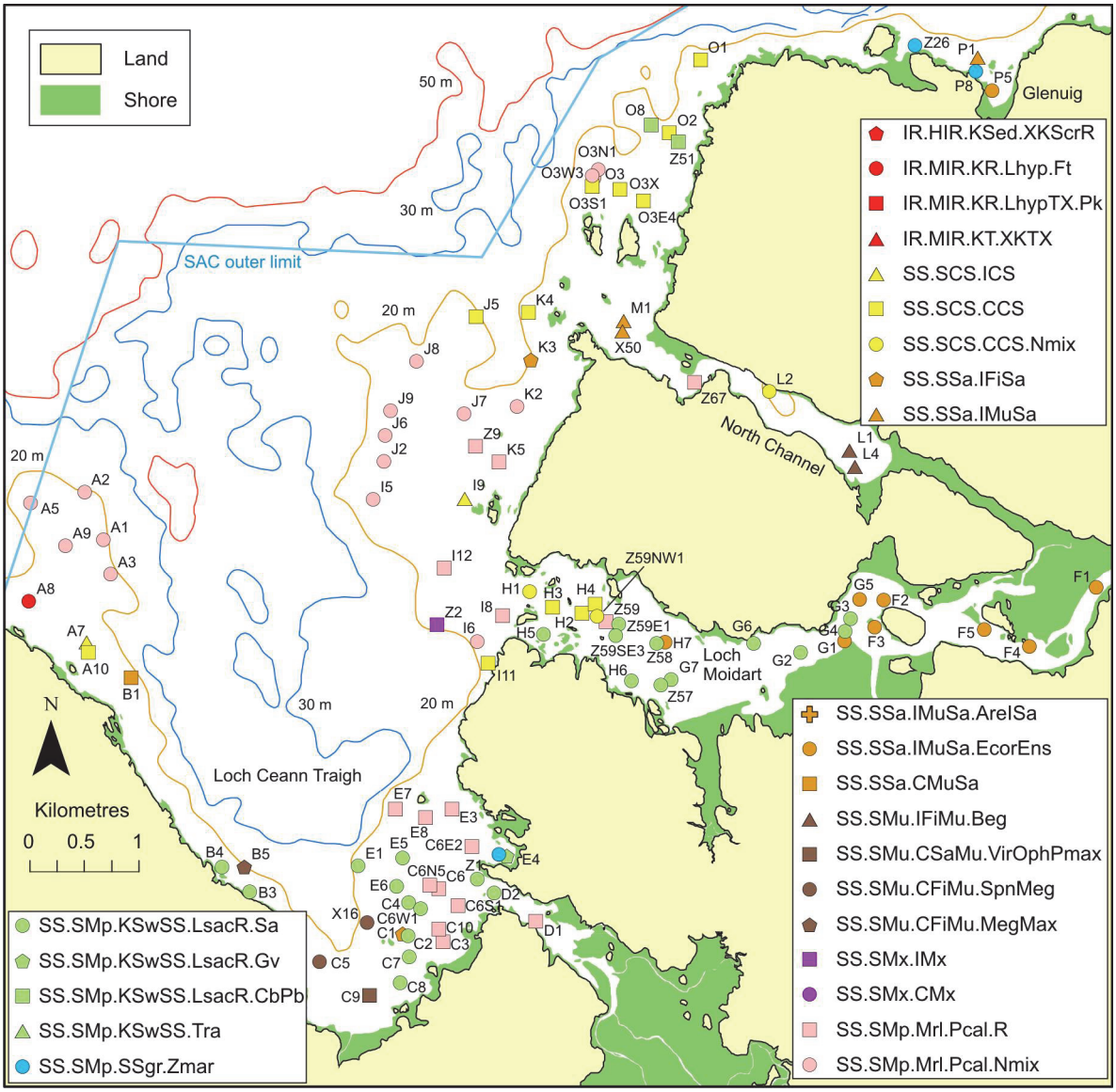


Figure 6. Distribution of initial biotopes recorded during the 2014 SCM video survey within the southern region of the Sound of Arisaig SAC.

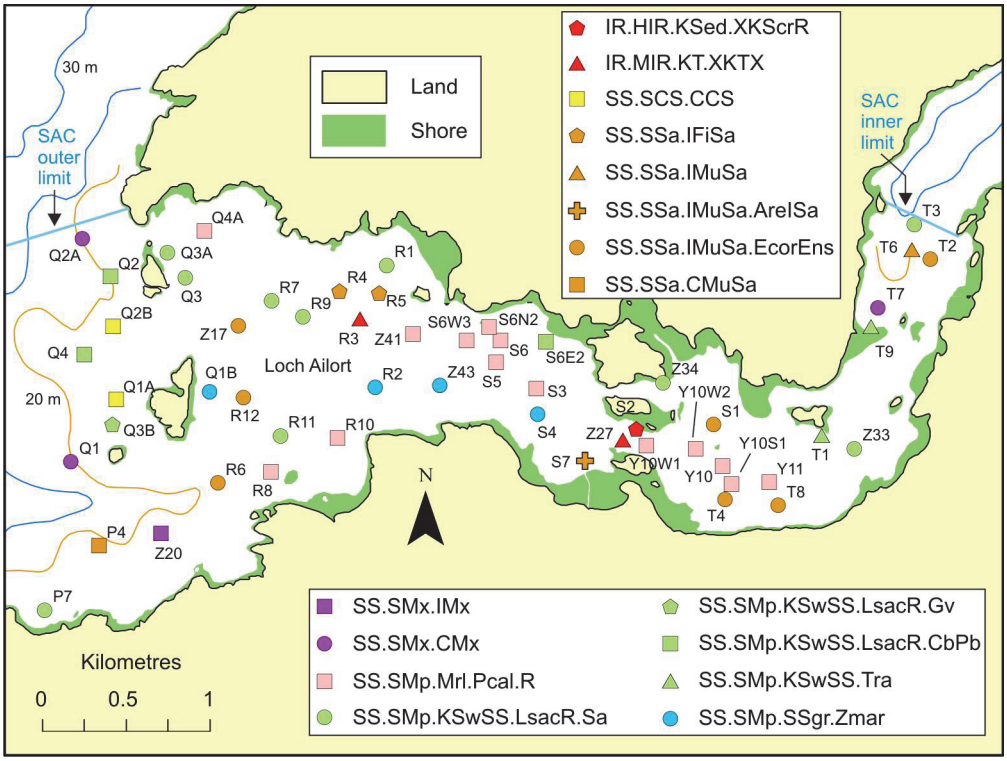


Figure 7. Distribution of initial biotopes recorded during the 2014 SCM video survey within the northern region of the Sound of Arisaig SAC.

A total of 26 biotopes was recorded at the start of video runs in 2014 (Table 2). The total number of biotope records in 2014 (161) exceeds the number of sites surveyed (156), as biotope mosaics were observed at a small number of sites. Maerl represents the dominant habitat, with **SS.SMp.Mrl.Pcal.R** widely distributed in shallower waters (1 - 13 m) in Loch Ailort, inner Loch Ceann Traigh and around the mouth of Loch Moidart, and **SS.SMp.Mrl.Pcal.Nmix** in deeper water (14 - 21 m), particularly in outer Loch Ceann Traigh. **SS.SMp.KSwSS** biotopes were also widely recorded, generally on sand substrates (**SS.SMp.KSwSS.LsacR.Sa**) in outer Loch Ailort, Loch Moidart and inner Loch Ceann Traigh. The other major biotopes were **SS.SSa.IMuSa.EcorEns** in Loch Ailort and inner Loch Moidart, and **SS.SCS.CCS** in the outer part of Loch Ailort and Loch Moidart and off the mouth of the north channel of Loch Moidart. Eelgrass beds (**SS.SMp.SSgr.Zmar**) were recorded at seven sites in the outer part of Loch Ailort and off Glenuig.

Table 2. Frequency of initial biotopes recorded during the 2014 SCM video survey and at the same sites during the 2003 SCM video survey.

Biotope	2014 main video survey	2003 main video survey	2014 maerl extent survey	2003 maerl extent survey
IR.HIR.KSed.XKScrR	2	1		
IR.MIR.KR.Lhyp.Ft	1			
IR.MIR.KR.Lhyp.Pk	1	1		
IR.MIR.KT.XKTX	3	2		
SS.SCS.ICS	2	3		
SS.SCS.CCS	12	16	1	2
SS.SCS.CCS.Nmix	2		1	
SS.SSa.IFiSa	4	1		
SS.SSa.IMuSa	4	4		
SS.SSa.IMuSa.AreISa	1	1		
SS.SSa.IMuSa.EcorEns	16	17		
SS.SSa.CMuSa	2	2		
SS.SMu.CSaMu.VirOphPmax	1	2		
SS.SMu.IFiMu.Beg	2	2		
SS.SMu.CFiMu.SpnMeg	2	3		
SS.SMu.CFiMu.MegMax	1			
SS.SMx.IMx	2	1		
SS.SMx.CMx	3	2		
SS.SMp.Mrl.Pcal.Nmix	14	12	1	1
SS.SMp.Mrl.Pcal.R	25	23	9	9
SS.SMp.KSwSS.LsacR.CbPb	4	6	1	1
SS.SMp.KSwSS.LsacR.Gv	2	2		
SS.SMp.KSwSS.LsacR.Sa	31	33	2	2
SS.SMp.KSwSS.Tra	2	2		
SS.SMp.SSgr.Zmar	7	6		

Table 2 compares the frequencies of initial biotopes recorded at the same sites by the 2014 and 2003 surveys. This amounts to different biotopes being recorded at 24 sites. The physical and biological descriptions of these sites in both years are summarised in Table 1.3 (Annex 1), which also provides a commentary on the likely cause of differences at each site.

Thirteen of the temporal differences are uncertain, largely as a consequence of the doubt concerning the accuracy of the 2003 biotope assignations. This results chiefly from poor video quality at these sites in 2003. No examples of **SS.SCS.CCS.Nmix** were identified in 2003 due to the failure to observe the characterising species, *Neopentadactyla mixta*. In fact throughout the 2003 survey work this species was recorded only at a single site exhibiting the biotope **SS.SMp.Mrl.Pcal.R**, whereas it was observed at eight sites in 2014.

At five of the remaining 11 sites it is considered likely that the temporal differences in recorded biotopes result from locational differences. Real temporal change appears to have taken place at six sites and these changes are summarised in Table 3. All six sites are located in the northern region of the SAC with site O8 3 km west of Glenuig and the remaining sites in the mouth of Loch Ailort. In every case biotope change is a consequence of substrate modification, with examples of finer sediments and denser stone cover in 2014, as well as redistribution of the sediment at site O8. All changes are consistent with natural temporal variation in wave action.

Table 3. Summary of temporal changes in biotopes between the 2003 and 2014 SCM surveys.

Site	2003 biotope	2014 biotope	Nature of change
O8	SS.SMp.KSwSS.LsacR.CbPb	SS.SMp.KSwSS.LsacR.CbPb & SS.SCS.CCS	Dense scatter of stones on coarse sediment in 2003 changed to patches of coarse sediment with scattered stones (as before) as well as areas of coarse sediment waves with stones concentrated in troughs
P4	SS.SSa.IMuSa.EcorEns	SS.SSa.CMuSa	Muddier sand in 2014 supporting sparse megafaunal burrows
Q1	SS.SSa.CMuSa	SS.SMx.CMx	Sand with much denser stone cover in 2014
R4	SS.SCS.CCS	SS.SSa.IFiSa	Coarse sand with stones changed to rippled medium sand
R5	SS.SCS.CCS	SS.SSa.IFiSa	Coarse sand and shell gravel changed to rippled medium sand
Z17	SS.SSa.IMuSa.EcorEns	SS.SSa.IMuSa.EcorEns & SS.SMp.KSwSS.LsacR.Sa	Locally denser stone cover in 2014 probably responsible for denser algal cover

3.2 SCM grab survey

The detailed results of the grain size analysis of the sediment samples from the grab survey are given in Table 2.2 (Annex 2), with graphical presentation in Figure 2.1 (Annex 2) and summarial descriptors provided in Table 2.3 (Annex 2). The species abundance data are given in Table 2.4 (Annex 2).

Total abundance and species diversity measures for the 2014 and 2003 grab surveys are given in Table 2.5 (Annex 2) and a digest of the data for those sites revisited in 2014 is provided in Table 4.

Considering the 15 sites grabbed in both 2003 and 2014, there is an insignificant overall temporal change in infaunal abundance, with a mean of 341 ind./grab in 2003 and 354 ind./grab in 2014. There are some marked temporal changes, both positive and negative, at individual sites (Table 4), although none of a scale where deterioration of the community could be envisaged. Similarly, the overall temporal change in taxon richness is minimal, with means of 51 taxa/grab and 48 taxa/grab recorded in 2003 and 2014 respectively. Temporal changes in richness at individual sites are mostly slight, but a marked reduction from 55 to 27 was recorded at site R2G. This site supports a very patchy eelgrass bed (**SS.SMp.SSgr.Zmar**) and it is possible that the grab sample was taken between eelgrass patches in 2014, where a lower diversity might be expected. At the other eelgrass site sampled in both years (P8G), there was little change. Comparison of the species composition at revisited sites in 2014 (Table 2.4, Annex 2) and in 2003 (Moore *et al*., 2004) indicates that no temporal changes are evident, such as the introduction of invasive species or the appearance or abundance increase of pollution indicators, that are suggestive of deterioration in the condition of the habitats.

Biotope ascriptions for the 2014 grab sites, based on both grab and video data, are provided in Table 2.5 (Annex 2). No temporal changes in biotope were recorded at the 15 sites sampled in 2003 and 2014.

Table 4. Total abundance and number of taxa recorded in grab samples taken at the same sites in 2014 and 2003. Also shown is the temporal change in taxon richness from 2003 to 2014 as a percentage of the 2003 value.

Site	Total abundance		No. taxa		
	2014	2003	2014	2003	% change
A10G	618	412	91	74	23
C8G	431	430	53	68	-22
C9G	826	356	70	78	-10
E5G	377	350	37	42	-12
G3G	340	669	42	45	-7
G7G	295	140	55	43	28
I9G	508	221	28	33	-15
K3G	183	172	38	25	52
L1G	6	1	3	1	200
O1G	285	209	56	60	-7
P8G	491	895	73	80	-9
R2G	142	307	27	55	-51
S1G	383	191	68	53	28
T6G	315	583	50	74	-32
Z17G	109	181	24	28	-14

Six of the 15 stations analysed for grain size in both survey years exhibited changes in at least one of the major particle size categories (gravel, coarse sand, medium sand, fine sand and silt/clay) exceeding 10% (Table 5). No overall trend is evident, with four sites becoming finer and two coarser. In the case of stations A10G and O1G the substrate is either poorly sorted or very spatially heterogeneous due to the formation of sediment waves in one or both years. At such locations, very large or multiple samples would need to be obtained to assess temporal change. R2G is located close to sites R4 and R5 at the mouth of Loch Ailort and follows the same temporal trend of reducing sediment size that was observed at these stations by video (Table 3), and which was assumed to probably result from temporal variation in wave action. Site S1G is located slightly higher up the loch and experienced a similar though slight reduction in grain size. A similar causation probably underlies the reduction in the coarse sand fraction at site C8G in the exposed Loch Ceann Traigh. Site L1G in the north channel of Loch Moidart experienced a large drop in silt/clay content from 94% to 59%. It is conceivable that the seabed in this shallow area (2.4 m) is strongly influenced by temporal variability in wave action.

Table 5. Summary of sediment composition at grab sites (with G suffix) and maerl transect sites (with T suffix) where temporal change in at least one particle size category exceeded 10%. Temporal change since 2003 is shown, with values >10% highlighted in red.

Site	2014					% change since 2003				
	% gravel	% coarse sand	% medium sand	% fine sand	% silt/clay	gravel	coarse sand	medium sand	fine sand	silt/clay
A10G	0.71	37.30	36.43	19.44	6.12	-2.01	-4.06	12.08	-3.84	-2.18
C8G	0.00	22.68	50.50	23.72	3.10	0.00	-20.15	20.78	-1.28	0.65
L1G	0.00	23.14	7.20	10.71	58.94	0.00	23.14	5.94	5.63	-34.73
O1G	8.92	87.50	2.21	0.43	0.95	-3.78	26.45	-17.56	-3.35	-1.73
R2G	4.80	21.01	39.69	33.45	1.05	-3.49	-14.83	-5.59	24.24	-0.32
S1G	0.00	8.84	25.53	62.10	3.53	-0.68	-8.13	1.39	10.17	-2.75
C6T	15.79	70.67	3.71	8.19	1.63	-30.74	21.97	2.15	6.61	-0.01
O3T	5.59	83.39	2.94	2.84	5.26	-19.98	11.10	2.61	2.60	3.69
Y10T	12.49	63.24	11.45	6.36	6.46	-16.45	15.68	3.49	-2.19	-0.53

3.3 SCM maerl survey

The results are reported here of the MNCR phase 2 and associated survey work at the five maerl bed locations previously examined in 2003. Physical and biological descriptions of the transects are provided in Table 3.1 (Annex 3).

3.3.1 Epibiota

SACFOR abundances of all taxa recorded along the transects are listed in Table 3.2 (Annex 3) and taxon richness shown in Table 7. *Phymatolithon calcareum* was the dominant maerl species at all sites. *Lithothamnion glaciale* was also recorded at sites Y10T and Z59T (although not confirmed by microscopical examination at this latter site), but only as nodular encrustations on stones.

Estimates of the percentage cover of live maerl obtained during the MNCR phase 2 survey are provided in Table 6. Also shown in the table are mean values of live and dead maerl derived from quadrat measurements, with detailed results for each quadrat given in Table 3.9 (Annex 3).

At the first site examined (C6T) estimation of live cover by both surveyors at all 20 quadrat locations revealed mean values of 20% and 33% by the different surveyors (a significant difference at $p<0.001$; t test). However, following discussions of these results, facilitated by examination of photographs of the quadrats, subsequent measures of mean live maerl cover at quadrat locations worked by both surveyors, revealed inter-worker differences in cover of <10%. Table 6 also provides an overall measurement of mean live maerl cover along each transect based on all quadrats, where duplicated measures at the same quadrat location have first been averaged. These values are very close to those derived independently by the experienced MNCR surveyor (Table 6).

Table 6. Estimates of live and dead maerl percentage cover at the five MNCR transect sites. Mean values for live and dead maerl are given for each site, as well as mean values of live maerl derived from all quadrat locations where estimates were obtained independently by two recorders. Also shown are overall estimates for the transect obtained by a third experienced MNCR phase 2 recorder.

Transect	Mean live % cover for repeated quadrat locations			Mean live % cover for all quadrat locations	Mean dead % cover for all quadrat locations	Overall estimate of live % cover by MNCR recorder
	Recorder 1	Recorder 2	Difference (%)			
C6T	19.75	33.00	+13.25	26.38	71.38	25
O3T	8.88	14.63	+5.75	10.20	86.63	10
S6T	50.00	57.10	+7.10	58.98	38.95	50
Z59T	4.00	4.83	+0.83	4.75	24.70	1-5
Y10T	44.00	53.50	+9.50	38.73	49.68	30-40

All sites show higher levels of taxon richness in 2014 than recorded by the 2003 baseline survey, although the elevation is no more than would be expected from slight variation in the intensity of effort (Table 7).

The percentage of taxa refound in 2014 appears fairly low (45 - 62%). While this may reflect some change in composition, most of the differences result from the recording of sparse or cryptic elements of the community that could be easily overlooked, or highly vagile species with sporadic appearance in the surveyed zone. At least one of the minor species recorded in 2014 does represent a temporal change. The invasive alga, *Heterosiphonia japonica*, was present at all sites in 2014, but at such a low density that it could not be said to be modifying the community structure at any site.

There was little evidence for a significant temporal change in the dominant elements of the community, except apparently for the maerl species (Table 7). In 2003 *Phymatolithon calcareum* was recorded as the dominant taxon at C6T, S6T, Z59T and co-dominant at O3T, with *Lithothamnion glaciale* dominant at Y10T, present at Z59T and C6T and co-dominant at O3T. *Lithothamnion corallioides* was also noted at Y10T. In 2014 *P. calcareum* was dominant at all sites, *L. glaciale* was only observed in its encrusting form and *L. corallioides* was not recorded. Given the slow growth rate of maerl (<1 mm yr^{-1} - Birkett *et al*., 1998), real temporal change in the dominant form appears most unlikely over this timescale, although some translocation of material from adjacent areas is possible. The most likely explanation for the apparent change in maerl composition is that there were errors in the identification of some of the 2003 material. No specimen material was preserved from the 2003 survey. This also explains the unlikely recording of *L. corallioides* in northern Scotland (see Hall-Spencer, 1995). Thus, it is believed that there is no firm evidence for a temporal change in maerl composition.

Table 7. Comparison of epibiotic taxon richness, live maerl cover and maerl species derived by MNCR phase 2 surveys along transects in 2014 and 2003. PC = Phymatolithon calcareum*, LC* = Lithothamnion corallioides*, LG* = Lithothamnion glaciale*. Brackets indicate encrusting form.*

Transect	No. epibiota taxa			Live maerl cover (%)		Maerl species	
	2014	2003	% shared taxa	2014	2003	2014	2003
C6T	74	67	54	25	20-30	PC	PC, LG
O3T	47	40	45	10	10	PC	PC, LG
S6T	79	77	52	50	25	PC	PC
Z59T	111	92	55	1-5	20	PC, (LG)	PC, LG
Y10T	109	92	62	30-40	50	PC, (LG)	LG, LC

No quadrat measurement of maerl density was carried out in 2003. Densities based on overall estimates made during the MNCR phase 2 survey are provided in Table 7. Similar live maerl cover values were obtained in both years at sites C6T, O3T and Y10T. In 2014 a markedly higher value was recorded at S6T and lower value at Z59T. These differences may be due to the high degree of patchiness present at these sites. At S6T, 50% cover was recorded in 2014 and 25% in 2003. However in 2003 the density along the first 15 m of the 25 m transect was only 1 - 5% cover, with presumably the density along the remainder of the transect c. 50%. Re-examination of the 2003 diver video footage reveals extensive areas of dense live maerl (50% cover or greater) from 15 - 25 m along the transect. With this degree of patchiness, a slight change in position of the transect or localised translocation of material by wave or current action, could lead to such a difference in overall density estimates. At Z59T a cover of 1 - 5% was recorded in 2014 but 20% in 2003. However, there was great variation in cover along the transect in 2003, with 30 - 50% along the first half of the transect, and 1 - 5% along the second half. Although values as high as 30 - 50% were not observed in 2014, the quadrat study recorded a maerl density of 15% locally. Some temporal reduction at site Z59T appears possible, although the high degree of patchiness, as well as the subjective nature of the methodology, precludes confirmation of this.

There was no change in the recorded extent of the five maerl beds. The 2014 video survey found live maerl at all stations and, where discernible, at similar levels of density, as in 2003 (Table 3.9, Annex 3).

3.3.2 Infauna

Species abundance data for the four replicate core samples taken at each of the five maerl sites are presented in Table 3.5 (Annex 3) and total abundance and diversity measures in Table 3.6 (Annex 3).

Multidimensional scaling analysis of the species abundance data (Figure 8) shows that species composition differs between sites and temporally at each site. This is confirmed by ANOSIM analysis ($p = 0.029$). Figure 8 suggests that species composition was much more variable in 2014 than 2003, but this a consequence of the replicates towards the bottom of the plot having relatively low levels of taxon richness.

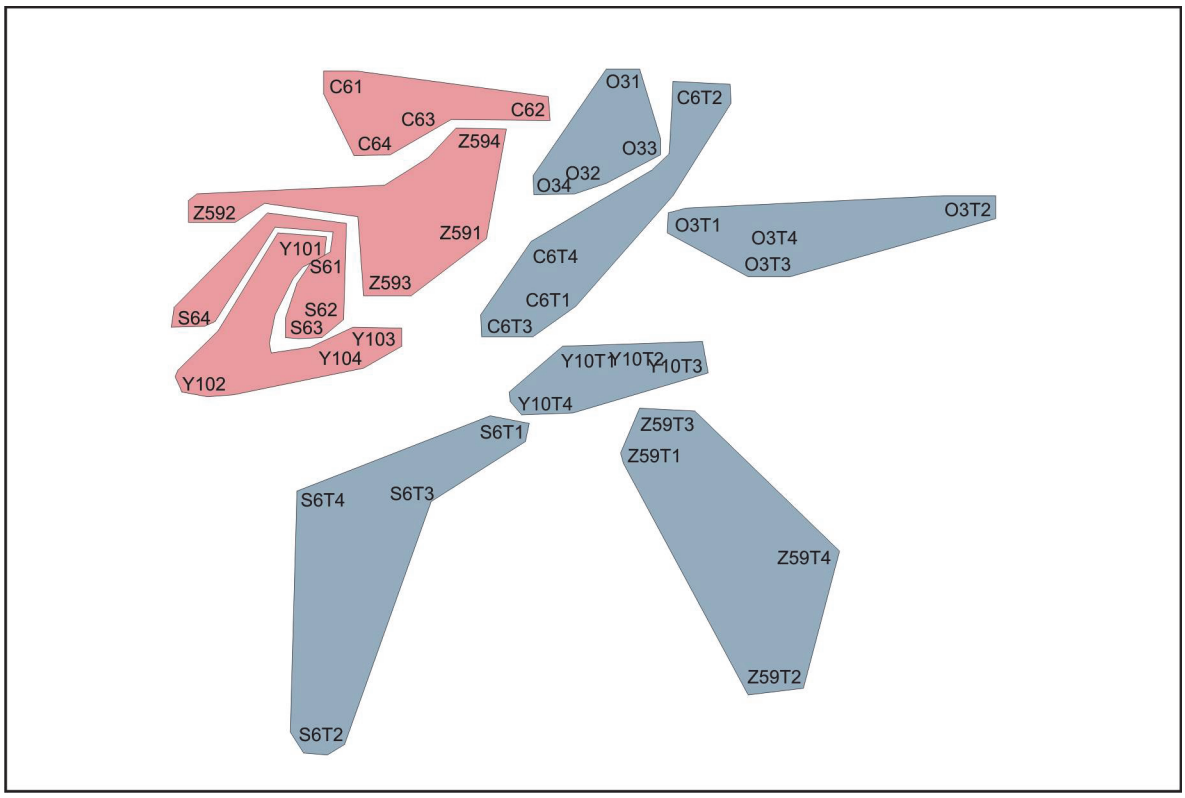


Figure 8. Non-metric multidimensional scaling ordination of infaunal, log-transformed species abundance data from four replicate core samples at five transect sites in 2003 and 2014. Replicates are grouped by site; pink clusters (2003) and blue clusters (2014). Stress = 0.18.

A temporal comparison of mean abundance and diversity measures is provided in Table 8. General Linear Model ANOVA and Tukey multiple comparison testing revealed significant reductions in abundance at sites S6T ($p = 0.04$) and Z59T ($p = 0.01$) and significant reductions in taxon richness at the same sites ($p < 0.01$ at both sites). However, as taxon richness can be strongly dependent upon sample size, the recorded reduction in richness may be merely a consequence of lowered abundance. Indeed, Shannon-Wiener diversity, which is less influenced by sample size, showed no significant temporal change at any of the sites.

Table 8. Comparison of mean taxon richness, Shannon-Wiener diversity (log_2) and total abundance in four replicate 10.3 cm diameter core samples derived from surveys along transects in 2014 and 2003.

Transect	No. taxa		Total abundance		Diversity (Shannon-Wiener)	
	2014	2003	2014	2003	2014	2003
C6T	34	34	133	108	4.02	4.21
O3T	30	36	99	89	4.18	4.63
S6T	38	70	162	377	4.02	4.81
Z59T	32	56	70	194	4.42	4.93
Y10T	50	52	158	123	4.80	5.22

3.3.3 Sediment composition

The detailed results of the grain size analysis of the sediment samples taken from the transects are given in Table 3.3 (Annex 3), with summarial descriptors provided in Table 3.4 (Annex 3) and graphical presentation in Figure 3.1 (Annex 3). Large temporal differences (>10%) between the 2003 and 2014 surveys were recorded at three sites, although these were restricted to the coarser fractions (coarse sand and gravel) (Table 5). However, it cannot be assumed that this represents real temporal change, due to the high degree of spatial variability (e.g. introduced by sediment wave formation, as well as by maerl and shell patchiness) and/or the presence of heterogeneous sediments.

3.4 Inshore deep mud with burrowing heart urchins survey

The results from this survey are presented in Annex 4, with those from the video analysis of the 25 mud survey sites in Table 4.1 (positional, temporal and depth data) and Table 4.2 (habitat and community data). The results from grab and dredge sampling are given in Table 4.3 (*in situ* observations), Tables 4.4 and 4.5 (detailed and summarial sediment composition descriptors, with graphical presentation in Figure 4.1), and Tables 4.6 and 4.7 (infaunal species abundance and diversity). The distribution of biotopes recorded at these sites is illustrated in Figure 9.

There is a clear distributional pattern, with **SS.SMu.CFiMu.SpnMeg.Fun** restricted to the inner part of Loch nan Uamh in an area of soft mud at depths of 30 - 37 m. *Funiculina quadrangularis* was present at relatively low abundance levels (occasional - frequent). **SS.SMu.CFiMu.MegMax** was widely distributed in the outer part of Loch nan Uamh, at the mouth of Loch Ailort and in the outer part of the surveyed area at depths of 33 - 67 m. It is probably present throughout most of the area beyond the 30 m depth contour, including within the SAC. The habitat of soft mud was generally well-worked by megafaunal burrowers, being often densely burrowed and mounded by a community including *Nephrops norvegicus*, *Maxmuelleria lankesteri*, *Jaxea nocturna*, *Callianassa subterranea*, *Calocaris macandreae*, *Goneplax rhomboides* and *Lesueurigobius friesii* (Figure 10). It should be noted that the sites assigned to **SS.SMu.CFiMu.SpnMeg.Fun** had an essentially similar fauna, including the presence of *M. lankesteri*, but have been referred to this latter biotope on the basis of the presence of *Funiculina*.

A single example of **SS.SMu.CFiMu.MegMax** was also recorded in shallow water (13 - 19 m) at the head of Loch Ailort. Otherwise the habitat encountered in this upper basin was quite different, consisting of anaerobic mud displaying black marbling and patches of *Beggiatoa* sp., and supporting dense *Oxydromus flexuosus* and profuse emergent filaments, possibly tubicular and produced by *Polydora* sp. (**SS.SMu.IFiMu.Beg**). This habitat appears to occupy most of the upper basin; it was recorded at depths of 27 - 49 m, with a transitional site observed at 21 m.

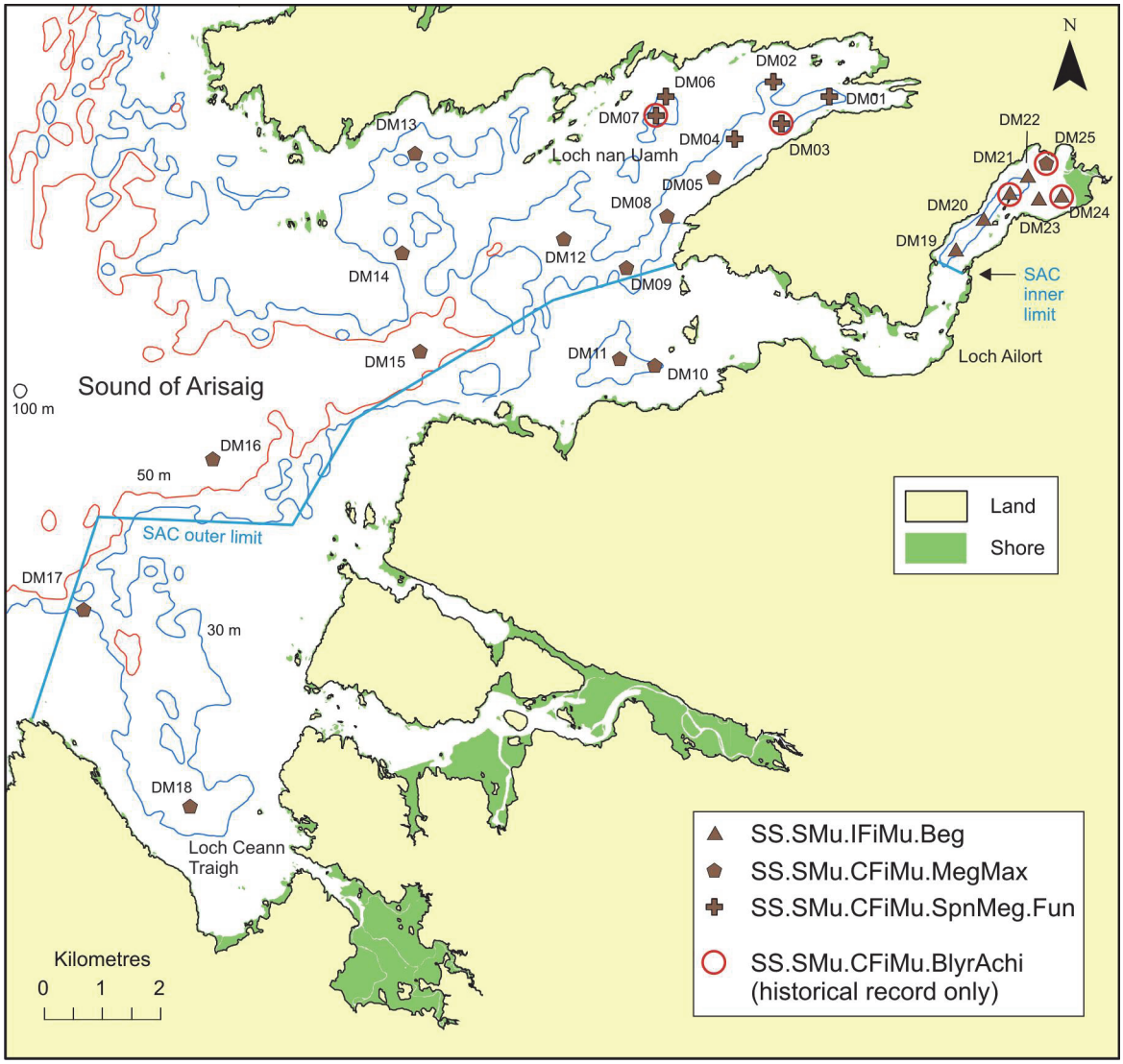


Figure 9. Distribution of biotopes recorded during the 2014 inshore deep mud survey.

The biotope **SS.SMu.CFiMu.BlyrAchi** is characterised by the presence of *Brissopsis lyrifera* and abundant *Amphiura chiajei* and *A. filiformis*. Single, fully-worked-up, grab samples taken at sites DM03, DM07 and DM25 (sites of historical records of this biotope) and DM10 (a site considered to be the same habitat by Howson (1990)) failed to include *Brissopsis* in 2014 but contained abundant *Amphiura chiajei* and generally superabundant *A. filiformis* (Table 4.6, Annex 4). However, multiple grabbing and naturalist dredge sampling at 14 of the sites revealed the presence of *Brissopsis* at DM03 and spatangid test material (probably *Brissopsis*) at a further five sites including DM07 and DM10, as well as dense *Amphiura* spp. at most sites (Table 4.3, Annex 4). Despite the indications of some of the characteristics of the biotope **SS.SMu.CFiMu.BlyrAchi** at several of the sites, the biotope was not identified during the current survey for reasons outlined in section 4.2

Figure 10. Video screen grab of an example of the biotope, ***SS.SMu.CFiMu.MegMax****, from site DM17, showing the exhalent mounds of* Maxmuelleria lankesteri.

4. DISCUSSION

4.1 Site Condition Monitoring

Monitoring of the condition of the subtidal sandbanks feature should consider seven attributes of which four require compulsory assessment (JNCC, 2004). Six attributes have been selected for monitoring within the Sound of Arisaig SAC by SNH (see Moore *et al*., 2004). These are listed in Annex 6 of this report.

Following monitoring of the feature, its condition is assessed by assignment to one of seven categories (SNH, 2010):

- Favourable Maintained - the attribute targets set for the natural features have been met, and the natural feature is likely to be secure on the site under present conditions.
- Favourable Recovered - the condition of the natural feature has recovered from a previous unfavourable condition, and attribute targets are now being met.
- Unfavourable Recovering - one or more of the attribute targets have not been met on the site, but management measures are in place to improve the condition.
- Unfavourable No Change - one or more of the attribute targets have not been met, and recovery is unlikely under the present management or other activity on the site.
- Unfavourable Declining - one or more of the attribute targets have not been met, evidence suggests that condition will worsen unless remedial action is taken.
- Partially Destroyed - something has happened on the site which has removed part of the natural features, there is no prospect of restoring the destroyed area.
- Totally Destroyed - the natural feature is no longer present, there is no prospect of restoring it.

This section derives an assessment of condition following consideration of the degree to which the targets set for each of the measured attributes have been met. For each attribute, the targets, methods for assessment of adherence to the target, and the results of assessment are summarised in Annex 6.

4.1.1 Extent

No human activities have been identified, such as land reclamation and shoreline development, that are likely to have influenced the extent of the sandbank feature. The 2014 point site video survey of 137 stations within the 20 m depth contour recorded sedimentary biotopes at 133 sites (Table 1.2, Annex 1), compared to 134 sites in 2003. This minor difference was believed to be due to a slight locational difference at one site between the two surveys. There is no evidence for a temporal change in the extent of the feature.

4.1.2 Topography

No activities or events are known to have occurred since the last monitoring exercise that are likely to have caused changes in the topography of the sediment.

The prescribed methodology for the measurement of topographical change involving depth recording at point stations (Annex 6) will only detect extreme variations in depth unless there is a high level of precision in position fixing and if measurements are referred to a fixed local datum. Allowing for the degree of tidal rise by the use of tidal prediction algorithms may lead to errors in excess of 1 m, depending upon the meteorological conditions. The accuracy of depth measurement will also vary with wave conditions. One extreme temporal difference was recorded during the video survey at site Z2 off the mouth of Loch Moidart, where a depth of 16.9 m in 2014 compared to 6.9 m in 2003. The site was close to the charted 20 m contour and so it is likely that the 2003 value was due to an error in the cited position.

Temporal comparisons are likely to be more reliable where the same depth recording equipment is used and where the vessel is known to be effectively stationary. This is the case for the bathymetric data collected during the grab survey. For the 15 grab sites visited in both survey years, the mean temporal change in recorded depth is 7 cm, with individual sites showing differences between 0 and 90 cm (Table 2.1 - Annex 2). No significant temporal change in the topography of the feature is apparent.

4.1.3 Sediment character

The target set by the site attribute table is that change in any of the major particle size categories (gravel, coarse sand, medium sand, fine sand and silt/clay) should not exceed 10%. This limit was breached in the case of six of the 15 grab sites sampled in both survey years and for three of the maerl transect sites. However, these changes could be explained by natural temporal variation in wave action, and particularly in relation to the maerl sites, the problems of representatively characterising poorly sorted and spatially variable sediments. There is no indication of deterioration in the condition of the subtidal sandbank feature resulting from recorded changes in sediment composition.

4.1.4 Distribution and spatial pattern of biotopes

The site attribute table stipulates that the following key biotopes should be recorded where they were found in 2003: **SS.SMp.Mrl.Pcal.R**, **SS.SMp.Mrl.Pcal.Nmix**, **SS.SMp.SSgr.Zmar**, **SS.SCS.CCS.Nmix**, **SS.SSa.IMuSa.EcorEns**, **SS.SMu.CSaMu.VirOphPmax** and **SS.SMp.KSwSS**. The examples of **SS.SCS.CCS.Nmix** identified in 2003 have been reinterpreted here as the higher biotope **SS.SCS.CCS**, due to the lack of evidence of the presence of the characterising species *Neopentadactyla mixta*. This species is known to withdraw into the sediment in response to diurnal, seasonal and probably hydrodynamic triggers (Könnecker and Keegan, 1973; Smith and Keegan, 1984).

The only confirmed examples of temporal biotope change recorded during the 2014 survey are listed in Table 3. These include the loss of examples of key biotopes at three sites in 2014 caused by an increase in the fine sediment fractions leading to the replacement of **SS.SCS.CCS** by **SS.SSa.IFiSa** at two sites and the replacement of **SS.SSa.IMuSa.EcorEns** by **SS.SSa.CMuSa** at the third site. All these sites are located at the mouth of Loch Ailort. These changes are consistent with sediment redistribution resulting from natural temporal variation in wave action and they might be expected to be reversed in due course. They are not considered to represent an indication of unfavourable condition of the attribute.

4.1.5 Extent of sub-feature

It is required that there should be no reduction in extent of the maerl and eelgrass biotopes. Both the main video survey carried out in 2014 and the localised spot video surveys of maerl extent at the five maerl beds examined by MNCR phase 2 surveys showed there to be no reduction in extent of any of these biotopes. A slight increase in the number of maerl records at sites in 2014 was considered to result from better video quality and an increase in eelgrass records from a slight locational difference at one site.

4.1.6 Species composition of representative or notable biotopes

The infaunal grab survey of representative sediment biotopes revealed no temporal changes in species richness or composition that could be considered indicative of deterioration of the habitat. A halving of species richness at one eelgrass site was believed to be possibly due to the patchiness of the habitat at the site in question.

There was variation in the maerl species recorded during the 2003 and 2014 surveys, but this difference was considered to probably result from misidentification of taxa in the earlier survey. The site attribute table (Annex 6) has been modified accordingly.

A reduction in the abundance of living maerl was recorded along the transect at site Z59T in Loch Moidart, with overall estimates of 20% in 2003 and 1-5% in 2014. However, as over half the transect supported only 1-5% cover in 2003, the temporal difference in cover values was considered to be possibly due to patchiness. Patchiness was also possibly responsible for a temporal increase in recorded maerl cover at site S6T in Loch Ailort. No significant temporal change in living maerl can be assumed at any site.

A significant reduction in infaunal taxon richness was recorded at two of the transect sites, S6T and Z59T, although this may have resulted from a corresponding reduction in faunal abundance at these sites. Dramatic seasonal variations in the fauna of maerl beds has been recorded elsewhere (Birkett *et al*., 1998) and in view of the absence of any indications of the presence of anthropogenic influence at these sites, the lack of corresponding significant reductions in species diversity and the maintenance of high epibiotic diversity, it seems likely that these recorded changes in taxon richness fall within the natural bounds of temporal variability.

4.1.7 Overall condition assessment

The result of the 2014 site condition monitoring of the Sound of Arisaig SAC is that the site should be assigned to the condition category "Favourable Maintained".

4.1.8 Recommendations

The methodological approach to condition monitoring of the sublittoral sandbank feature of the SAC is considered to have been effective for the majority of the feature attributes assessed, with the notable exception of maerl cover. The degree of maerl patchiness present at certain sites, particularly S6T and Z59T, reduces the likelihood of firm identification of real temporal change in live maerl cover. This is exacerbated if, as in the 2003 baseline survey, there are no replicated measurements of maerl cover on which to base statistical comparisons. While considerably more extensive sampling of the maerl beds would be desirable for the quantification of maerl, this has to be balanced against the narrow opportunity for sampling presented by the duration of slack water at most of the sites.

The influence of patchiness on the sensitivity of temporal change detection is likely to be reduced by the introduction of relocatable transects, with the placement of permanent markers, such as road pins, at the transect ends. This is less important for the two open water sites, C6T and O3T, where patchiness was perceived to be low, as perhaps exemplified by the close similarity in density measures in 2003 and 2014.

The influence of patchiness may be further reduced by extending the area of maerl quantification sampling. This could be achieved without significantly increasing sampling effort or survey time, by doubling the transect belt width for quadrat sampling from 2 to 4 m either side of the transect tape, producing a survey area of 200 m^2. As in the 2014 work, divers would take maerl cover estimates using 0.25 m^2 quadrats within this area using random numbers for quadrat placement. To minimise inter-worker variability and maximise temporal consistency in quantification, divers would initially receive training in cover estimation using existing photographs of quadrats taken in 2014. At least a proportion of the quadrats should be photographed to provide both a visual record of condition, as well as assessing, and if necessary adjusting, diver estimates of cover. Not all quadrats will be suitable for this purpose due to the surface cover of biota, especially algal turfs.

Significant improvement in the assessment of topographical change would necessitate the measurement, rather than the prediction, of tidal rise, bearing in mind the dependency of prediction accuracy on meteorological conditions. Measurement is likely to involve the establishment of a tide gauge levelled to a known vertical datum. It is suggested that such an approach should only be considered for six yearly monitoring where there is cause to suspect temporal change. The site attribute table (Annex 6) stipulates that a full bathymetric survey should be carried out every 18 years. On the basis of the first two SCM events in the Sound of Arisaig SAC this prescription is no longer considered necessary and the SAT has been modified accordingly. A full coverage acoustic survey would not be able to discern extent of maerl beds or distinguish proportions of live and dead maerl any more than the current approach.

4.2 Inshore deep mud with burrowing heart urchins survey

Firm identification of the biotope **SS.SMu.CFiMu.BlyrAchi** can be extremely difficult and requires consideration of both epifaunal and infaunal data. The characteristics of the biotope can be summed up as:

- Circalittoral mud
- *Amphiura chiajei* abundant
- *Amphiura filiformis* abundant
- *Brissopsis lyrifera* present
- Lacking *Pennatula* and *Funiculina*
- Lacking or low numbers of *Virgularia*

The biotope system arises from an artificial classification procedure and within a biotope complex, such as **SS.SMu.CFiMu**, the various component biotopes intergrade in such a way that unambiguous ascription to a particular biotope is often not possible, even with detailed faunal and sedimentary data. According to Connor *et al*. (2004), the **BlyrAchi** biotope can support at least one megafaunal burrower, *Nephrops norvegicus*. All of the burrowed mud biotopes (**SpnMeg**, **SpnMeg.Fun**, **MegMax**) can support abundant *Amphiura chiajei* and *A. filiformis*. Examples include **MegMax** in Loch Sween (Moore *et al*., 2013) and **SpnMeg** and **SpnMeg.Fun** in the Loch Linnhe system (Nickell *et al*., 2013). *Brissopsis lyrifera* is also known to be a component of **SpnMeg** at some sites (Connor *et al*., 2004) and is also found with **SpnMeg.Fun** (e.g. Moore *et al*., 2011). Thus the distinction between **BlyrAchi** and the other **CFiMu** biotopes is not clear-cut. In the context of the identification of suitable representative examples of the **BlyrAchi** biotope within the suite of Nature Conservation MPAs, then it is suggested that such records should have the characteristics of abundant *Amphiura* spp. (especially *A. chiajei*), the presence of *Brissopsis lyrifera* and the absence of seapens, apart from *Virgularia*, and the absence of a rich burrowing megafaunal community including *Maxmuelleria lankesteri* and thalassinidean shrimps. Unburrowed examples of the biotope are likely to be more readily identifiable.

SS.SMu.CFiMu.BlyrAchi was previously recorded at sites DM03 and DM07 in Loch nan Uamh based on a 1989 survey of the loch by Howson (1990). In 2014 the habitat recorded here, although supporting *Brissopsis* and dense populations of *Amphiura filiformis* and *A. chiajei*, was more closely referable to **SS.SMu.CFiMu.SpnMeg.Fun**, which occupied the upper region of the loch beyond the 30 m depth contour. In addition to the presence of *Funiculina*, the soft mud was worked by a suite of megafaunal burrowers including *Nephrops norvegicus*, *Maxmuelleria lankesteri* and thalassinidean shrimps. This burrowing community characterises the biotope **SMu.CFiMu.MegMax**, which was found to be widely distributed in the outer part of Loch nan Uamh, at the mouth of Loch Ailort and in the outer part of the surveyed area at depths of 33 - 67 m. The community lacked *Funiculina* but supported the sea pens *Virgularia mirabilis* and, at one site, *Pennatula phosphorea*.

The three historical records of **SS.SMu.CFiMu.BlyrAchi** in the upper basin of Loch Ailort were regarded as highly uncertain due to the very poor video quality and absence of any infaunal data (Moore *et al*., 2004). The better quality of the 2014 video footage shows two of these sites to be clearly referable to SS.SMu.IFiMu.Beg, and the third to SMu.CFiMu.MegMax. Re-examination of the 2003 video footage shows the two IFiMu.Beg sites to display the black anaerobic sediment marbling characteristic of the biotope. Comparison of the video from the 2003 and 2014 surveys does not provide any indication of temporal deterioration in habitat condition at these sites.

5. REFERENCES

Birkett, D.A., Maggs, C.A. & Dring, M.J. 1998. *Maerl (volume V). An overview of dynamic and sensitivity characteristics for conservation management of marine SACs*. Scottish Association for Marine Science. (UK Marine SACs Project). Available from <http://www.ukmarinesac.org.uk/pdfs/maerl.pdf>

Connor, D.W., Dalkin, M.J., Hill, T.O., Holt, R.H.F. & Sanderson, W.G. 1997. *Marine Biotope Classification for Britain and Ireland. Volume 2. Sublittoral Biotopes Version 97.06*. Peterborough: JNCC.

Connor, D.W., Allen, J.H., Golding, N., Howell, K.L., Lieberknecht, L.M., Northen, K.O. & Reker, J.B. 2004. *The National Marine Habitat Classification for Britain and Ireland. Version 04.05.* Peterborough: Joint Nature Conservation Committee. ISBN: 1 861 07561 8 (internet version). Available from <http://jncc.defra.gov.uk/page-1584>

Davies, J. & Hall-Spencer, J. 1996. Mapping of the benthic biotopes in the proposed Sound of Arisaig Special Area of Conservation. *Scottish Natural Heritage Research, Survey and Monitoring Report, No. 83.*

Hall-Spencer, J. 1995. *Lithothamnion corallioides* P. & H. Crouan may not extend into Scottish waters. *Coralline News*, **20**: 1-3.

Howson, C.M. 1990. Surveys of Scottish sealochs: sealochs of Arisaig and Moidart. *Nature Conservancy Council, CSD Report No. 1086.*

Howson, C.M. & Donnan, D.W. 2000. Trials of monitoring techniques for biotopes in the Sound of Arisaig cSAC. *Scottish Natural Heritage Commissioned Report F98PA09*.

JNCC. 1998. A Statement on Common Standards Monitoring. Available from <http://jncc.defra.gov.uk/page-2198>

JNCC. 2004. Common Standards Monitoring Guidance for Inshore Sublittoral Sediment Habitats Version August 2004. Available from <http://jncc.defra.gov.uk/PDF/CSM_marine_sublittoral_sediment.pdf>

Könnecker, G. & Keegan, B.F. 1973. *In situ* behavioural studies on echinoderm aggregations. *Helgolander Wissenschaftliche Meeresuntersuchungen*, **24**: 157-162.

Moore, C.G., Lyndon, A.R. & Mair, J.M. 2004. The establishment of site condition monitoring of marine sedimentary habitats in the Sound of Arisaig cSAC. *Scottish Natural Heritage Commissioned Report No. 071 (ROAME No. F02AA409).*

Moore, C.G., Harries, D.B., Trigg, C., Porter, J.S. & Lyndon, A.R. 2011. The distribution of Priority Marine Features and MPA search features within the Ullapool Approaches: a broadscale validation survey. *Scottish Natural Heritage Commissioned Report No. 422*. <http://www.snh.org.uk/pdfs/publications/commissioned_reports/422.pdf>

Moore, C.G. & James, B.D. 2011. Scoping immediate priorities for MPA-related benthic marine biological survey work in Scottish territorial waters. *Scottish Natural Heritage Commissioned Report No. 381.* <http://www.snh.org.uk/pdfs/publications/commissioned_reports/381.pdf>

Moore, C.G., Harries, D.B., Atkinson, R.J.A., Clark, L., Cook, R.L., Hirst, N.E., Saunders, G.R., Lyndon, A.R., Sanderson, W.G. & Porter, J.S. 2013. The distribution and condition of proposed protected features within the Loch Sween possible Nature Conservation MPA. *Scottish Natural Heritage Commissioned Report No. 621.* <http://www.snh.org.uk/pdfs/publications/commissioned_reports/621.pdf>

Nickell, T.D., Hughes, D.J, Hausrath, J., Gontarek, S. & Clark, L. 2013. The distribution of Priority Marine Features and MPA search features within Lochs Linnhe, Eil, Leven and Etive: a broadscale validation survey (Part A). *Scottish Natural Heritage Commissioned Report No. 501.* <http://www.snh.org.uk/pdfs/publications/commissioned_reports/501.pdf>

Smith T.B. & Keegan, B.F. 1984. Seasonal torpor in *Neopentadactyla mixta* (Ostergren) (Holothuroidea: Dendrochirotida). In *Proceedings of the Fifth International Echinoderm Conference*. Galway, 24-29 September 1984. Echinodermata., Rotterdam: A.A. Balkema.

SNH. 1996. *Unpublished ROV survey of Loch Ailort*. MNCR database survey 654.

SNH. 2010. *Condition of designated sites*. Available from <http://www.snh.gov.uk/docs/B686627.pdf>

ANNEX 1: VIDEO SCM SURVEY DATA

Table 1.1. Site details for the spot video survey. Time given as BST as this matches the video overlay display.

Site	Date	Latitude start	Longi-tude start	Latitude end	Longi-tude end	Depth start (m)	Depth end (m)	Gear	Time start (BST)	Time end (BST)
A1	22/07/2014	56.79207	-5.94800	56.79228	-5.94798	17.5	17.7	Dropdown	11:34:19	11:36:34
A2	22/07/2014	56.79587	-5.95117	56.79572	-5.95055	20.8	17.2	Dropdown	12:25:41	12:26:44
A3	22/07/2014	56.78922	-5.94670	56.78948	-5.94683	17.5	18.0	Dropdown	11:24:06	11:26:51
A5	22/07/2014	56.79480	-5.95913	56.79487	-5.95822	20.0	16.6	Dropdown	12:06:12	12:10:23
A7	22/07/2014	56.78357	-5.94987	56.78378	-5.95023	15.5	15.8	Dropdown	10:35:26	10:38:26
A8	22/07/2014	56.78672	-5.95877	56.78650	-5.95882	10.7	12.3	Dropdown	11:01:19	11:06:33
A9	22/07/2014	56.79140	-5.95367	56.79143	-5.95325	15.9	15.5	Dropdown	11:43:30	11:46:03
A10	22/07/2014	56.78272	-5.94953	56.78292	-5.95013	15.1	15.0	Dropdown	10:21:56	10:25:22
B1	22/07/2014	56.78077	-5.94297	56.78108	-5.94367	19.0	18.0	Dropdown	10:10:55	10:13:39
B3	22/07/2014	56.76367	-5.92397	56.76360	-5.92395	10.9	10.6	Dropdown	16:35:12	16:36:32
B4	22/07/2014	56.76560	-5.92823	56.76543	-5.92837	9.2	6.7	Dropdown	16:05:53	16:08:06
B5	22/07/2014	56.76568	-5.92488	56.76555	-5.92507	26.7	26.9	Dropdown	16:14:19	16:17:26
C1	23/07/2014	56.76073	-5.90085	56.76105	-5.90130	9.5	6.2	Dropdown	12:44:58	12:47:33
C2	23/07/2014	56.76060	-5.89998	56.76072	-5.90030	6.8	7.0	Dropdown	12:52:45	12:54:33
C3	23/07/2014	56.76022	-5.89480	56.76037	-5.89533	5.9	5.9	Dropdown	11:08:54	11:11:07
C4	23/07/2014	56.76332	-5.90010	56.76353	-5.90058	6.8	6.3	Dropdown	11:49:30	11:51:31
C5	23/07/2014	56.75815	-5.91307	56.75863	-5.91348	17.9	17.4	Dropdown	13:45:21	13:47:58
C6	23/07/2014	56.76457	-5.89573	56.76488	-5.89595	7.9	6.7	Dropdown	10:14:56	10:17:47
C7	23/07/2014	56.75885	-5.89965	56.75903	-5.90018	7.2	16.5	Dropdown	13:00:46	13:02:51
C8	23/07/2014	56.75668	-5.90088	56.75693	-5.90068	5.5	5.4	Dropdown	13:17:18	13:20:01
C9	23/07/2014	56.75558	-5.90537	56.75590	-5.90548	11.2	11.9	Dropdown	13:35:00	13:37:39
C10	23/07/2014	56.76125	-5.89547	56.76148	-5.89603	6.8	6.5	Dropdown	11:16:32	11:18:52
D1	23/07/2014	56.76223	-5.88107	56.76238	-5.88143	5.8	4.5	Dropdown	10:57:22	10:58:33
D2	23/07/2014	56.76440	-5.88743	56.76458	-5.88817	5.2	5.2	Dropdown	10:45:56	10:48:31
E1	23/07/2014	56.76617	-5.90790	56.76640	-5.90857	18.3	21.3	Dropdown	12:05:45	12:07:12
E3	23/07/2014	56.77115	-5.89423	56.77122	-5.89483	5.0	4.6	Dropdown	09:46:21	09:49:50
E4	02/08/2014	56.76750	-5.88575	56.76751	-5.88516	1.3	0.8	Diver	17:08:10	17:12:56
E5	23/07/2014	56.76698	-5.90132	56.76717	-5.90180	7.8	8.2	Dropdown	09:58:00	10:00:18
E6	23/07/2014	56.76462	-5.90205	56.76488	-5.90268	7.7	8.0	Dropdown	11:56:27	11:59:03
E7	23/07/2014	56.77097	-5.90272	56.77122	-5.90322	11.6	10.9	Dropdown	09:32:26	09:35:16
E8	02/08/2014	56.77037	-5.89813	56.77037	-5.89829	7.7	7.7	Diver	16:06:38	16:08:46
F1	01/08/2014	56.79150	-5.79941	56.79155	-5.79974	3.1	2.4	Mini dropdown	10:30:58	10:33:01
F2	27/07/2014	56.78975	-5.83105	56.78960	-5.83020	4.6	3.0	Dropdown	17:01:16	17:04:03
F3	01/08/2014	56.78750	-5.83223	56.78775	-5.83239	0.0	-0.3	Mini dropdown	11:01:44	11:04:28
F4	01/08/2014	56.78647	-5.80899	56.78625	-5.80924	1.1	0.4	Mini dropdown	10:41:08	10:44:26
F5	01/08/2014	56.78768	-5.81583	56.78763	-5.81636	0.2	-0.2	Mini dropdown	10:50:15	10:52:29
G1	27/07/2014	56.78627	-5.83663	56.78622	-5.83613	2.6	0.3	Dropdown	16:34:22	16:34:55
G2	27/07/2014	56.78520	-5.84312	56.78530	-5.84202	2.0	2.8	Dropdown	16:24:41	16:26:14
G3	27/07/2014	56.78810	-5.83590	56.78835	-5.83537	1.8	1.1	Dropdown	16:45:25	16:46:53
G4	27/07/2014	56.78708	-5.83665	56.78717	-5.83542	5.1	2.6	Dropdown	16:39:38	06:41:16

Table 1.1 continued

Site	Date	Latitude start	Longi-tude start	Latitude end	Longi-tude end	Depth start (m)	Depth end (m)	Gear	Time start (BST)	Time end (BST)
G5	27/07/2014	56.78975	-5.83470	56.78962	-5.83443	1.4	1.2	Dropdown	16:52:50	16:56:18
G6	27/07/2014	56.78575	-5.85025	56.78587	-5.84830	6.5	5.6	Dropdown	16:14:50	16:15:40
G7	27/07/2014	56.78252	-5.86230	56.78231	-5.86073	5.0	5.0	Dropdown	16:01:06	16:03:58
H1	22/07/2014	56.78925	-5.88403	56.78902	-5.88398	13.5	14.1	Dropdown	17:38:01	17:40:38
H2	27/07/2014	56.78763	-5.87602	56.78772	-5.87632	14.8	14.0	Dropdown	14:34:22	14:36:36
H3	27/07/2014	56.78802	-5.88047	56.78823	-5.88118	12.8	11.8	Dropdown	14:10:53	14:13:26
H4	27/07/2014	56.78843	-5.87413	56.78853	-5.87413	10.0	10.2	Dropdown	14:50:55	14:54:48
H5	27/07/2014	56.78577	-5.88167	56.78577	-5.88188	7.7	2.2	Dropdown	14:20:46	14:21:23
H6	27/07/2014	56.78228	-5.86822	56.78215	-5.86745	7.0	8.0	Dropdown	15:43:51	15:46:35
H7	01/08/2014	56.78557	-5.86350	56.78548	-5.86358	0.6	0.7	Dropdown	09:05:34	09:08:58
I5	24/07/2014	56.79630	-5.90795	56.79658	-5.90833	15.5	15.0	Dropdown	12:15:35	12:17:52
I6	22/07/2014	56.78495	-5.89152	56.78488	-5.89177	16.4	16.5	Dropdown	17:11:38	17:18:22
I8	22/07/2014	56.78717	-5.88788	56.78700	-5.88772	12.3	12.3	Dropdown	17:29:17	17:31:37
I9	23/07/2014	56.79668	-5.89430	56.79700	-5.89444	8.4	7.9	Dropdown	15:33:33	15:35:22
I11	22/07/2014	56.78325	-5.88977	56.78342	-5.88978	14.6	14.8	Dropdown	17:00:10	17:02:30
I12	23/07/2014	56.79092	-5.89697	56.79108	-5.89693	13.8	10.9	Dropdown	15:24:19	15:25:12
J2	24/07/2014	56.79947	-5.90663	56.79973	-5.90692	12.4	12.7	Dropdown	12:25:01	12:27:09
J5	24/07/2014	56.81163	-5.89377	56.81207	-5.89405	19.8	20.4	Dropdown	13:01:16	13:04:23
J6	24/07/2014	56.80160	-5.90663	56.80188	-5.90708	17.7	17.1	Dropdown	12:33:14	12:35:47
J7	23/07/2014	56.80365	-5.89492	56.80413	-5.89488	16.3	16.1	Dropdown	15:59:43	16:02:06
J8	24/07/2014	56.80778	-5.90240	56.80792	-5.90274	16.3	16.7	Dropdown	12:50:39	12:51:18
J9	24/07/2014	56.80362	-5.90595	56.80390	-5.90628	17.3	16.3	Dropdown	12:42:03	12:43:24
K2	23/07/2014	56.80440	-5.88707	56.80447	-5.88670	14.8	14.6	Dropdown	16:11:08	16:14:01
K3	23/07/2014	56.80828	-5.88530	56.80820	-5.88462	19.5	18.1	Dropdown	16:23:54	16:26:38
K4	23/07/2014	56.81215	-5.88600	56.81227	-5.88583	16.2	14.5	Dropdown	16:36:18	16:37:50
K5	23/07/2014	56.79980	-5.88940	56.80028	-5.88945	7.2	8.1	Dropdown	15:41:45	15:44:03
L1	27/07/2014	56.80192	-5.83708	56.80223	-5.83800	2.1	3.5	Dropdown	10:43:34	10:46:55
L2	27/07/2014	56.80650	-5.84950	56.80660	-5.85070	20.0	21.2	Dropdown	10:29:08	10:33:01
L4	31/07/2014	56.80063	-5.83617	56.80052	-5.83610	0.4	0.2	Dropdown	13:22:54	13:24:13
M1	27/07/2014	56.81180	-5.87170	56.81203	-5.87140	15.7	14.5	Dropdown	09:33:28	09:35:29
O1	24/07/2014	56.83348	-5.86182	56.83343	-5.86170	18.4	18.4	Dropdown	15:10:23	15:14:49
O2	24/07/2014	56.82740	-5.86602	56.82748	-5.86598	18.4	18.6	Dropdown	14:47:38	14:51:44
O3	23/07/2014	56.82345	-5.87695	56.82355	-5.87660	16.1	15.8	Dropdown	17:11:26	17:13:25
O8	24/07/2014	56.82797	-5.86877	56.82792	-5.86840	18.5	18.2	Dropdown	14:57:22	15:00:45
P1	24/07/2014	56.83460	-5.82038	56.83447	-5.82018	12.9	11.8	Dropdown	16:06:53	16:09:38
P4	24/07/2014	56.84118	-5.78968	56.84123	-5.78898	15.8	17.7	Dropdown	17:33:14	17:36:24
P5	24/07/2014	56.83195	-5.81805	56.83202	-5.81792	-0.2	-0.2	Dropdown	16:31:38	16:34:32
P7	24/07/2014	56.83758	-5.79468	56.83748	-5.79430	9.4	7.2	Dropdown	17:44:34	17:47:33
P8	24/07/2014	56.83347	-5.82053	56.83340	-5.82013	3.0	2.8	Dropdown	16:20:19	16:23:05
Q1	24/07/2014	56.84558	-5.79272	56.84577	-5.79233	24.4	22.7	Dropdown	16:59:57	17:02:11
Q1A	26/07/2014	56.84900	-5.78858	56.84926	-5.78845	14.7	13.9	Dropdown	12:40:03	12:42:23
Q1B	26/07/2014	56.84963	-5.77945	56.85008	-5.77955	4.5	4.4	Dropdown	14:45:02	14:48:20
Q2	26/07/2014	56.85555	-5.78960	56.85605	-5.78968	16.7	16.3	Dropdown	13:09:30	13:12:49
Q2A	26/07/2014	56.85752	-5.79248	56.85778	-5.79256	24.4	23.4	Dropdown	13:18:40	13:20:13
Q2B	26/07/2014	56.85290	-5.78915	56.85315	-5.78965	15.4	15.9	Dropdown	13:00:46	03:03:35
Q3	26/07/2014	56.85567	-5.78233	56.85600	-5.78182	5.2	4.8	Dropdown	14:23:39	14:26:45

Table 1.1 continued

Site	Date	Latitude start	Longi-tude start	Latitude end	Longi-tude end	Depth start (m)	Depth end (m)	Gear	Time start (BST)	Time end (BST)
Q3A	26/07/2014	56.85695	-5.78415	56.85708	-5.78390	3.8	4.2	Dropdown	14:08:27	14:09:59
Q3B	26/07/2014	56.84768	-5.78885	56.84807	-5.78878	14.6	14.6	Dropdown	12:31:16	12:34:10
Q4	26/07/2014	56.85135	-5.79183	56.85168	-5.79242	17.3	18.2	Dropdown	12:51:12	12:54:16
Q4A	26/07/2014	56.85820	-5.78062	56.85845	-5.78045	3.4	3.1	Dropdown	14:14:51	14:17:31
R1	26/07/2014	56.85675	-5.76267	56.85663	-5.76130	3.2	2.7	Dropdown	16:29:19	16:31:56
R2	26/07/2014	56.85022	-5.76335	56.85043	-5.76223	2.5	2.5	Dropdown	15:48:11	15:53:10
R3	26/07/2014	56.85384	-5.76510	56.85396	-5.76391	5.5	5.1	Dropdown	16:13:30	16:17:38
R4	26/07/2014	56.85527	-5.76722	56.85525	-5.76608	5.6	4.8	Dropdown	16:37:57	16:39:44
R5	26/07/2014	56.85527	-5.76332	56.85567	-5.76240	3.8	4.2	Dropdown	16:22:55	16:24:43
R6	26/07/2014	56.84480	-5.77833	56.84543	-5.77820	18.3	16.3	Dropdown	15:05:05	15:08:45
R7	26/07/2014	56.85460	-5.77378	56.85472	-5.77213	7.0	6.8	Dropdown	16:53:26	16:56:12
R8	26/07/2014	56.84548	-5.77317	56.84602	-5.77263	4.9	4.7	Dropdown	15:16:14	15:20:39
R9	26/07/2014	56.85382	-5.77067	56.85402	-5.76952	6.0	6.3	Dropdown	16:45:26	16:48:15
R10	26/07/2014	56.84745	-5.76682	56.84794	-5.76630	2.3	2.6	Dropdown	15:35:50	15:39:43
R11	26/07/2014	56.84743	-5.77235	56.84787	-5.77210	4.3	4.4	Dropdown	15:26:09	15:28:54
R12	26/07/2014	56.84938	-5.77615	56.84977	-5.77590	5.7	5.0	Dropdown	14:54:09	14:57:25
S1	31/07/2014	56.84897	-5.73018	56.84895	-5.73048	7.1	5.2	Dropdown	09:05:04	09:07:36
S2	31/07/2014	56.84856	-5.73771	56.84857	-5.73841	-0.1	1.0	Mini dropdown	10:49:44	10:53:30
S3	31/07/2014	56.85050	-5.74760	56.85047	-5.74715	1.5	1.6	Dropdown	08:19:05	08:21:05
S4	31/07/2014	56.84912	-5.74738	56.84907	-5.74665	1.5	1.6	Dropdown	08:25:04	08:29:28
S5	31/07/2014	56.85180	-5.75163	56.85167	-5.75062	1.5	0.8	Dropdown	07:40:11	07:42:37
S6	31/07/2014	56.85297	-5.75130	56.85302	-5.75027	2.4	1.3	Dropdown	08:00:32	08:04:00
S7	31/07/2014	56.84679	-5.74256	56.84690	-5.74239	1.5	1.7	Mini dropdown	10:59:14	11:01:24
T1	31/07/2014	56.84863	-5.71958	56.84857	-5.71968	3.7	4.1	Mini dropdown	10:13:24	10:15:50
T2	28/07/2014	56.85823	-5.70970	56.85832	-5.70963	5.6	5.1	Dropdown	16:23:12	16:24:36
T3	28/07/2014	56.86007	-5.71138	56.86008	-5.71080	7.2	6.0	Dropdown	16:01:14	16:02:08
T4	31/07/2014	56.84500	-5.72878	56.84502	-5.72888	3.8	3.4	Dropdown	09:26:06	09:28:06
T6	28/07/2014	56.85873	-5.71155	56.85870	-5.71107	7.3	5.3	Dropdown	16:07:47	16:12:05
T7	28/07/2014	56.85555	-5.71458	56.85597	-5.71425	13.7	16.1	Dropdown	16:30:38	16:34:26
T8	28/07/2014	56.84478	-5.72357	56.84478	-5.72368	7.8	7.9	Dropdown	17:06:41	17:10:12
T9	28/07/2014	56.85452	-5.71520	56.85468	-5.71495	3.1	4.3	Dropdown	16:40:52	16:43:43
X16	23/07/2014	56.76153	-5.90617	56.76185	-5.90677	19.2	24.1	Dropdown	12:34:28	12:36:47
X50	27/07/2014	56.81095	-5.87177	56.81117	-5.87142	13.4	9.7	Dropdown	09:41:01	09:43:45
Y10	31/07/2014	56.84675	-5.72918	56.84670	-5.72925	5.9	5.7	Dropdown	09:12:38	09:16:00
Y11	28/07/2014	56.84602	-5.72452	56.84598	-5.72398	10.7	10.8	Dropdown	17:16:35	17:20:15
Z1	23/07/2014	56.76552	-5.89002	56.76578	-5.89032	9.3	6.2	Dropdown	10:37:57	10:39:04
Z2	31/07/2014	56.78622	-5.89766	56.78606	-5.89859	16.9	16.9	Dropdown	14:05:28	14:08:35
Z9	23/07/2014	56.80100	-5.89302	56.80140	-5.89312	12.4	12.6	Dropdown	15:51:23	15:53:21
Z17	26/07/2014	56.85320	-5.77693	56.85355	-5.77673	7.6	7.0	Dropdown	14:33:52	14:36:58
Z20	24/07/2014	56.84197	-5.78365	56.84213	-5.78303	15.9	16.6	Dropdown	17:23:31	17:26:20
Z26	24/07/2014	56.83540	-5.82978	56.83525	-5.82953	4.8	3.0	Dropdown	15:54:03	15:57:43
Z27	31/07/2014	56.84795	-5.73897	56.84782	-5.73837	6.8	6.5	Dropdown	08:36:48	08:41:08
Z33	28/07/2014	56.84798	-5.71635	56.84833	-5.71575	6.5	4.7	Dropdown	16:56:10	16:57:56

Table 1.1 continued

Site	Date	Latitude start	Longi-tude start	Latitude end	Longi-tude end	Depth start (m)	Depth end (m)	Gear	Time start (BST)	Time end (BST)
Z34	31/07/2014	56.85108	-5.73527	56.85091	-5.73507	-0.4	2.2	Mini dropdown	10:29:05	10:30:33
Z41	26/07/2014	56.85313	-5.75985	56.85295	-5.75832	2.9	3.7	Dropdown	16:00:56	16:03:41
Z43	31/07/2014	56.85047	-5.75706	56.85047	-5.75733	1.2	1.3	Mini dropdown	11:09:26	11:13:09
Z51	24/07/2014	56.82668	-5.86465	56.82687	-5.86440	15.7	15.2	Dropdown	14:39:40	14:42:10
Z57	27/07/2014	56.78205	-5.86383	56.78197	-5.86295	7.3	7.7	Dropdown	15:51:52	15:53:27
Z58	01/08/2014	56.78542	-5.86472	56.78525	-5.86465	0.9	0.8	Dropdown	08:59:30	09:02:01
Z59	27/07/2014	56.78702	-5.87237	56.78693	-5.87210	9.7	9.5	Dropdown	15:13:06	15:17:46
Z67	27/07/2014	56.80700	-5.86070	56.80690	-5.86082	6.1	6.4	Dropdown	10:04:18	10:07:52

Table 1.2. *Substrates, biota and initial biotopes recorded during the spot video survey.*

Site	Substrate	Biota	Biotope	Comments
A1	Waves of maerl/maerl gravel, with shells and some pebbles concentrated in troughs	Maerl bed, with live *Phymatolithon calcareum* concentrated in troughs (locally C) but also scattered over crest areas - F overall. *Lanice conchilega*? (P)	SS.SMp.Mrl.Pcal.Nmix	
A2	Waves of maerl/maerl gravel	Live *Phymatolithon calcareum* mostly <5% (R) but possibly F locally	SS.SMp.Mrl.Pcal.Nmix	
A3	Waves of maerl/maerl gravel, with shells concentrated in troughs	*Phymatolithon calcareum* concentrated in troughs (where F) but also scattered over crest areas at lower abundance. *Liocarcinus* spp. (O), serpulids on shells (R)	SS.SMp.Mrl.Pcal.Nmix	
A5	Waves of maerl, with shells concentrated in troughs	Maerl bed, with live *Phymatolithon calcareum* in troughs and on crests (F, locally C). *Pecten maximus* (P), *Aequipecten opercularis*? (P), *Marthasterias glacialis* (P), *Chaetopterus variopedatus*? (P), serpulid worms (R)	SS.SMp.Mrl.Pcal.Nmix	
A7	Poorly sorted medium-coarse sand with gravel (including possibly some maerl gravel), pebbles and scattered cobbles	Sparse algal clumps including foliose (R) and filamentous reds (O), juvenile *Saccharina latissima* (O). Fauna includes *Lanice conchilega* (O), *Marthasterias glacialis* (P), *Callionymus* sp. (P), serpulid worms (R) and *Cancer pagurus* (P)	SS.SCS.ICS	Uncertain. Algae too sparse for KSwSS
A8	Bedrock and boulders with small sand patches	Rock supports forest of *Laminaria hyperborea* (A) and understorey of red foliose and filamentous algae (C-A). Pink coralline algae (P), *Echinus esculentus* (P), Labridae sp. (P), *Marthasterias glacialis* (P)	IR.MIR.KR.Lhyp.Ft	
A9	Waves of maerl/maerl gravel, with shells concentrated in troughs	*Phymatolithon calcareum* concentrated in troughs (where C locally) but also scattered over crest areas at lower abundance (overall F). *Cancer pagurus* (P), red algal tufts (R)	SS.SMp.Mrl.Pcal.Nmix	
A10	Poorly sorted shelly medium-coarse sand with shells	Sparse algal tufts (O) including reds and *Dictyota dichotoma* (R). *Lanice conchilega* (P), *Liocarcinus* sp. (P)	SS.SCS.CCS	Uncertain. Algae too sparse for KSwSS. Could be ICS

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
B1	Poorly mixed silty sand with gravel, shell material and scattered pebbles and cobbles	Crab pits (P), *Liocarcinus* sp. (R), *Pecten maximus* (P), *Cerianthus lloydii* (R), *Luidia ciliaris* (P), mollusc egg mass (P), single *Nephrops norvegicus* burrow	SS.SSa.CMuSa	Uncertain
B3	Sand with scattered pebbles and sparsely scattered cobbles	Patchy algal turf composed principally of reds (S), with *Dictyota dichotoma* (P), *Desmarestia aculeata* (P) and *Saccharina latissima* (O)	SS.SMp.KSwSS.LsacR.Sa	
B4	Coarse sand with scattered pebbles	Dense algal turf (c.90% cover), although much of the material may be drift. Turf includes reds (A), *Saccharina latissima*, *Laminaria hyperborea*, *Desmarestia aculeata* and *Ulva* sp. *Pomatoschistus pictus* (P), *Echinus esculentus* (P)	SS.SMp.KSwSS.LsacR.Sa	
B5	Soft, hummocked mud	Mud moderately densely burrowed by *Nephrops norvegicus* (C), *Jaxea nocturna* (F), *Callianassa subterranea* (P) and *Maxmuelleria lankesteri* (P). *Lesueurigobius friesii* (P)	SS.SMu.CFiMu.MegMax	
C1	Slightly silty fine sand with scattered shells	Very sparse algae including *Chorda filum* (F), *Saccharina latissima* (P), *Ulva* (R) and filamentous reds (R). Brachyura (O) including *Liocarcinus* sp. (P), *Asterias rubens* (P), Paguridae sp. (R)	SS.SSa.IFiSa	Uncertain biotope. Algae too sparse for KSwSS
C2	Sand with scattered surface gravel, pebbles and shells	*Saccharina latissima* (C) and *Chorda filum* (C), with patchy algal turf including filamentous reds, *Desmarestia aculeata*? (P) and *Asperococcus bullosus* (P). Juvenile gadoids (P)	SS.SMp.KSwSS.LsacR.Sa	
C3	Maerl	Live *Phymatolithon calcareum* F-C at least locally. Algal turf covering c. 50% of substrate with *Saccharina latissima* (C), *Laminaria hyperborea* (P), *Desmarestia aculeata* (P), *Chorda filum* (P), *Asperococcus bullosus* (P), *Ulva* sp. (P), filamentous reds (P), including *Asparagopsis armata*. *Callionymus* sp. (P)	SS.SMp.Mrl.Pcal.R	
C4	Sand with scatter of dead maerl and shells	Algal turf c. 40% cover including *Saccharina latissima* (F), *Chorda filum* (P), *Desmarestia aculeata* (P), *Ulva* sp. (P), filamentous red algae (C). Sparse live *Phymatolithon calcareum* (R). *Liocarcinus* sp. (P)	SS.SMp.KSwSS.LsacR.Sa	

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
C5	Sandy mud or muddy sand	Sparse megafaunal burrows and small mounds, probably including *Nephrops norvegicus* (P), *Callianassa subterranea* (P) and possibly *Goneplax rhomboides* (P). *Virgularia mirabilis* (O), *Amphiura* spp. (S), *Asterias rubens* (F), *Liocarcinus* sp. (R). Drift kelp	SS.SMu.CFiMu.SpnMeg	Uncertain biotope - sandy and poorly developed burrowing fauna
C6	Low waves of maerl	Algal turf c. 25% cover, largely concentrated in troughs and dominated by browns, especially *Desmarestia aculeata* (F), *Saccharina latissima* (C) and *Dictyota dichotoma* (P), with reds also present. Live *Phymatolithon calcareum* possibly F. *Liocarcinus* sp. (P), juvenile gadoids (P)	SS.SMp.Mrl.Pcal.R	
C7	Silty sand with surface scatter of dead maerl and shells, dense in places	Patchy algal turf including filamentous reds, *Desmarestia aculeata*, *Ulva* sp. (R). *Chorda filum* (C), *Saccharina latissima* (C). Live *Phymatolithon calcareum* apparently sparse (R)	SS.SMp.KSwSS.LsacR.Sa	
C8	Fine sand	*Saccharina latissima* (F), *Chorda filum* (C), sparse algal clumps (some possibly drift) including filamentous reds (R) and *Ulva* sp. *Cerianthus lloydii* (P), *Asterias rubens* (P), juvenile gadoids (P)	SS.SMp.KSwSS.LsacR.Sa	Biotope uncertain - sparse algae
C9	Silty sand with scattered shells	*Virgularia mirabilis* F, *Amphiura* spp. (A, S locally), Paguridae sp. (P), Pleuronectiformes sp. (P). Algae include *Saccharina latissima* (O) and filamentous reds (O), some of which may be drift material	SS.SMu.CSaMu.VirOphPmax	Biotope uncertain - sediment sandy
C10	Waves of maerl	Algal turf c. 50% cover, largely concentrated in troughs and including *Dictyota dichotoma* (P), *Desmarestia aculeata* (P), *Chorda filum* (P), *Saccharina latissima* (C), *Ulva* sp. (P) and filamentous reds (C) including *Asparagopsis armata* (P) Live *Phymatolithon calcareum* possibly F. *Lanice conchilega* (P)	SS.SMp.Mrl.Pcal.R	
D1	Dead maerl on sand	Live *Phymatolithon calcareum* present and possibly F locally. Fairly light patchy algal turf including *Chorda filum* (C) and *Saccharina latissima* (O). *Cerianthus lloydii* (P), *Carcinus maenas* (P)	SS.SMp.Mrl.Pcal.R	Uncertain biotope
D2	Sand with scattered dead maerl	Algal turf c. 25% cover including *Chorda filum* (A), *Saccharina latissima* (F), *Asperococcus bullosus* (P), Ectocarpaceae spp. (P), with reds and *Ulva* sp. also present. Live *Phymatolithon calcareum* probably R. *Lanice conchilega* (P), *Cerianthus lloydii* (P)	SS.SMp.KSwSS.LsacR.Sa	
E1	Silty sand with shell material, dense in places	Patchy and fairly sparse algal turf including filamentous reds (O) and *Saccharina latissima* (F)	SS.SMp.KSwSS.LsacR.Sa	Uncertain biotope

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
E3	Low waves of maerl	Algal turf c. 30% cover, concentrated in troughs, apparently dominated by browns, especially *Chorda filum* (A), *Dictyota dichotoma* (P), *Saccharina latissima* (F), *Desmarestia aculeata* (P) and *Asperococcus bullosus* (P), with reds also present. Live *Phymatolithon calcareum* (probably F). *Asterias rubens* (P)	SS.SMp.Mrl.Pcal.R	
E4	Maerl	*Chorda filum* (C), sparse algal turf (c.10-20% cover) dominated by browns, especially Ectocarpaceae sp. (F); *Asperococcus* sp. (R), *Fucus serratus*? (R), *Ulva* sp. (R), filamentous green alga (R). Patches of *Zostera marina* (locally A) with *Arenicola marina* (P)	SS.SMp.KSwSS.LsacR.Gv, SS.SMp.SSgr.Zmar	Uncertain LsacR.Gv biotope. Bed of dead maerl
E5	Fine sand with surface scatter of dead maerl	Patchy algal turf (c. 30% cover) including *Saccharina latissima* (F), red algae (F), *Dictyota dichotoma* (P), *Chorda filum* (P), *Codium fragile*? (R), *Ulva* sp. (R)	SS.SMp.KSwSS.LsacR.Sa	
E6	Coarse sand with shells and scattered dead maerl locally	Algal cover c. 30% including filamentous reds (C), *Saccharina latissima* (F), *Desmarestia aculeata* (P) and *Ulva* sp. (P). Live *Phymatolithon calcareum* (R). *Asterias rubens* (P)	SS.SMp.KSwSS.LsacR.Sa	
E7	Scattered dead maerl on sand	Patches of live *Phymatolithon calcareum* (locally F). Patchy algal turf (c. 30% cover) including foliose and filamentous reds (C), browns including *Saccharina latissima* (F), *Laminaria hyperborea* (P), *Dictyota dichotoma* (P) and *Desmarestia aculeata* (P), and *Ulva* sp. (R). *Lanice conchilega* (P), *Liocarcinus* sp. (P), juvenile gadoids (P)	SS.SMp.Mrl.Pcal.R	Poor maerl bed
E8	Sand with scattered dead maerl, pebbles and shells	Patchy live *Phymatolithon calcareum* (F). Fairly sparse algal turf includes *Dictyota dichotoma* (O), *Saccharina latissima* (P), *Ulva* sp. (R) and filamentous reds (O-F). *Liocarcinus* sp. (P), *Anemonia viridis* (P), drift kelp	SS.SMp.Mrl.Pcal.R	Poor example of biotope
F1	Fine sand with scattered *Ensis* shells	*Arenicola marina* (C), *Carcinus maenas* (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope
F2	Rippled fine sand with sparsely scattered *Ensis* shells	Very sparse algal clumps, although becoming more extensive locally towards end if the run	SS.SSa.IMuSa.EcorEns	Uncertain biotope
F3	Fine sand with sparse *Ensis* shells	*Chorda filum* (C) and sparse algal clumps (R). *Arenicola marina* (F-C), Gobiidae sp. (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope
F4	Fine sand with patches of shells, especially *Ensis*	Chorda filum (C) and sparse clumps of algae (R) including Ulva sp. Drift kelp. Carcinus maenas? (P), *Crossaster papposus* (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
F5	Fine sand with some *Ensis* shells	*Arenicola marina* (O), *Chorda filum* (O), algal tufts (R)	SS.SSa.IMuSa.EcorEns	Uncertain biotope
G1	Rippled fine sand, with possibly black anaerobic marbling	Patches of probably drift algal material	SS.SSa.IMuSa.EcorEns	Uncertain biotope
G2	Sand with scattered shells	Algal turf with c. 50% cover. *Chorda filum* (A), red filamentous algae (P), *Ulva* sp. (R), Brachyura sp. (P). Fast run with poor detail discernible	SS.SMp.KSwSS.LsacR.Sa	
G3	Fine-medium sand with scattered shell gravel	Patchy algal turf, probably dominated by filamentous red algae. *Chorda filum* (A), *Saccharina latissima*? (P), *Ulva* sp. (R)	SS.SMp.KSwSS.LsacR.Sa	
G4	Sand with dense pebbles and scattered *Ensis* shells locally	Mostly dense algal turf apparently dominated by filamentous red algae (S locally). Pebbles support serpulid worms (P) and *Ascidiella* sp. (P)	SS.SMp.KSwSS.LsacR.Sa	Uncertain biotope
G5	Rippled fine sand with sparsely scattered *Ensis* shells	Vey sparse algal clumps, drift algae, *Chorda filum* (O-F). *Carcinus maenas* (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope
G6	Medium sand with scattered shells, especially *Ensis*, and dead maerl gravel?	Patchy algal turf (c. 50% cover) with filamentous reds (P) and *Saccharina latissima*? (P)	SS.SMp.KSwSS.LsacR.Sa	
G7	Medium sand with scattered shells, especially *Ensis,* dense locally	Generally fairly sparse algal turf (F) but very patchy and locally dense. *Saccharina latissima* (F), filamentous reds algae (P), *Chorda filum* (F), *Ulva* sp. (R), *Carcinus maenas*? (P)	SS.SMp.KSwSS.LsacR.Sa	
H1	Coarse sand and gravel with dense shell patches, especially *Ensis*	Sparse algal clumps (R), *Lanice conchilega* (P), *Nemertesia ramosa* (F), *Hyas* sp.? (R), *Alcyonidium diaphanum* (R), *Neopentadactyla mixta* (P)	SS.SCS.CCS.Nmix	
H2	gravel and coarse sand with pebbles and shells, locally dense	Stones and shells encrusted with *Balanus* spp. (R) and serpulid worms (R) and supporting very sparse red foliose algae (R), *Ulva* sp. (R), *Dictyota dichotoma* (R, hydroids (R) and *Alcyonium digitatum* (R). *Callionymus* sp. (R), Gobiidae sp. (P), juvenile gadoids (R), *Carcinus maenas* (P), *Liocarcinus* sp. (O), *Marthasterias glacialis* (P)	SS.SCS.CCS	
H3	Coarse sand and gravel with dense shell patches, especially *Ensis,* and latterly pebbles	Shells and stones support serpulid worms (P), *Clavelina lepadiformis* (R), *Nemertesia ramosa* (R), *Metridium senile* (R), red foliose algae (R), pink coralline algae (P), *Urticina* sp. (R). *Asterias rubens* (O), *Liocarcinus* sp. (O), juvenile gadoids (P), *Phymatolithon calcareum* (R)	SS.SCS.CCS	

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
H4	Coarse sand and gravel with scattered shells	Sparse algal tufts, apparently mostly filamentous reds (O), with *Chorda filum* (R) and Ectocarpaceae sp. (R). *Cerianthus lloydii* (C), *Anemonia viridis*? (R), *Halecium halecinum*? (R), Gobiidae sp. (P), *Liocarcinus* sp. (P), *Asterias rubens* (P)	SS.SCS.CCS	
H5	Coarse sand and gravel with scattered *Ensis* shells	Sediment with around 50% coverage by algae, some possibly drift, including *Saccharina latissima* (F), *Chorda filum* (P), filamentous and foliose reds (P) and *Ulva* sp. (O)	SS.SMp.KSwSS.LsacR.Sa	Uncertain biotope
H6	Sand with scattered gravel and pebbles, locally dense	Very patchy algal turf (locally S), apparently predominantly filamentous reds, with foliose reds (P), *Saccharina latissima* (O) and *Chorda filum* (O). *Cerianthus lloydii* (P), *Liocarcinus* sp. (P), *Asterias rubens* (O), Paguridae sp. (P)	SS.SMp.KSwSS.LsacR.Sa	Uncertain biotope
H7	Fine-medium sand with shell material and scattered *Ensis* shells	*Chorda filum* (C), *Saccharina latissima* (R) and sparse algal clumps (O). Juvenile gadoids (P), Gobiidae sp. (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope
I5	Waves of maerl	Live *Phymatolithon calcareum* F overall but C-A in troughs. *Liocarcinus* sp. (P), *Echinus esculentus* (P)	SS.SMp.Mrl.Pcal.Nmix	
I6	Waves of maerl and stone gravel, with shells in troughs	Sparse live Phymatolithon calcareum, although possibly F locally in troughs. Juvenile gadoids, foliose red algae (R)	SS.SMp.Mrl.Pcal.Nmix	
I8	Sand with dead maerl and densely scattered pebbles and cobbles	Sparse maerl bed with live *Phymatolithon calcareum* F in patches. Dense algal turf (around 50% cover) with red algae (A) and browns including *Dictyota dichotoma* (O), *Saccharina latissima* (F) and *Laminaria hyperborea*? (P). *Lanice conchilega* (F), *Cancer pagurus* (P), *Asterias rubens* (P)	SS.SMp.Mrl.Pcal.R	
I9	Coarse sand	Drift algae including kelp	SS.SCS.ICS	
I11	Slightly silty medium-coarse sand with sparsely scattered pebbles, cobbles and isolated boulders	Stones support sparse tufts of red algae (R), serpulid worms (R) and pink coralline algae. *Lanice conchilega* (P), *Liocarcinus* sp. (P), juvenile gadoids (P)	SS.SCS.CCS	Biotope uncertain. Could be CMx or IMX initially
I12	Maerl gravel between boulders	Live *Phymatolithon calcareum* possibly F locally. Boulders support *Laminaria hyperborea* and red algal turf including *Delesseria sanguinea*	SS.SMp.Mrl.Pcal.R	Uncertain. Could be Pcal.Nmix
J2	Waves of maerl/maerl gravel	Live *Phymatolithon calcareum* concentrated in troughs where F locally.	SS.SMp.Mrl.Pcal.Nmix	

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
J5	Predominantly coarse sand but with scattered pebbles, cobbles and boulders	Sediment with much drift kelp. *Callionymus lyra* (P). Rock supports sparse *Laminaria hyperborea* (O), pink coralline algae (C), sparse foliose algae (O) including reds and *Dictyota dichotoma*, *Balanus* spp. (P) and serpulid worms (P). *Echinus esculentus* (F), *Asterias rubens* (P), *Botryllus schlosseri*	SS.SCS.CCS, IR.MIR.KR.Lhyp.Pk	Uncertain biotope. Mosaic with kelp park
J6	Waves of maerl	Live *Phymatolithon calcareum* concentrated in troughs where F locally.	SS.SMp.Mrl.Pcal.Nmix	
J7	Waves of maerl	Live *Phymatolithon calcareum* on crests but concentrated in troughs where C locally. *Neopentadactyla mixta* (P)	SS.SMp.Mrl.Pcal.Nmix	
J8	Waves of maerl	Live *Phymatolithon calcareum* concentrated in troughs where C in a narrow band	SS.SMp.Mrl.Pcal.Nmix	
J9	Waves of maerl	Live *Phymatolithon calcareum* concentrated in troughs where C in a narrow band	SS.SMp.Mrl.Pcal.Nmix	
K2	Waves of maerl	Live *Phymatolithon calcareum* concentrated in troughs where C in a narrow band	SS.SMp.Mrl.Pcal.Nmix	
K3	Flat medium sand	*Cancer pagurus* (P), drift kelp	SS.SSa.IFiSa	Uncertain biotope
K4	Waves of coarse sand	No sediment biota seen	SS.SCS.CCS	
K5	Maerl	Live *Phymatolithon calcareum* (C, at least locally) and supporting algal turf of c. 30 % cover. Flora dominated by *Dictyota dichotoma* (C), with *Saccharina latissima* and foliose and filamentous red algae including *Asparagopsis armata*	SS.SMp.Mrl.Pcal.R	
L1	Black anaerobic mud becoming cleaner throughout run	Initially *Beggiatoa* patches. *Liocarcinus* sp. (P), Brachyura sp. (P)	SS.SMu.IFiMu.Beg	
L2	Coarse sand and gravel with shells and pebbles	*Neopentadactyla mixta* (F), *Carcinus maenas* (O), *Liocarcinus* sp. (P), *Asterias rubens* (O), *Henricia* sp.? (R), *Aequipecten opercularis* (P)	SS.SCS.CCS.Nmix	
L4	Mud with black anaerobic marbling	*Arenicola marina* hummocks (F)	SS.SMu.IFiMu.Beg	
M1	Silty sand with surface scatter of dead shells and sparse dead maerl	Sink for dead algae with dense drift kelp (both *Saccharina latissima* and *Laminaria hyperborea*) and *Desmarestia aculeata*	SS.SSa.IMuSa	Biotope uncertain
O1	Waves of coarse sand and maerl gravel with gravel and pebbles in troughs	Stones encrusted with pink coralline algae, *Balanus* spp. and serpulid worms and supporting sparse filamentous red algae (R). Live *Phymatolithon calcareum* very sparse (<1% - R). *Asterias rubens* (P)	SS.SCS.CCS	

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
O2	Waves of coarse sand with gravel and pebbles in troughs	Stones encrusted with pink coralline algae (R) and serpulid worms and supporting very sparse filamentous red algae (R). One thallus of live *Phymatolithon calcareum* seen. Juvenile gadoids (P)	SS.SCS.CCS	
O3	Waves of maerl	Live maerl *Phymatolithon calcareum* concentrated in troughs where locally F	SS.SMp.Mrl.Pcal.Nmix	
O8	Coarse sand and maerl gravel with varying densities of pebbles, cobbles and occasional boulders	Small stones encrusted with pink coralline algae, serpulid worms and *Balanus* spp. and supporting hydroid clumps (R), filamentous and foliose red algae (O) and *Dictyota dichotoma* (R). *Laminaria hyperborea* (O), *Saccharina latissima*? (P), *Marthasterias glacialis* (P), *Echinus esculentus* (P), juvenile gadoids (P). Live *Phymatolithon calcareum* very sparse (<1% - R)	SS.SMp.KSwSS.LsacR.CbPb, SS.SCS.CCS	Uncertain biotope. Mosaic with SS.SCS.CCS
P1	Silty fine sand	*Amphiura* spp. (S), *Turritella communis* shells (O), *Arenicola marina* (P), *Lanice conchilega* (P). Sparse algal clumps, some of which may be drift, including filamentous and foliose reds (O), *Ulva* sp., *Dictyota dichotoma* (R) and *Saccharina latissima* (F)	SS.SSa.IMuSa	Uncertain biotope. Could be KSwSS
P4	Muddy sand	Small mounds and sparse megafaunal burrows including possibly *Nephrops norvegicus* (F). *Amphiura* spp. (A), *Arenicola marina* (P), *Turritella communis* shells (O)	SS.SSa.CMuSa	Uncertain biotope
P5	Shelly fine sand with scattered *Ensis* shells	Algal patches including *Chorda filum* (C), Ectocarpaceae sp. (F) and *Saccharina latissima* (O), some possibly drift material. Gobiidae sp. (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope
P7	Fine-medium sand	Algal turf covering c. 50% of seabed, although much of it possibly drift material. *Saccharina latissima* (C), *Desmarestia aculeata* (C), *Dictyota dichotoma* (F), filamentous red algae (P). *Lanice conchilega* (P)	SS.SMp.KSwSS.LsacR.Sa	
P8	Fine-medium sand	*Zostera marina* (A) but patchy. Patchy algal turf (F, possibly much of it drift material) including *Saccharina latissima* (O), *Desmarestia aculeata* (P), *Dictyota dichotoma* (P), *Ulva* sp. (R) and probably reds (P). *Liocarcinus* sp. (P)	SS.SMp.SSgr.Zmar	
Q1	Silty, shelly, gravelly sand with dense cobbles and pebbles	Stones encrusted with pink coralline algae (O) and serpulid worms (F) and supporting very sparse foliose red algae (R) and hydroids (O). *Lanice conchilega* (P), *Munida rugosa* (F)	SS.SMx.CMx	Uncertain biotope
Q1A	Waves of coarse sand with shells and pebbles in troughs	Sparse algae including *Saccharina latissima* (O) and filamentous (O) and foliose (R) reds. Scattered thalli of *Phymatolithon calcareum* (R)	SS.SCS.CCS	

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
Q1B	Medium sand	Patchy *Zostera* bed with *Zostera marina* (C). Algal turf with c. 40% coverage including *Saccharina latissima* (C), *Chorda filum* (F), filamentous reds (F) including *Asparagopsis armata* (P), *Ulva* sp. (F) and *Desmarestia aculeata* (O). *Necora puber* (P), *Carcinus maenas* (P), *Asterias rubens* (P)	SS.SMp.SSgr.Zmar	
Q2	Dense pebbles and cobbles on coarse sand	Stones encrusted with pink coralline algae (O), serpulid worms (P) and *Balanus* spp. (P) and supporting turf of filamentous and foliose red algae (C), *Saccharina latissima* (F), *Laminaria hyperborea* (F) and *Dictyota dichotoma* (P). *Lanice conchilega* (P), juvenile gadoids (P)	SS.SMp.KSwSS.LsacR.CbPb	Uncertain biotope
Q2A	Dense shells and scattered pebbles and dead maerl on silty sand	Stones and shells with sparse pink coralline algae (R). Drift weed	SS.SMx.CMx	Uncertain biotope
Q2B	Coarse sand and stone gravel with some maerl gravel, pebbles and shells	A few thalli of *Phymatolithon calcareum* but R. Stones support serpulid worms (R) and filamentous red algae (R). Small *Laminaria hyperborea*? (P)	SS.SCS.CCS	
Q3	Fine-medium sand	*Saccharina latissima* (F), *Chorda filum* (C), patchy algal turf including *Ulva lactuca* (F), filamentous reds (O), Ectocarpaceae sp. (O). *Asterias rubens* (O), *Liocarcinus* sp. (P), *Cerianthus lloydii* (R), Paguridae sp. (P)	SS.SMp.KSwSS.LsacR.Sa	
Q3A	Coarse sand with scattered shells	*Saccharina latissima* (P), *Chorda filum* (C), Ectocarpaceae sp. (F), algal tufts including filamentous reds (O) and browns (P). *Liocarcinus* sp. (P)	SS.SMp.KSwSS.LsacR.Sa	Uncertain biotope
Q3B	Gravelly coarse sand with scattered pebbles	*Saccharina latissima* (F), generally sparse filamentous and foliose red algae (F). Pebbles encrusted with pink coralline algae (P)	SS.SMp.KSwSS.LsacR.Gv	Uncertain biotope
Q4	Dense gravel, pebbles and cobbles on sand	Stones encrusted with pink coralline algae (F), serpulid worms (P) and *Balanus* spp. (P) and supporting patchy turf of foliose and filamentous red algae (C) and *Dictyota dichotoma* (R). Kelp present may be drift material. *Lanice conchilega* (O), *Liocarcinus* sp. (P)	SS.SMp.KSwSS.LsacR.CbPb	Uncertain biotope
Q4A	Sand with scattered maerl	Sparse maerl bed, with *Phymatolithon calcareum* F locally. *Saccharina latissima* (O), *Chorda filum* (C-A), *Desmarestia aculeata*? (P), *Asterias rubens* (P), *Liocarcinus* sp. (P)	SS.SMp.Mrl.Pcal.R	

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
R1	Sand with scattered gravel	Algal cover c. 20% with *Saccharina latissima* (C), *Chorda filum* (C), Ectocarpaceae sp. (P), *Dictyota dichotoma*? (P), *Asperococcus bullosus* (P), filamentous red algae (F). *Asterias rubens* (O)	SS.SMp.KSwSS.LsacR.Sa	
R2	Medium sand	Patchy *Zostera* bed with *Zostera marina* locally C-A. *Laminaria hyperborea* (C), *Halidrys siliquosa* (O), red foliose and filamentous algae (O), *Ulva* sp. (R), *Asterias rubens* (O)	SS.SMp.SSgr.Zmar	
R3	Gravel, pebbles and scattered cobbles and possibly boulders	Larger stones support *Laminaria hyperborea* (F), *Saccharina latissima* (O-F) and *Halidrys siliquosa* (O). *Chorda filum* (F), *Dictyota dichotoma* (P), *Desmarestia aculeata* (R), *Ulva* sp. (P), filamentous and foliose red algae (O) including *Asparagopsis armata* (P). *Liocarcinus* sp. (P), *Asterias rubens* (O). Scattered thalli of live *Phymatolithon calcareum* (R)	IR.MIR.KT.XKTX	Uncertain biotope
R4	Clean medium sand, rippled locally	Scattered kelp and other algae - largely drift material	SS.SSa.IFiSa	
R5	Rippled medium sand	No life seen	SS.SSa.IFiSa	
R6	Slightly silty fine sand with many Ensis shells	Much kelp, especially *Saccharina latissima*, and other algae but probably largely drift material. Some attached *Dictyota dichotoma* (R) and filamentous red algae (O). *Turritella communis* shells (R), *Liocarcinus* sp. (P), juvenile gadoids (P), *Asterias rubens* (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope. Could be KSwSS.LsacR.Sa
R7	Medium sand	Around 20% cover with algae, although very patchy and large amounts will be drift material. *Saccharina latissima* (F-C), *Dictyota dichotoma*? (P), *Desmarestia aculeata* (P), filamentous red algae (P), filamentous green algae (R), *Chorda filum* (P)	SS.SMp.KSwSS.LsacR.Sa	Uncertain biotope. Could be EcorEns
R8	Maerl	Live *Phymatolithon calcareum* (C) supporting dense algal turf (65% cover) including *Saccharina latissima* (C), *Dictyota dichotoma* (C), *Desmarestia aculeata* (F), filamentous reds (O-F) including *Asparagopsis armata*, *Chorda filum* (P), *Ulva* sp. (R). Juvenile gadoids (P), *Asterias rubens* (P), bivalve siphons (P)	SS.SMp.Mrl.Pcal.R	
R9	Sand with scattered pebbles	Algal turf covering c. 20% of seabed *Saccharina latissima* (F-C), *Laminaria hyperborea* (P), *Chorda filum* (C), *Desmarestia aculeata* (O), *Dictyota dichotoma*? (P), filamentous red algae (O), *Ulva* sp. (R), filamentous green algae (P)	SS.SMp.KSwSS.LsacR.Sa	

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
R10	Maerl	Live *Phymatolithon calcareum* (C) supporting dense algal turf (60% cover) including *Saccharina latissima* (A), *Dictyota dichotoma* (C), *Desmarestia aculeata* (F-C), filamentous reds (P), *Chorda filum* (P), *Ulva* sp. (R)	SS.SMp.Mrl.Pcal.R	
R11	Fine-medium sand with scattered gravel and *Ensis* shells	Algal turf covering c. 50% of seabed *Saccharina latissima* (C), *Chorda filum* (C), *Desmarestia aculeata* (P), *Dictyota dichotoma* (C), *Asperococcus bullosus* (P), filamentous and foliose red algae including *Polyides rotundus* (P), *Ulva* sp. (O), filamentous green algae (P). *Juvenile gadoids (P)*	SS.SMp.KSwSS.LsacR.Sa	
R12	Fine sand with scattered *Ensis* shells	Sparse scattered algal patches including *Saccharina latissima* (O), *Chorda filum* (F), filamentous reds (O), *Ulva* sp. (R). *Arenicola marina* (F), *Liocarcinus* sp. (P), *Asterias rubens* (P), Paguridae sp. (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope
S1	Medium sand, with some scattered *Ensis* shells	Patches of algal material - largely drift. *Cerianthus lloydii* (P), *Carcinus maenas* (P), *Liocarcinus* sp. (P), *Hyas* sp. (P), Paguridae sp. (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope
S2	Sand with scattered gravel, pebbles and presumably cobbles and possibly boulders	*Laminaria hyperborea* (A) (with much *Membranipora membranacea* and *Electra pilosa*), *Saccharina latissima* (P), *Halidrys siliquosa* (F), *Chorda filum* (F); algal understorey including filamentous reds including *Asparagopsis armata* (P), *Dictyota dichotoma* (P) and *Ulva* sp. (P). *Symphodus melops*? (P), juvenile gadoids? (P)	IR.HIR.KSed.XKScrR	Uncertain biotope as very sandy but much of seabed hidden by kelp
S3	Maerl with scattered pebbles and probably boulders or cobbles	Live *Phymatolithon calcareum* probably F, but C locally and supporting algal turf dominated by *Dictyota dichotoma* (C-A); *Chorda filum* (A), *Laminaria hyperborea* (P), *Saccharina latissima* (P), *Halidrys siliquosa* (P), filamentous reds (P). *Asterias rubens* (P), *Anemonia viridis* (P)	SS.SMp.Mrl.Pcal.R	
S4	Maerl, gravel and scattered pebbles	Mosaic of patchy *Zostera* bed with live maerl and *Laminaria hyperborea* forest, with some maerl, in areas of scattered cobbles. *Z. marina* (locally A), *L. hyperborea* (locally A) and *Phymatolithon calcareum* (locally F). *Chorda filum* (C), *Halidrys siliquosa* (F), *Fucus serratus* (P), *Saccharina latissima* (P), *Dictyota dichotoma* (C), red filamentous algae (P) including *Asparagopsis armata*. *Cerianthus lloydii* (P)	SS.SMp.SSgr.Zmar, SS.SMp.Mrl.Pcal.R, IR.MIR.KT.XKTX	
S5	Maerl	*Phymatolithon calcareum* (C) supporting algal turf dominated by browns, especially *Dictyota dichotoma* (A); *Chorda filum* (A), *Desmarestia aculeata* (P), *Saccharina latissima* (C), filamentous reds (P). *Asterias rubens* (P), *Cerianthus lloydii* (P)	SS.SMp.Mrl.Pcal.R	

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
S6	Maerl	*Phymatolithon calcareum* (A) supporting algal turf dominated by browns, especially *Dictyota dichotoma* (C); *Chorda filum* (A), *Saccharina latissima* (C), *Halidrys siliquosa* (P), filamentous reds (P), *Ulva* sp. (R).	SS.SMp.Mrl.Pcal.R	
S7	Fine sand	*Arenicola marina* (C) forming hummocks, brown diatom film (A), *Chorda filum* (F), *Saccharina latissima* (P), filamentous brown algae (O), *Cereus pedunculatus* (P), *Liocarcinus* sp. (P), *Carcinus maenas* (P), Gobiidae sp. (P)	SS.SSa.IMuSa.AreISa	
T1	Gravelly sand	Patchy algal mat (overall c. 50% cover) apparently formed principally from *Trailliella*-like filamentous reds. Apparently living algae include *Asperococcus bullosus* (R) and *Chorda filum* (C). *Liocarcinus* sp. (P), *Aequipecten opercularis* (P)	SS.SMp.KSwSS.Tra	Uncertain biotope
T2	Fine sand, preceded and followed by rock	*Arenicola marina* (C), *Cerianthus lloydii*? (O), Paguridae sp. (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope
T3	Shelly fine-medium sand	Patchy algal turf (15% cover, locally denser); *Chorda filum* (P), red filamentous algae (P). *Aequipecten opercularis* (O), *Arenicola marina* (R), *Chaetopterus variopedatus* (R), Ascidiacea sp. (P), *Myxicola infundibulum* (P), serpulids (R) on shells	SS.SMp.KSwSS.LsacR.Sa	Uncertain biotope
T4	Fine-medium sand	Drift algae and sparse attached brown tufts including *Dictyota dichotoma* (R), Ectocarpaceae sp. (R) and *Chorda filum* (R). *Cerianthus lloydii* (P), *Carcinus maenas* (P), *Liocarcinus* sp. (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope
T6	Shelly fine sand	*Arenicola marina* (F), *Chaetopterus variopedatus* (F) providing support for *Ascidiella aspersa* (P) and algae including filamentous reds, *Saccharina latissima*, *Ulva* sp. *Turritella communis* shells (F), some of which are inhabited by pagurids, *Carcinus maenas* (P), *Aequipecten opercularis* (P), *Asterias rubens* (O), *Cerianthus lloydii* (R)	SS.SSa.IMuSa	Uncertain biotope
T7	Pebbles and gravel on sand	Stones encrusted with serpulid worms (A) and pink coralline algae (F) and support hydroids (F) including *Nemertesia ramosa* (P). *Buccinum undatum* (R), *Antedon* sp. (P), *Echinus esculentus* (O), *Marthasterias glacialis* (P), *Scyliorhinus* sp. (P), *Chaetopterus variopedatus* (O), Paguridae sp. (P)	SS.SMx.CMx	Uncertain biotope
T8	Medium sand with shell material	Algal patches, including *Chorda filum* (P) and *Saccharina latissima* (P), but possibly largely drift material. *Lanice conchilega* (P)	SS.SSa.IMuSa.EcorEns	Uncertain biotope

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
T9	Shelly sand	Patchy, apparently largely loose algal mat with *Chorda filum* (F); *Saccharina latissima* (O) and *Asperococcus bullosus* (P) but possibly drift material. Gobiidae sp. (P), *Cerianthus lloydii* (P), *Carcinus maenas* (P)	SS.SMp.KSwSS.Tra	Uncertain biotope
X16	Sandy mud or muddy sand	Burrows include those of *Nephrops norvegicus* (C) and possibly *Goneplax rhomboides* (P) and *Calocaris macandreae* (P). No large mounds observed but smaller mounds are possibly those of *Callianassa subterranea* (P) and *Maxmuelleria lankesteri* (P). *Amphiura* spp. (A, at least locally), *Virgularia mirabilis* (F), Brachyura sp. (P), *Asterias rubens* (O)	SS.SMu.CFiMu.SpnMeg	Uncertain biotope
X50	Muddy sand with surface scatter of shells, including *Ensis,* and pebbles	Some drift weed, especially kelp and apparently sparse filamentous red algae attached to shells and stones. *Asterias rubens* (O), *Liocarcinus* sp. (P), *Turritella communis* shells (P)	SS.SSa.IMuSa	Uncertain biotope
Y10	Maerl with scattered pebbles	Live maerl (C - largely *Phymatolithon calcareum*) supporting algal turf with filamentous reds (C); *Laminaria hyperborea* (P), *Chorda filum* (P), *Asperococcus* sp. (P). Gobiidae sp. (P)	SS.SMp.Mrl.Pcal.R	Maerl ID checked in lab
Y11	Maerl	Live maerl (largely *Phymatolithon calcareum*) (O-F but C locally) supporting sparse algal flora including foliose reds, *Dictyota dichotoma*? and *Chorda filum* (O). *Liocarcinus* sp. (O), bivalve siphons (P), *Pholis gunnellus* (P)	SS.SMp.Mrl.Pcal.R	Maerl ID checked in lab
Z1	Coarse sand with scattered dead maerl, shell material and shells	Live *Phymatolithon calcareum* apparently very sparse (R). Patchy algal turf (c. 20% cover) including *Saccharina latissima* (O), *Chorda filum* (P) and reds (F). *Lanice conchilega* (P)	SS.SMp.KSwSS.LsacR.Sa	
Z2	Mixed substrate of sand with gravel, pebbles and cobbles	Stones sparsely encrusted with *Balanus* spp. (R), serpulid worms (R) and pink coralline algae (O) and supporting sparse tufts of foliose red algae (O), *Dictyota dichotoma* (R) and *Saccharina latissima* (O). *Lanice conchilega* (R), *Marthasterias glacialis* (P), *Carcinus maenas?* (P). Sparse scattered live thalli of *Phymatolithon calcareum* present locally (R)	SS.SMx.IMx	Uncertain biotope
Z9	Maerl	Live *Phymatolithon calcareum* (C). Patchy algal turf, generally sparse but locally with filamentous red algae (C). Much drift weed, including kelp	SS.SMp.Mrl.Pcal.R	Biotope uncertain due to algal sparcity - possibly Phy.Nmix, at least in part

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
Z17	Slightly rippled fine-medium sand with scattered *Ensis* shells	Patchy coverage of kelp (especially *Saccharina latissima* - F) and *Desmarestia aculeata* (O-F) but much of it could be drift material. Some clearly attached algae (R-O) including *Dictyota dichotoma* (R). *Asterias rubens* (P)	SS.SSa.IMuSa.EcorEns, SS.SMp.KSwSS.LsacR.Sa	Uncertain biotope
Z20	mixed substrate with sand, gravel, pebbles and cobbles	Stones encrusted with serpulid worms (P), *Balanus* spp. (P) and pink coralline algae (O) and supporting filamentous (R) and foliose (F-C) red algae, *Dictyota dichotoma* (R), hydroids including *Nemertesia ramosa* (R) and *Suberites* sp. (R). *Virgularia mirabilis* (R), *Asterias rubens* (F), *Marthasterias glacialis* (P)	SS.SMx.IMx	Uncertain biotope
Z26	Fine-medium sand	*Zostera marina* (A) but patchy. *Carcinus maenas* (P), *Ulva* sp. (R), juvenile gadoids (P), Pleuronectiformes sp. (P)	SS.SMp.SSgr.Zmar	
Z27	Pebbles, cobbles and shells with scattered boulders	Stones support dense weed cover including *Dictyota dichotoma* (A) and red filamentous algae including *Asparagopsis armata* (P) and *Halidrys siliquosa* (P), with *Laminaria hyperborea* locally C-A in boulder patches. Live *Phymatolithon calcareum* scattered throughout but becoming A locally. *Metridium senile* (P), *Echinus esculentus* (P), *Marthasterias glacialis* (P), *Asterias rubens* (O). Stones encrusted with serpulid worms (P) and pink coralline algae (P)	IR.MIR.KT.XKTX, SS.SMp.Mrl.Pcal.R	Uncertain biotope
Z33	Shelly medium? sand	Patchy algal turf including filamentous and foliose red algae, and *Saccharina latissima* (F). *Chorda filum* (F), *Carcinus maenas*? (P), *Echinus esculentus* (P)	SS.SMp.KSwSS.LsacR.Sa	
Z34	Sand with scattered shells, pebbles and probably cobbles	Dense *Saccharina latissima* forest (A) with fronds extensively encrusted with *Electra pilosa* and *Membranipora membranacea*. Understorey dominated by filamentous reds (C - mostly *Trailliella*-like), with *Ulva* sp. (R); *Halidrys siliquosa* (P), *Chorda filum* (C)	SS.SMp.KSwSS.LsacR.Sa	Biotope uncertain. Start of run too shallow with rock and then boulders also supporting dense *Saccharina* forest
Z41	Maerl	Dense maerl bed with live *Phymatolithon calcareum* (C, locally A over large areas). Maerl supports algal turf (c. 20% cover) dominated by browns including *Saccharina latissima* (F), *Chorda filum* (C) and *Dictyota dichotoma* (P); also foliose and filamentous red algae (F). *Asterias rubens* (P)	SS.SMp.Mrl.Pcal.R	

Table 1.2 continued

Site	Substrate	Biota	Biotope	Comments
Z43	Fine-medium sand with scattered pebbles, cobbles and boulders, probably in patches	Patchwork of dense *Zostera marina* (locally A) and dense *Laminaria hyperborea* (locally A) with sparse *Halidrys siliquosa* (P). Kelp supporting rich stipe community of red algae, *Halichondria panicea* and *Alcyonidium hirsutum*?; fronds with *Membranipora membranacea* and *Obelia geniculata*, Patchy algal turf barely observed but includes *Dictyota dichotoma* (P). *Asterias rubens* (P)	SS.SMp.SSgr.Zmar, IR.HIR.KSed.XKScrR	
Z51	Dense pebbles and cobbles, and locally boulders, on coarse sand	Stones support turf of foliose and filamentous red algae (C), *Dictyota dichotoma* (F) and sparse *Saccharina latissima* (P). Encrusting community includes pink coralline algae (C), *Balanus* spp. (C), serpulid worms (P) and *Parasmittina trispinosa* (R). Hydroids (P), *Echinus esculentus* (P), juvenile gadoids (P)	SS.SMp.KSwSS.LsacR.CbPb	Uncertain biotope
Z57	Medium sand with scattered dead maerl and shells, dense in places	Very patchy algal turf (locally S) with filamentous reds (locally S), foliose reds (R), *Ulva* sp. (R) and *Saccharina latissima* (O). *Cerianthus lloydii* (locally C), juvenile gadoids (P), Paguridae sp. (P)	SS.SMp.KSwSS.LsacR.Sa	Uncertain biotope
Z58	Fine-medium sand with shell material and scattered shells, especially *Ensis*	*Chorda filum* (A), *Saccharina latissima* (C), patchy algal turf including filamentous browns (F) and *Ulva* sp. (O)	SS.SMp.KSwSS.LsacR.Sa	
Z59	Coarse sand, maerl and shell gravel with scattered shells, locally dense	Patchy maerl bed with *Phymatolithon calcareum* overall F. Algal turf patchy with around 20% cover including filamentous reds (F-C), foliose reds (O) and *Saccharina latissima* (O). Shells encrusted with serpulid worms (R) and pink coralline algae (O). *Liocarcinus* sp. (O), *Carcinus maenas* (P), *Hyas* sp. (P), juvenile gadoids (P), *Asterias rubens* (O), *Cerianthus lloydii* (C), *Metridium senile* (R), *Amphilectus fucorum*? (R)	SS.SMp.Mrl.Pcal.R	
Z67	Maerl	Patchy maerl bed with *Phymatolithon calcareum* F-C overall but S locally. Patchy algal turf dominated by *Dictyota dichotoma* (F-C). *Saccharina latissima* (O), *Chorda filum* (P), filamentous red algae (O-F)	SS.SMp.Mrl.Pcal.R	

Table 1.3. Details of differences recorded at sites between the 2003 and 2014 SCM video surveys.

Site	2014 survey				2003 survey				Biotope change	Comments
	Depth (m)	Substrate	Biota	Biotope	Depth (m)	Substrate	Biota	Biotope 2003		
A8	10.7-12.3	Bedrock and boulders with small sand patches	Rock supports forest of *Laminaria hyperborea* (A) and understorey of red foliose and filamentous algae (C-A). Pink coralline algae (P), *Echinus esculentus* (P), Labridae sp. (P), *Marthasterias glacialis* (P)	IR.MIR.KR.Lhyp.Ft	12.5-12.8	Shell gravel	Possibly some maerl present	SS.SCS.CCS	Yes	Small pockets of sand present in 2014 could be SS.SCS.CCS Difference is due to locational difference
J5	19.8-20.4	Predominan-tly coarse sand but with scattered pebbles, cobbles and boulders	Sediment with much drift kelp. *Callionymus lyra* (P)	SS.SCS.CCS & IR.MIR.KR.Lhyp.Pk	19.4-15.0	Coarse sand/gravel with many cobbles and scattered boulders	Barnacles, coralline crusts and erect red algae on cobbles (F), *Asterias* (R), *Echinus* (O), (*Laminaria hyperborea* (O) but possibly drift	SS.SMp.KSw SS.LsacR.CbPb	Yes	Much more sediment in 2014 - due to enhanced deposition or possibly locational difference- slightly deeper in 2014
L2	20.0-21.2	Coarse sand and gravel with shells and pebbles	*Neopentadactyla mixta* (F), *Carcinus maenas* (O), *Liocarcinus* sp. (P), *Asterias rubens* (O), *Henricia* sp.? (R), *Aequipecten opercularis* (P)	SS.SCS.CCS.Nmix	21.9-24.1	Gravelly mud with megafaunal burrows and a few maerl fragments	*Liocarcinus* (F), *Virgularia* (F)	SS.SMu.CSaMu.VirOphPmax	Yes	Different biotope in 2003 - mostly slightly deeper and siltier

Table 1.3 continued

Site	2014 survey				2003 survey				Biotope change	Comments
	Depth (m)	Substrate	Biota	Biotope	Depth (m)	Substrate	Biota	Biotope 2003		
O8	18.5-18.2	Coarse sand and maerl gravel with varying densities of pebbles, cobbles and occasional boulders; waves of coarse sand and maerl gravel also present with gravel and pebbles in troughs	Small stones encrusted with pink coralline algae, serpulid worms and *Balanus* spp. and supporting hydroid clumps (R), filamentous and foliose red algae (O) and *Dictyota dichotoma* (R). *Laminaria hyperborea* (O), *Saccharina latissima*? (P), *Marthasterias glacialis* (P), *Echinus esculentus* (P), juvenile gadoids (P). Live *Phymatolithon calcareum* very sparse (<1% - R)	SS.SMp.KSwSS.LsacR.CbPb & SS.SCS.CCS	18.0-18.9	sand, pebbles, cobbles and occasional boulders and maerl gravel	filamentous and foliose red algae 10%, barnacles 3%, coralline crusts 5%, Nemertesia O, Asterias R, Luidia R, maerl 1%	SS.SMp.KSwSS.LsacR.CbPb	Yes	Although briefly similar to 2003 biotope initially, sediment waves are present in 2014 with stones concentrated in troughs
P4	15.8-17.7	Muddy sand	Small mounds and sparse megafaunal burrows including possibly *Nephrops norvegicus* (F). *Amphiura* spp. (A), *Arenicola marina* (P), *Turritella communis* shells (O)	SS.SSa.CMuSa	15.5-17.2	Fine sand with Arenicola mounds	Crab (R), *Arenicola* (F/C)	SS.SSa.IMuSa.EcorEns	Yes	2003 different biotope - not as muddy , smoother and apparently no burrows

Table 1.3 continued

Site	2014 survey				2003 survey				Biotope change	Comments
	Depth (m)	**Substrate**	**Biota**	**Biotope**	**Depth (m)**	**Substrate**	**Biota**	**Biotope 2003**		
Q1	24.4-22.7	Silty, shelly, gravelly sand with dense cobbles and pebbles	Stones encrusted with pink coralline algae (O) and serpulid worms (F) and supporting very sparse foliose red algae (R) and hydroids (O). *Lanice conchilega* (P), *Munida rugosa* (F)	SS.SMx.CMx	23.8-24.2	Slightly silty shelly gravelly sand with scatter of pebbles and cobbles	*Nemertesia* (O) on cobbles, *Lanice* (O), *Amphiura* (C), *Cerianthus*? (R)	SS.SSa.CMuSa	Yes	Much denser stone cover than in 2003
R4	5.6-4.8	Clean medium sand, rippled locally	Scattered kelp and other algae - largely drift material	SS.SSa.IFiSa	5.6-5.4	Coarse sand with dense patches of pebbles and gravel and small amount of drift algae - possibly rock covered by shallow veneer of sediment	Kelp (*Laminaria hyperborea/Saccorhiza polyschides*)( )F	SS.SCS.CCS	Yes	2003 definitely coarser sediment
R5	3.8-4.2	Rippled medium sand	No life seen	SS.SSa.IFiSa	3.6-0.0	Rippled coarse sand/shell gravel	*Saccorhiza polyschides*? (R)	SS.SCS.CCS	Yes	2003 definitely coarser sediment

Table 1.3 continued

Site	2014 survey				2003 survey				Biotope change	Comments
	Depth (m)	Substrate	Biota	Biotope	Depth (m)	Substrate	Biota	Biotope 2003		
Z2	16.9-16.9	Mixed substrate of sand with gravel, pebbles and cobbles	Stones sparsely encrusted with *Balanus* spp. (R), serpulid worms (R) and pink coralline algae (O) and supporting sparse tufts of foliose red algae (O), *Dictyota dichotoma* (R) and *Saccharina latissima* (O). *Lanice conchilega* (R), *Marthasterias glacialis* (P), *Carcinus maenas?* (P). Sparse scattered live thalli of *Phymatolithon calcareum* present locally (R)	SS.SMx.IMx	6.9-7.4	Maerl gravel	Live maerl c.10%?, *Saccharina latissima* (O), red algal turf 10%, *Dictyota dichotoma* (O), *Dictyosiphon* (O), Ulva (O), *Asterias* (P)	SS.SMp.Mrl.Pcal.R	Yes	2003 habitat quite different - low waves of maerl. Sampled cited position but depth differs by around 10 m, so locational difference
Z17	7.6-7.0	Slightly rippled fine-medium sand with scattered *Ensis* shells and occasional pebbles and cobbles	Patchy coverage of kelp (especially *Saccharina latissima* - F) and *Desmarestia aculeata* (O-F) but much of it could be drift material. Some clearly attached algae (R-O) including *Dictyota dichotoma* (R). *Asterias rubens* (P)	SS.SSa.IMuSa.EcorEns & SS.SMp.KSwSS.LsacR.Sa	7.9-7.8	Rippled sand	Only drift weed seen	SS.SSa.IMuSa.EcorEns	Yes	Bare patches similar to 2003 biotope but much greater algae in 2014 and scattered stones

Table 1.3 continued

Site	2014 survey				2003 survey				Biotope change	Comments
	Depth (m)	Substrate	Biota	Biotope	Depth (m)	Substrate	Biota	Biotope 2003		
Z26	4.8-3.0	Fine-medium sand	*Zostera marina* (A) but patchy. *Carcinus maenas* (P), *Ulva* sp. (R), juvenile gadoids (P), Pleuronectiformes sp. (P)	SS.SMp.SSgr.Zmar	4.8-5.7	Shelly coarse-medium sand with much drift weed and drift Zostera and scattered Ensis shells	Sparse tufts of algae	SS.SSa.IMuSa.EcorEns	Yes	Different biotope could be due to slight location difference. Small overlap in depth coverage
A2	20.8-17.2	Waves of maerl/maerl gravel	Live *Phymatolithon calcareum* mostly <5% (R) but possibly F locally	SS.SMp.Mrl.Pcal.Nmix	20.6	Waves of coarse sand/gravel with scattering of shell debris, especially in troughs. Some dead maerl possibly present. Rocky reefs in the background	*Liocarcinus* (R)	SS.SCS.CCS	Un-certain	Live maerl could be present in 2003 but video provides little detail of the wave troughs. 2003 biotope (CCS) present in 2014 but not at start of run
B5	26.7-26.9	Soft, hummocked mud	Mud moderately densely burrowed by *Nephrops norvegicus* (C), *Jaxea nocturna* (F), *Callianassa subterranea* (P) and *Maxmuelleria lankesteri* (P) *Lesueurigobius friesii* (P)	SS.SMu.CFiMu.MegMax	26.1-26.7	Hummocked mud with megafaunal burrows	Megafaunal burrows including probably *Nephrops norvegicus* (P) and mostly small mounds	CMU.SpMeg	Un-certain	2003 video footage too unclear to be certain of same biotope

Table 1.3 continued

Site	2014 survey				2003 survey				Biotope change	Comments
	Depth (m)	Substrate	Biota	Biotope	Depth (m)	Substrate	Biota	Biotope 2003		
C1	9.5-6.2	Slightly silty fine sand with scattered shells	Very sparse algae including *Chorda filum* (F), *Saccharina latissima* (P), *Ulva* (R) and filamentous reds (R). Brachyura (O) including *Liocarcinus* sp. (P), *Asterias rubens* (P), Paguridae sp. (R)	SS.SSa.IFiSa	8.7-5.7	Silty sand with 10% shell cover (especially Ensis)	*Saccharina latissima* (F), red and brown algae 25% cover, *Liocarcinus* (O), *Mya* (P), *Ulva* (O), *Chorda* (O)	SS.SMp.KSw SS.LsacR.Sa	Un-certain	Similar to 2003 but less algae - could be due to presence of less drift material
E8	7.7-7.7	Sand with scattered dead maerl, pebbles and shells	Patchy live *Phymatolithon calcareum* (F). Fairly sparse algal turf includes *Dictyota dichotoma* (O), *Saccharina latissima* (P), *Ulva* sp. (R) and filamentous reds (O-F). *Liocarcinus* sp. (P), *Anemonia viridis* (P), drift kelp	SS.SMp.Mrl.Pcal.R	7.7-3.3	Maerl gravel	Scattered algae - possibly mostly drift	SS.SCS.ICS	Un-certain	Very little live maerl visible in 2003 but video coverage fleeting. 2014 footage shows live maerl to be patchy and so little evidence for biotope change at site
F2	4.6-3.0	Rippled fine sand with sparsely scattered *Ensis* shells	Very sparse algal clumps, although becoming more extensive locally towards end if the run	SS.SSa.IMuSa.EcorEns	4.0-3.9	Shelly fine sand with scatter of shells	*Saccharina latissima* (O), *Chorda* (O), algal turf 5%, gobies (R)	SS.SMp.KSw SS.LsacR	Un-certain	Sediment flatter (no ripples) and with much more shell material in 2003, with denser algae, although areas with very sparse algal cover

Table 1.3 continued

Site	2014 survey				2003 survey				Biotope change	Comments
	Depth (m)	Substrate	Biota	Biotope	Depth (m)	Substrate	Biota	Biotope 2003		
H1	13.5-14.1	Coarse sand and gravel with dense shell patches, especially *Ensis*	Sparse algal clumps (R), *Lanice conchilega* (P), *Nemertesia ramosa* (F), *Hyas* sp.? (R), *Alcyonidium diaphanum* (R), *Neopentadactyla mixta* (P)	SS.SCS.CCS.Nmix	13.8-15.0	Shell gravel with much shell debris and drift weed (especially Ensis)	Gobies (O), *Carcinus* (O), *Alcyonium* (R), *Asterias* (O)	SS.SCS.CCS	Un-certain	*Neopentadactyla* not seen in 2003
H7	0.6-0.7	Fine-medium sand with shell material and scattered *Ensis* shells	*Chorda filum* (C), *Saccharina latissima* (R) and sparse algal clumps (O). Juvenile gadoids (P), Gobiidae sp. (P)	SS.SSa.IMuSa.EcorEns	0.5-0.3	Sand (medium-coarse) with scattered shell debris	*Chorda* (C), *Saccharina latissima* (O), light (<5%) and patchy mixed algal cover including Ulva and filamentous greens, reds and browns	SS.SMp.KSwSS.LsacR	Un-certain	More algae at start of 2003 run but same biotope at end of run, so possibly (fairly subtle) difference due to patchiness
I8	12.3-12.3	Sand with dead maerl and densely scattered pebbles and cobbles	Sparse maerl bed with live *Phymatolithon calcareum* F in patches. Dense algal turf (around 50% cover) with red algae (A) and browns including *Dictyota dichotoma* (O), *Saccharina latissima* (F) and *Laminaria hyperborea*? (P). *Lanice conchilega* (F), *Cancer pagurus* (P), *Asterias rubens* (P)	SS.SMp.Mrl.Pcal.R	12.0-8.9	Sand with 80% cover of pebbles	*Laminaria hyperborea*? (O), *Saccharina latissima* (R), *Urticina* (R), barnacles F and red algae 5% cover on pebbles	SS.SMp.KSwSS.LsacR.CbPb	Un-certain	Algae far sparser in 2003. No evidence of live maerl in 2003, though no good close-up visibility - camera too horizontal

Table 1.3 continued

Site	2014 survey				2003 survey				Biotope change	Comments
	Depth (m)	Substrate	Biota	Biotope	Depth (m)	Substrate	Biota	Biotope 2003		
J2	12.4-12.7	Waves of maerl/maerl gravel	Live *Phymatolithon calcareum* concentrated in troughs where F locally.	SS.SMp.Mrl.Pcal.Nmix	9.6-10.7	Waves of maerl gravel with shell debris	*Asterias* (O), no live maerl seen but possibly present	SS.SCS.CCS	Un-certain	Possibly same biotope as 2003. 2003 live maerl probably not seen due to absence of video lights
R7	7.0-6.8	Medium sand	Around 20% cover with algae, although very patchy and large amounts will be drift material. *Saccharina latissima* (F-C), *Dictyota dichotoma*? (P), *Desmarestia aculeata* (P), filamentous red algae (P), filamentous green algae (R), *Chorda filum* (P)	SS.SMp.KSwSS.LsacR.Sa	7.1-7.1	Slightly shelly medium? sand with rare maerl fragments	*Liocarcinus* (O), *Arenicola* (O), very scattered tufts of algae and some drift algae, *Saccharina latissima* (O)	SS.SSa.IMuSa.EcorEns	Un-certain	2003 could be same biotope, although far less weed. Most of 2014 weed could be drift

Table 1.3 continued

Site	2014 survey				2003 survey				Biotope change	Comments
	Depth (m)	Substrate	Biota	Biotope	Depth (m)	Substrate	Biota	Biotope 2003		
S2	-0.1--1.0	Sand with scattered gravel, pebbles and presumably cobbles and possibly boulders	*Laminaria hyperborea* (A) (with much *Membranipora membranacea* and *Electra pilosa*), *Saccharina latissima* (P), *Halidrys siliquosa* (F), *Chorda filum* (F); algal understorey including filamentous reds including *Asparagopsis armata* (P), *Dictyota dichotoma* (P) and *Ulva* sp. (P). *Symphodus melops*? (P), juvenile gadoids? (P)	IR.HIR.KSed.XKScrR	0.2--0.3	Pebbly sand	*Chorda* (C), *Halidrys* (O), *Ulva* (F), *Laminaria hyperborea* (O), *Saccharina latissima* (O)	SS.SMp.KSwSS.LsacR	Un-certain	Patches of 2003 footage similar to 2014 but generally far less *L. hyperborea*

Table 1.3 continued

Site	2014 survey				2003 survey				Biotope change	Comments
	Depth (m)	Substrate	Biota	Biotope	Depth (m)	Substrate	Biota	Biotope 2003		
Z27	6.8-6.5	Pebbles, cobbles and shells with scattered boulders	Stones support dense weed cover including *Dictyota dichotoma* (A) and red filamentous algae including *Asparagopsis armata* (P) and *Halidrys siliquosa* (P), with *Laminaria hyperborea* locally C-A in boulder patches. Live *Phymatolithon calcareum* scattered throughout but becoming A locally. *Metridium senile* (P), *Echinus esculentus* (P), *Marthasterias glacialis* (P), *Asterias rubens* (O). Stones encrusted with serpulid worms (P) and pink coralline algae (P)	IR.MIR.KT.XKTX & SS.SMp.Mrl.Pcal.R	7.3-6.4	Pebbles, cobbles and occasional boulders	c.60% cover of red and brown algae (including *Dictyota*), *Laminaria hyperborea* (C), *Saccorhiza polyschides* (P), *Luidia* (O), *Marthasterias* (O), *Necora* (R), *Asterias* (O)	IR.MIR.KT.XKTX	Un-certain	Live maerl possibly present in 2003 but poor video detail due to strong current

Table 1.3 continued

Site	2014 survey				2003 survey				Biotope change	Comments
	Depth (m)	Substrate	Biota	Biotope	Depth (m)	Substrate	Biota	Biotope 2003		
Z59 NW 1	11.5-10.9	Gravel and coarse sand with scattered shells and pebbles, locally dense	Sparse tufts of algae including reds (R), *Saccharina latissima* (O), *Chorda filum* (O). *Cerianthus lloydii* (C), *Neopentadactyla mixta* (P), *Asterias rubens* (O), *Henricia* sp. (R), *Carcinus maenas* (O), *Liocarcinus* sp. (O), Gobiidae sp. (P), juvenile gadoids (P), hydroids (R) including *Halecium halecinum*?, *Metridium senile* (R), *Amphilectus fucorum*? (R)	SS.SCS.CCS.Nmix	11	Gravel with scattered shells and occasional cobbles	Very light algal cover; live maerl present but in low abundance	SS.SCS.CCS	Un-certain	*Neopentadactyla* not seen in 2003

ANNEX 2: GRAB SCM SURVEY DATA

Table 2.1. Details of grab sampling sites for the 2014 SCM survey. Also shown for comparison of the 15 resampled sites are the depths of the sites in 2003 and the recorded temporal depth change between surveys.

Site	Date	Time (UT)	Latitude	Long-itude	Depth (m)	Grab full-ness	Field notes	Depth 2003 (m)	Temporal depth change (m)
A2G	22/07/2014	13:01:20	56.79582	-5.95087	19.9	2/3	shell gravel and coarse sand		
A10G	22/07/2014	13:25:46	56.78272	-5.94953	15.1	1/2	medium sand	15.6	0.5
C5G	23/07/2014	13:03:33	56.75817	-5.91330	17.6	3/4	muddy sand		
C8G	23/07/2014	13:29:17	56.75670	-5.90082	5.7	2/3	slightly silty sand	5.2	-0.5
C9G	23/07/2014	13:17:53	56.75565	-5.90543	11.7	1/2	slightly muddy sand	12	0.3
E5G	23/07/2014	13:44:32	56.76700	-5.90118	7.5	2/3	fine sand	7.6	0.1
G3G	27/07/2014	16:13:55	56.78822	-5.83573	1.6	1/2	fine sand	1.8	0.2
G7G	27/07/2014	16:36:09	56.78243	-5.86190	4.6		fine-medium sand	4.6	0
I9G	24/07/2014	10:46:08	56.79678	-5.89430	9	3/4	shell gravel	9.9	0.9
K3G	24/07/2014	10:28:15	56.80838	-5.88515	20	2/3	medium sand	19.4	-0.6
L1G	27/07/2014	11:50:56	56.80218	-5.8374	2.4	full	soft sulphurous mud	1.6	-0.8
O1G	24/07/2014	09:34:36	56.83348	-5.86165	18.9	1/2	coarse sand	18.4	-0.5
P4G	28/07/2014	07:42:05	56.84115	-5.78950	15.8	2/3	silty fine sand		
P8G	24/07/2014	08:01:50	56.83337	-5.82045	3	1/4	medium sand	3.7	0.7
Q1AG	28/07/2014	07:59:34	56.84900	-5.78853	14.1	1/2	shell gravel		
R2G	28/07/2014	08:43:14	56.85017	-5.76327	2.3	2/3	medium sand	2.8	0.5
S1G	28/07/2014	09:12:51	56.84895	-5.73023	6.8	1/2	fine sand	6.1	-0.7
S4G	26/07/2014	16:37:54	56.84908	-5.74763	1.1	1/2	sand with maerl gravel		
T6G	28/07/2014	09:37:30	56.85883	-5.71175	8.3	3/4	fine sand	8.7	0.4
Z17G	28/07/2014	08:28:49	56.85325	-5.77683	7	2/3	fine sand	7.5	0.5

Table 2.2. Percentage of total sediment sample collected by sieves at 0.5 phi interval mesh sizes at 2014 grab sample sites.

Sieve (phi)	Site									
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3
-3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-2.50	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-2.00	0.83	0.71	0.07	0.00	0.06	0.18	1.43	0.06	0.03	0.00
-1.50	3.67	0.72	0.25	0.22	0.09	0.29	1.62	0.29	0.69	0.11
-1.00	9.32	1.69	0.41	0.59	0.12	0.17	1.90	0.52	2.84	0.11
-0.50	20.86	4.34	0.42	2.01	0.36	0.49	2.28	1.80	13.68	0.31
0.00	29.21	7.38	0.51	3.84	0.57	0.82	2.20	3.83	40.93	0.37
0.50	25.48	11.21	0.51	5.34	0.96	3.12	3.13	8.60	34.65	0.90
1.00	7.99	11.96	0.90	10.69	1.54	5.27	5.79	18.53	5.27	1.99
1.50	0.80	19.75	1.60	23.58	6.15	4.89	10.94	23.88	0.70	9.54
2.00	0.20	16.68	1.50	26.92	26.13	8.76	34.02	25.24	0.26	40.74
2.50	0.06	9.89	4.45	11.60	31.66	32.69	22.74	5.96	0.07	36.61
3.00	0.03	6.06	18.33	9.81	14.92	34.82	6.64	3.24	0.01	6.10
3.50	0.03	2.08	24.23	1.98	6.23	6.23	2.63	3.28	0.00	1.12
4.00	0.03	1.41	17.85	0.32	2.18	0.84	1.44	1.62	0.00	0.43
>4	1.08	6.12	28.99	3.10	9.02	1.44	3.24	3.14	0.86	1.66

Sieve (phi)	Site									
	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
-3.50	0.00	4.58	0.00	0.00	0.00	0.00	0.00	8.58	0.00	0.00
-3.00	0.00	0.18	0.00	0.00	0.00	0.62	0.00	2.70	0.00	0.00
-2.50	0.00	1.59	0.00	0.00	0.00	3.71	0.00	2.94	0.00	0.00
-2.00	0.00	2.56	0.00	1.26	0.52	0.47	0.00	2.23	0.00	0.21
-1.50	0.00	9.55	0.00	1.62	0.65	1.08	0.23	4.46	0.02	0.01
-1.00	7.12	12.90	0.00	3.29	1.92	1.39	0.48	6.05	0.22	0.05
-0.50	6.62	21.66	0.11	5.58	10.01	1.85	0.96	9.83	0.30	0.18
0.00	3.87	21.64	0.22	6.87	24.20	2.92	1.31	6.38	0.44	0.48
0.50	3.43	16.35	0.97	7.25	24.54	5.34	2.18	3.87	0.79	0.66
1.00	2.10	5.40	2.63	7.09	10.37	8.43	3.68	4.02	1.15	2.33
1.50	2.35	1.59	5.39	4.84	8.68	15.42	8.76	4.03	1.52	5.23
2.00	4.85	0.62	10.88	5.30	6.63	24.27	16.77	10.93	6.60	39.66
2.50	4.49	0.23	26.35	6.39	7.36	23.90	21.03	20.58	15.35	42.02
3.00	2.73	0.09	34.22	29.02	3.29	8.88	27.48	10.15	37.19	7.19
3.50	1.53	0.07	9.64	14.65	0.49	0.56	10.87	1.20	20.50	1.10
4.00	1.96	0.03	2.99	2.97	0.06	0.11	2.71	0.26	7.09	0.10
>4	58.94	0.95	6.60	3.85	1.28	1.05	3.53	1.80	8.81	0.78

Table 2.3. Particle size characteristics of sediments at the 2014 grab sample sites. $MD_{ø}$ = median grain diameter in phi units, $Md_{μ}$ = median grain diameter in microns, $QD_{ø}$ = phi quartile deviation, ND = not determined.

Station	$MD_{ø}$	$MD_{μ}$	$QD_{ø}$	% gravel	% coarse sand	% medium sand	% fine sand	% silt/clay
A2	-0.25	1189	0.48	1.24	96.53	1.00	0.15	1.08
A10	1.30	406	0.78	0.71	37.30	36.43	19.44	6.12
C5	3.45	92	ND	0.07	3.00	3.10	64.85	28.99
C8	1.55	342	0.53	0.00	22.68	50.50	23.72	3.10
C9	2.21	216	0.53	0.06	3.65	32.28	55.00	9.02
E5	2.40	189	0.37	0.18	10.15	13.65	74.57	1.44
G3	1.80	287	0.48	1.43	16.92	44.96	33.44	3.24
G7	1.35	392	0.55	0.06	33.58	49.12	14.10	3.14
I9	-0.10	1072	0.33	0.03	98.07	0.96	0.08	0.86
K3	1.95	259	0.32	0.00	3.79	50.29	44.26	1.66
L1	>4	ND	ND	0.00	23.14	7.20	10.71	58.94
O1	-0.55	1464	0.63	8.92	87.50	2.21	0.43	0.95
P4	2.55	171	0.40	0.00	3.93	16.27	73.20	6.60
P8	2.50	177	1.25	1.26	31.71	10.14	53.03	3.85
Q1A	0.25	841	0.70	0.52	71.69	15.30	11.21	1.28
R2	1.68	312	0.63	4.80	21.01	39.69	33.45	1.05
S1	2.38	192	0.58	0.00	8.84	25.53	62.10	3.53
S4	0.86	551	1.70	16.45	34.60	14.95	32.19	1.80
T6	2.80	144	0.43	0.00	2.92	8.13	80.14	8.81
Z17	2.00	250	0.30	0.21	3.72	44.89	50.41	0.78

Table 2.4. Abundance of infauna (no./0.1m^2) in samples from SCM grab survey. G suffix omitted from site names for brevity. Nomenclature follows WoRMS (2014).

Taxon	Site																		
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Cerianthus lloydii		1																		
Actiniaria sp																1				
Edwardsia claparedii	5	6	5	3	3					2		1	3	2			3			1
Platyhelminthes spp		2	1															1		
Nemertea spp		1						2		1			1							1
Tubulanus polymorphus		1	7	4	4			2				1	1	22			2		2	
Cerebratulus sp	1	1	5	2	2		1			1		2	1	1			2	1		
Nematoda	50	39	9	18			1		254			34		2	69			70	5	
Priapulus caudatus			1																	
Sipuncula sp juv	1																			
Golfingia (Golfingia) elongata		1			1												1			
Thysanocardia procera		1			2								2							
Phascolion (Phascolion) strombus strombus			2														3			
Pisione remota	77								40			12			23			2		
Aphrodita aculeata juv		1															2		1	
Polynoidae spp juv	4	3	1			1									2			2		
Polynoidae spp indet	4		8		1							5		1				1	2	
Malmgrenia andreapolis																			1	
Malmgreniella arenicolae													3							
Pholoe inornata		15	1	1			1					10		1				10		
Pholoe baltica		8	44	2	16		1	1				4	15			1			1	
Sigalion sp juv														2						
Sigalion mathildae						2														
Sthenelais sp indet													2							
Sthenelais limicola					3					1										
Eteone longa agg			3	1	1													1		
Pseudomystides limbata	1	3										6								

Table 2.4 continued

Taxon	Site																			
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Phyllodoce groenlandica				1																
Phyllodoce mucosa														3						
Phyllodoce rosea						1													1	
Eulalia mustela	1														2					
Eumida bahusiensis					1												1			
Eumida sanguinea	1	1										3						2		
Paranaitis kosteriensis		2											1							
Lacydonia miranda	1																			
Glycera alba			1	1													2			
Glycera celtica								1												
Glycera fallax																	1			
Glycera lapidum	16	9					1	2	11	1		3			9			6		
Glycera tridactyla						1														
Glycinde nordmanni		1			1			1									4			
Goniada maculata		4	3	3	3								2	1						
Goniadella gracilis	4																			
Hesionidae sp juv																		1		
Podarkeopsis capensis			2	1	5			1				1		4			2			
Hesiospina aurantiaca	1											2								
Psamathe fusca	4														1					
Oxydromus flexuosus					1								1							
Syllis spp indet	3																			
Trypanosyllis (Trypanosyllis) coeliaca	2								3			11			4			1		
Syllis hyalina												1								
Syllis parapari		1										4								
Syllis garciai	2	1							11			6			5			15		
Syllis licheri	6	3							3						3					
Syllis pontxioi	1														1					
Amblyosyllis formosa	1	1																		

Table 2.4 continued

Taxon	Site																			
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Syllides convolutus				1														1		
Parexogone hebes		2		7	2			2					1					1	1	
Exogone (Exogone) naidina																	3			
Exogone (Exogone) verugera							17	1									1			
Sphaerosyllis bulbosa	17								5			21			9					
Sphaerosyllis taylori	6	4		2					5			1			1		3	3		
Eunereis longissima	2																	1		
Platynereis dumerilii						1														
Nephtyidae spp juv		1	2					2		2			3			2	1			1
Aglaophamus agilis		4																		
Nephtys cirrosa						1				2						2				4
Nephtys hombergii			4		3		3	1									1		5	
Nephtys kersivalensis				1	1			1								1				
Nephtys longosetosa										1										
Nephtys assimilis		1				1								1	1					
Aponuphis bilineata	1	37		5	1			3		4		3			2		1			
Nothria sp										2										
Marphysa bellii							2													
Lysidice unicornis		2																1		
Lumbrineridae spp juv		1	2		2			1									1			
Lumbrineris cingulata/aniara		5	14	10	34			1		1		3	1				15	1		
Parougia eliasoni																		1		
Protodorvillea kefersteini	10	11		5					12			8			59			5		
Schistomeringos neglecta	1																			
Leitoscoloplos mammosus			10														4			
Scoloplos (Scoloplos) armiger		1					1	2		3									1	
Aricidea (Aricidea) wassi		6		3				6		2				17						
Aricidea (Acmira) catherinae			1																	
Aricidea (Acmira) cerrutii		76		8				7		4		2			5					

Table 2.4 continued

Taxon	Site																		
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Levinsenia gracilis					2															
Paradoneis lyra		2	1		2			2					1				3		2	
Apistobranchus tullbergi					2												2			
Poecilochaetus serpens																	2			
Aonides oxycephala				3				4						11			1	1		
Aonides paucibranchiata	1			1			1		7	4		1			3		1	9		
Laonice bahusiensis	3	3	1									3			9					
Malacoceros fuliginosus																		8		
Dipolydora coeca					2								1	11			1			
Dipolydora caulleryi															5					
Dipolydora quadrilobata							1													
Prionospio fallax					2									1			2		42	
Aurospio banyulensis		1																4		
Prionospio cirrifera		1																	1	
Prionospio cf *multibranchiata*			2																	
Pseudopolydora cf *paucibranchiata*																			1	
Pseudopolydora pulchra		1				2	2	6			3			1			8	2	6	
Scolelepis (Scolelepis) squamata						3														1
Spio sp																		13	1	
Spio armata agg															1					
Paraspio decorata							1	4		1				6	1	1	9		5	1
Spio filicornis		1						2								1		2		
Spio martinensis																	1			
Spiophanes bombyx					1	8	3	3		1			1							4
Spiophanes kroyeri		1	2		2								2				3		20	
Magelona alleni			1	9	12	1							5	2			6		1	
Magelona filiformis				118	4	125							2	64			52			4
Magelona minuta			12		7								3	1	2		5		9	
Magelona johnstoni						19								1						

Table 2.4 continued

Taxon	Site																		
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Caulleriella alata				4				1						30				3		
Chaetozone setosa		1	7		5	1		1					4	3			2		2	
Chaetozone gibber								1												
Chaetozone christiei				7		46		17						2						
Chaetozone sp D		22		5	13	2		3					3	1			2	2		
Cirriformia tentaculata																		5		
Aphelochaeta sp								10												
Tharyx killariensis		43	15	18	12			24					2	14			5		5	
Monticellina sp			1		1															
Diplocirrus glaucus		5	5		4								9	1			6			
Capitella spp			47		1	1								1				1		
Mediomastus fragilis		50	4	25	2		18	89				3		69	1		3	56		
Notomastus sp	1	2	5				3	2				2	1				4	6		
Peresiella clymenoides		1																		
Arenicola marina											2									
Maldanidae spp juv			2				8						1							
Clymenura sp					1		5						1				3	11		
Euclymene oerstedi																	2	1		
Praxillella affinis			2		2								3					3		
Ophelia borealis															1					1
Travisia forbesii										2							1			4
Ophelina acuminata		2		1																
Polyophthalmus pictus																		2		
Scalibregma inflatum		3		6	1			1						1			1	1		
Scalibregma celticum		2																		
Polygordiidae spp	35								87			14		1	21					
Owenia borealis		1	3	2	3	8	2						1	1		1	1			
Galathowenia oculata		16	2	4	5								2	39			11			
Pectinariidae spp juv													2	1					5	

Table 2.4 continued

Taxon	Site																			
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Amphictene auricoma													1							
Lagis koreni							2													
Ampharetidae sp indet																	1			
Melinna palmata			7		11								2				10		14	
Ampharete falcata		1															1			
Ampharete lindstroemi								1					3	1					1	
Amphicteis gunneri													1							
Sosane sulcata																	5			
Terebellides stroemii		1			1															
Phisidia aurea		1																		
Pista bansei		28						4		38					1		1	1		
Pista mediterranea		2											1							
Polycirrus sp	5	1	1		5		16	3				10								
Streblosoma intestinale					1								1						2	
Chone duneri																		12		
Paradialychone filicaudata																		1		
Euchone rubrocincta																			1	
Euchone southerni		1																		
Jasmineira caudata		16	2	10	3									1	3					
Serpulidae spp indet																		4		
Hydroides elegans																		1		
Spirobranchus lamarcki												1						21		
Tubificoides amplivasatus			8																4	
Enchytraeidae sp		40						1										20		
Endeis spinosa																2				
Anoplodactylus petiolatus					2													1	3	
Cirripedia spp	P											P								
Nebalia sp indet																		1		
Apherusa bispinosa												2								

Table 2.4 continued

Taxon	Site																			
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Monoculodes carinatus															3			1		
Perioculodes longimanus																	1			
Pontocrates arenarius									4						1			1		
Synchelidium maculatum								1												1
Amphilochoides serratipes																		1		
Gitanopsis bispinosa												1								
Leucothoe lilljeborgi/incisa	1												1	2				1	2	
Urothoe elegans		1	1			1	12	9					5	25			6			
Urothoe marina		11					21	1							1	4		30		
Harpinia antennaria			1										1	7			7		7	
Metaphoxus fultoni	1							1				1						4		
Phoxocephalus holbolli							19													
Acidostoma obesum													1							
Hippomedon denticulatus									1											
Socarnes filicornis																		8		
Nototropis falcatus																3				
Atylus vedlomensis	1					1		2	4			2		7	1	1		21		
Dexamine spinosa														1				5		
Dexamine thea							1											1		
Guernea (Guernea) coalita		1							7									3		
Ampelisca brevicornis		1		2		5				16			1				3			
Ampelisca tenuicornis			1										1				22			
Ampelisca typica	1	4		1		1				2					2		1			
Bathyporeia elegans						15	8									7				29
Bathyporeia pilosa							2													
Gammaridae spp						16														
Abludomelita obtusata													1						4	
Animoceradocus semiserratus	1																			
Cheirocratus spp indet (female)		1					1	5				2		4	2					

Table 2.4 continued

Taxon	Site																			
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Cheirocratus assimilis								1												
Cheirocratus intermedius														3						
Maerella tenuimana														1						
Gammaropsis cornuta				3			1	1	2					1				4		
Microprotopus maculatus														1						
Photis longicaudata								18						2						
Ericthonius sp indet (female)														5						
Ericthonius difformis														3						
Jassa sp indet (female)																2		1		
Jassa falcata																1				
Aoridae spp indet (female)		7				2	2							9	1			7		
Aora gracilis						1								5						
Autonoe denticarpus															1					
Leptocheirus hirsutimanus		2																		
Leptocheirus pectinatus		1																		
Crassicorophium crassicorne							154	2					1					10		
Siphonoecetes (Centraloecetes) kroyeranus				1						1										7
Caprella acanthifera																		4		
Pariambus typicus		4		1	1		1							1						
Phtisica marina							2									3		1	1	
Isopoda sp?									29											
Gnathia sp indet (female)																1				
Cirolanidae sp juv	1																			
Natatolana borealis	1																			
Araphura brevimanus																			4	
Leptognathia paramanca																		1		
Tanaopsis graciloides				3	3	1		1						11						
Bodotria arenosa		2										1								
Iphinoe trispinosa		1				2														

Table 2.4 continued

Taxon	Site																			
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Eudorella truncatula			1																1	
Nannastacus brevicaudatus		1										1								
Pseudocuma simile										1										
Diastylis lucifera													1							
Diastylis rugosa										1										
Paguridae spp juv			1									1				1		1		
Galathea sp juv			1																	
Pisidia longicornis			1																	
Achaeus cranchii												1								
Liocarcinus navigator			1																	
Chaetoderma nitidulum			1																	
Polyplacophora spp juv		3										8			8			34		
Leptochiton asellus	1	2										11		1	3			78		
Testudinalia testudinalis																		5		
Patella pellucida														1				2		
Gibbula sp juv																		1		
Skenea serpuloides							1													
Lacuna vincta						1								7		88		10		
Rissoa parva						7					1					1		38		
Pusillina sarsii							1									1				
Onoba semicostata																		17		
Turritella communis													6				4		6	
Eulima bilineata												1								
Melanella alba															3					
Vitreolina philippi																		1		
Euspira nitida			1		1										1					
Hyala vitrea			1																	
Nassarius reticulatus																1				
Cylichna cylindracea			6		5								2							

Table 2.4 continued

Taxon	Site																			
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Philine spp					1				1	2					1					
Retusa obtusa															1					
Retusa umbilicata									1	1			1							2
Bivalvia sp									1											
Nuculidae sp juv													1							
Nucula nitidosa			3		5								1	1						
Nucula nucleus										1		2								
Nucula sulcata										1										
Mytilidae spp juv												1						2		
Glycymeris glycymeris juv												1								
Limatula gwyni	4																			
Pectinidae spp juv														1					3	
Anomiidae spp juv			3															2		
Lucinoma borealis			1	4	2			1						12			2	2		
Myrtea spinifera			2		1														1	
Thyasira spp juv		5	10	2	27								2				18		18	
Thyasira flexuosa		1	34	26	91			4					5	2			51		76	
Devonia perrieri			2																	
Kurtiella bidentata		1	487	34	394	1	11						91	1				9	6	
Tellimya ferruginosa						7								1						
Tellimya tenella				1																
Astartidae spp juv									2											
Goodallia triangularis										2		2			1					2
Cardiidae spp juv							2	2	1						5		1	13	1	
Acanthocardia sp juv													2							
Parvicardium scabrum																		2		
Spisula sp juv	2									1					3					
Spisula elliptica	2														6					
Ensis spp juv		4						3							1	1				2

Table 2.4 continued

Taxon	Site																		
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Phaxas pellucidus	1		2		1	1				2			3	2			3	2	18	
Tellina tenuis																5				6
Tellina fabula			7	8	3	61								25			27		6	
Moerella donacina	2	25		4				2		5				1		1				
Gari spp juv	3	1										7			12					
Gari fervensis														1						
Gari tellinella	11	1							9			7			11			1		
Abra spp juv		2	11		5			2		10										
Abra alba		1	3	18	15		2	9		1			1	3			4		2	
Abra nitida			2		2														4	
Abra prismatica										2			1	2			1			
Arctica islandica juv						1														1
Dosinia spp juv	2	6	1	4	4			1		6			2	3	1	1	1	5		6
Dosinia exoleta	2								1				1							
Tapes sp juv												2								
Polititapes aureus		1							2			3								
Chamelea striatula			4	4	2	12	1			1				3	3	3			1	7
Clausinella fasciata	5								1			15								
Timoclea ovata	1	3										11			1		1	3		1
Mysia undata					1															
Mya sp juv							2	8										13		
Corbula gibba					1			1					3					4		
Hiatella arctica																		1		
Thracioidea spp juv	6			1		8		3		27		1	2		2	3	9		2	5
Thracia phaseolina				11	2	7		1						1	1		6			2
Thracia villosiuscula																1				
Cochlodesma praetenue		6		4						4							2			13
Phoronis sp		1	2							2			12	2			4	1	1	
Asteroidea spp juv												2		1						

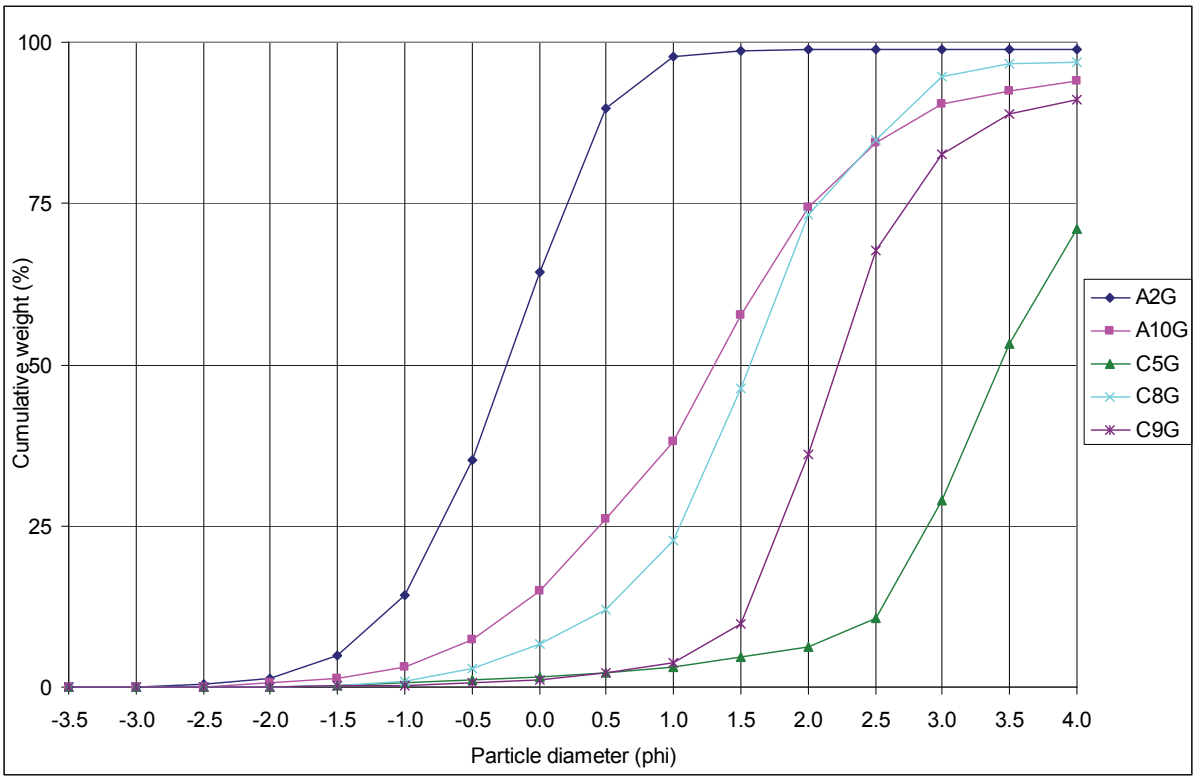
Table 2.4 continued

Taxon	Site																			
	A2	A10	C5	C8	C9	E5	G3	G7	I9	K3	L1	O1	P4	P8	Q1A	R2	S1	S4	T6	Z17
Ophiuroidea spp juv	6	1	2	1	4				1			1	4	4				10		
Amphiura chiajei			4		1								1						1	
Amphiura filiformis		1	97	1	40								66	2					3	
Amphipholis squamata	4	1										9		1				11		
Echinoidea spp juv		4	1	5	17		1			18		3		3	2		1	3		1
Echinocyamus pusillus	4	1					1		2			2			2					
Echinocardium sp juv						1														1
Echinocardium cordatum						1								1						
Holothuroidea sp indet															1					
Cucumariidae spp juv															5			1		
Leptosynapta bergensis	1		3				1		1				1					7		
Labidoplax buskii		1	1																	
Oestergrenia digitata					1								2						2	
Ascidiidae spp juv		2					3			3		5	2			1		4		1
Ascidiella aspersa																		7		
Branchiostoma lanceolatum	2																			
Ammodytidae sp juv												1								
Chaetognatha sp		1																		

Table 2.5. Abundance and diversity measures for infauna from the 2014 SCM grab survey, together with ascribed biotope. Also shown for comparison are abundance and taxon richness values from the 2003 survey. J' = Pielou evenness index, H' = Shannon-Wiener diversity index based on different log bases, ND = not determined.

Site	Total abundance		No. taxa		J'	H'(log_{10})	H'(log_2)	Biotope
	2014	2003	2014	2003	2014	2014	2014	2014
A2G	334	ND	51	ND	0.74	1.26	4.18	SS.SMp.Mrl.Pcal.Nmix
A10G	618	412	91	74	0.78	1.52	5.06	SS.SCS.CCS
C5G	955	ND	69	ND	0.52	0.96	3.20	SS.SMu.CFiMu.SpnMeg
C8G	431	430	53	68	0.78	1.34	4.44	SS.SMp.KSwSS.LsacR.Sa
C9G	826	356	70	78	0.55	1.01	3.37	SS.SMu.CSaMu.VirOphPmax
E5G	377	350	37	42	0.66	1.03	3.42	SS.SMp.KSwSS.LsacR.Sa
G3G	340	669	42	45	0.62	1.01	3.37	SS.SMp.KSwSS.LsacR.Sa
G7G	295	140	55	43	0.74	1.29	4.30	SS.SMp.KSwSS.LsacR.Sa
I9G	508	221	28	33	0.56	0.81	2.70	SS.SCS.ICS
K3G	183	172	38	25	0.79	1.25	4.16	SS.SSa.IFiSa
L1G	6	1	3	1	0.92	0.44	1.46	SS.SMu.IFiMu.Beg
O1G	285	209	56	60	0.87	1.52	5.04	SS.SCS.CCS
P4G	315	ND	64	ND	0.69	1.24	4.12	SS.SSa.CMuSa
P8G	491	895	73	80	0.77	1.43	4.74	SS.SMp.SSgr.Zmar
Q1AG	330	ND	50	ND	0.74	1.26	4.19	SS.SCS.CCS
R2G	142	307	27	55	0.51	0.73	2.44	SS.SMp.SSgr.Zmar
S1G	383	191	68	53	0.82	1.50	4.97	SS.SSa.IMuSa.EcorEns
S4G	713	ND	91	ND	0.81	1.58	5.24	SS.SMp.SSgr.Zmar SS.SMp.Mrl.Pcal.R
T6G	315	583	50	74	0.77	1.30	4.32	SS.SSa.IMuSa
Z17G	109	181	24	28	0.82	1.13	3.74	SS.SSa.IMuSa.EcorEns

Figure 2.1. Particle size analysis of sediment collected at grab survey stations, showing cumulative weight of sediment retained on sieves at 0.5 phi intervals.



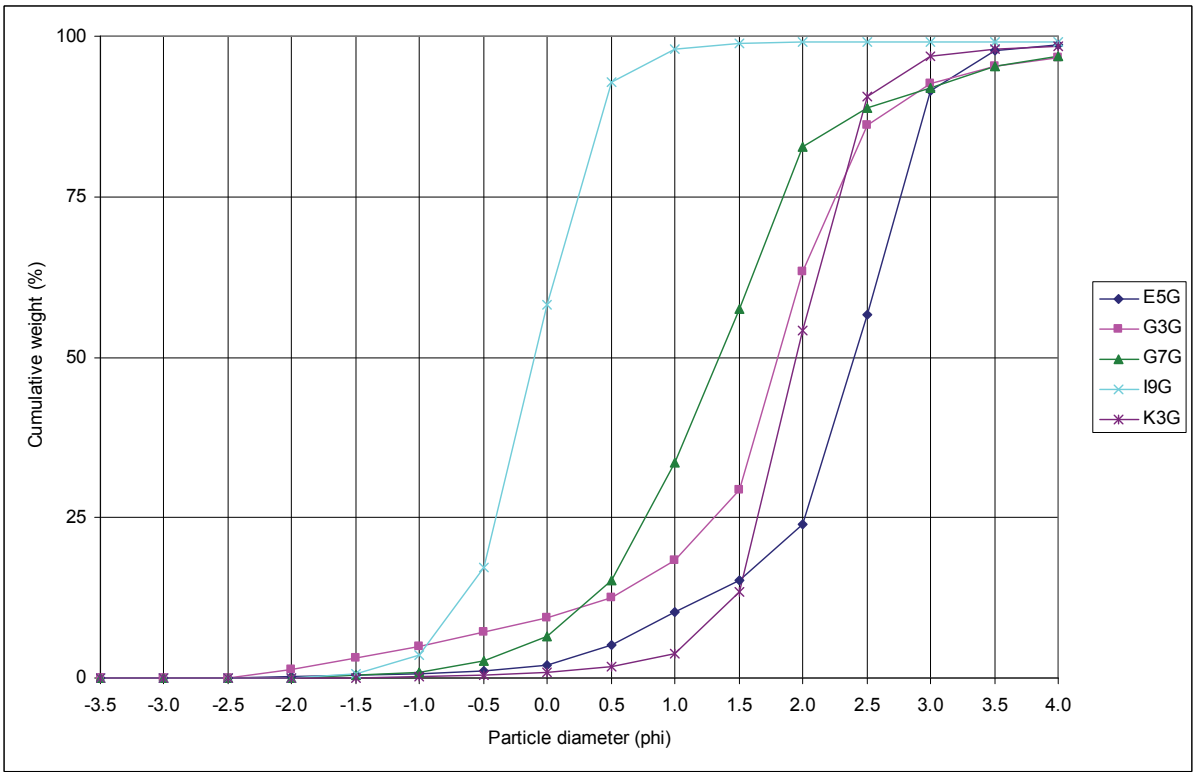
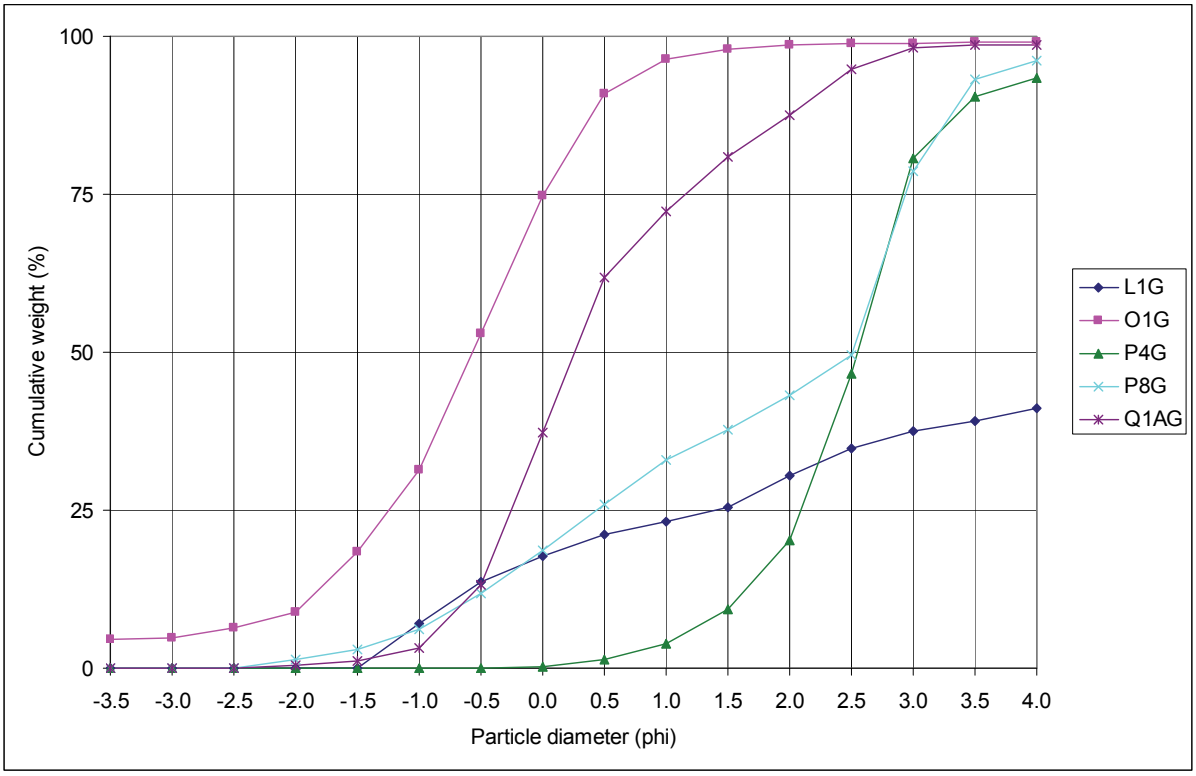
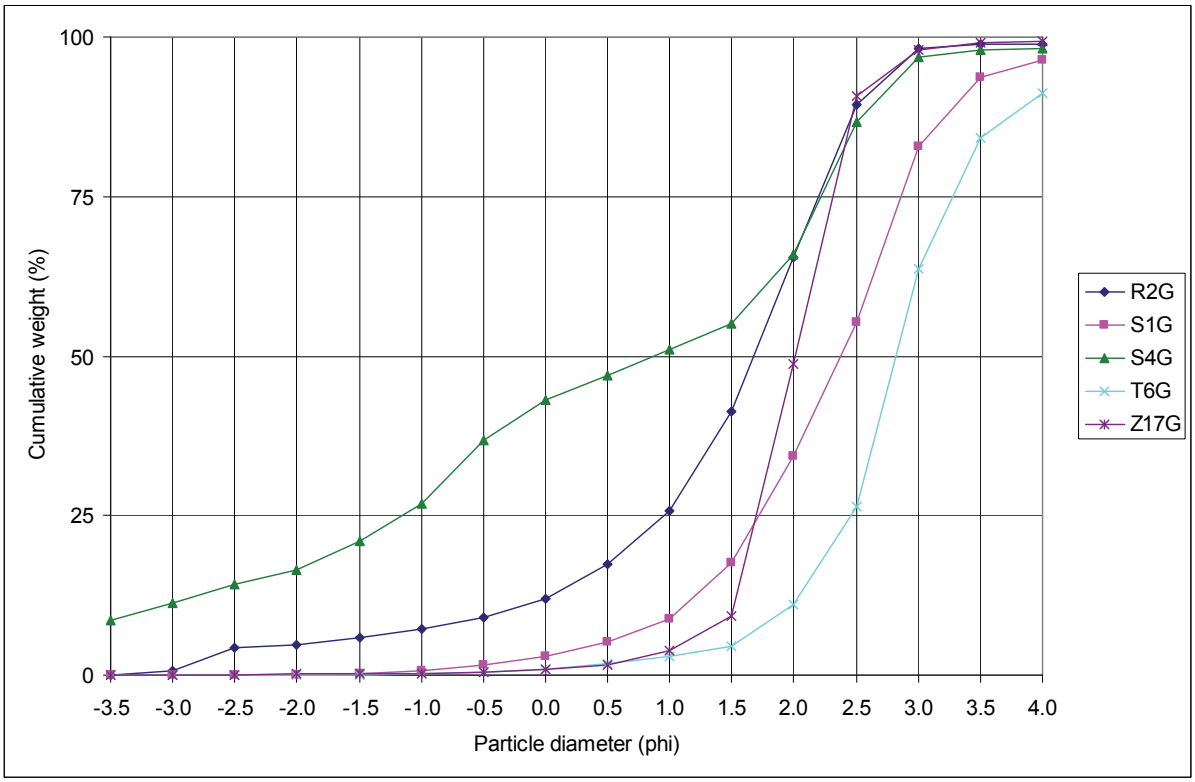


Figure 2.1 continued





ANNEX 3: MAERL SCM SURVEY DATA

Table 3.1. Descriptions of maerl transects where MNCR phase 2 surveys were carried out.

Site	Location	Date	Position (transect start)	Position (transect end)	Transect bearing (°M)	Depth transect start (m)	Depth transect end (m)	Habitat description	Biotope
C6T	Loch Ceann Traigh	02-Aug-14	56.76455 -5.89575	56.76473 -5.89600	327	7.4	8.0	Waves of maerl gravel with an amplitude of c. 0.2 m and wavelength of c. 1.0 - 1.5 m. The substrate was composed of live maerl (*Phymatolithon calcareum*) 25% (C), dead maerl and comminuted maerl 70% and sand 5%. Quadrat measures of maerl cover indicated the percentage cover of live and dead maerl to be respectively 26% and 71%. Unlike the living maerl, an algal turf was largely restricted to wave troughs and was strongly dominated by browns (25 - 30% cover), especially *Desmarestia aculeata* (C), *Saccharina latissima* (C) and *Dictyota dichotoma* (F). Dominant reds included the *Falkenbergia* stage of *Asparagopsis armata* (O) and *Brongniartella byssoides* (O). The presence of sparse *Heterosiphonia japonica* (R) was recorded.	SS.SMp. Mrl.Pcal. R
O3T	Open coast	03-Aug-14	56.82345 -5.87694	56.82346 -5.87653	92	17.2	17.1	Waves of maerl gravel and coarse sand with an amplitude of c. 0.2 m and wavelength of c. 0.9 - 1.0 m, with sparsely scattered shells and occasional boulders up to c. 80 cm.. Live *Phymatolithon calcareum*, estimated to cover c. 10% (F), was scattered over the transect band but concentrated in the troughs, where it reached 30 - 50% cover locally in 15 - 20 cm wide bands. Quadrat measures of maerl cover indicated the percentage cover of live and dead maerl to be respectively 10% and 87%. Sparse epibiota discernible included foliose and filamentous red algae including *Heterosiphonia japonica*, *Neopentadactyla mixta* (F) and *Asterias rubens* (F). Boulders supported *Laminaria hyperborea* (F), *Halecium halecinum* and an algal turf.	SS.SMp. Mrl.Pcal

Table 3.1 continued

Site	Location	Date	Position (transect start)	Position (transect end)	Transect bearing (°M)	Depth transect start (m)	Depth transect end (m)	Habitat description	Biotope
S6T	Loch Ailort	04-Aug-14	56.85297 -5.75093	56.85302 -5.75054	82	2.0	1.8	The substrate was composed of maerl on sand, with live *Phymatolithon calcareum* estimated to cover 50% of the seabed (A), and dead maerl and maerl gravel 50%. Quadrat measures of maerl cover produced estimates of 59% and 39% for live and dead maerl material respectively. The maerl supported a rich epiflora dominated by browns (50% cover), especially *Dictyota dichotoma* (A), *Chorda filum* (A) and *Saccharina latissima* (C). Red algae covered around 10% of the seabed, with dominant forms including *Brongniartella byssoides* (F) and *Bonnemaisonia asparagoides* (O). *Heterosiphonia japonica* was present at low density. Dominant faunal elements of the community included *Cerianthus lloydii* (C), *Lacuna vincta* (C), *Neopentadactyla mixta* (F), *Asterias rubens* (F) and *Ensis* sp. (F).	SS.SMp. Mrl.Pcal. R
Z59 T	Loch Moidart, South Channel	05-Aug-14	56.78654 -5.87164	56.78662 -5.87201	297	8.7	9.3	Poorly sorted substrate of sand, stone and shell gravel, pebbles and scattered shells, dense in places. In addition dead maerl and maerl gravel constituted perhaps 10 - 30% of the substrate with live *Phymatolithon calcareum* generally at low density (R) but frequent in patches. Quadrat measurement of maerl cover produced estimates of 5% overall (locally 15%) for live material and 25% for dead material. The substrate, especially the shell material, supported a red algal turf of around 30% cover, dominated by *Heterosiphonia plumosa* (C), *Bonnemaisonia asparagoides* (C) and *Phyllophora crispa* (F), together with sparse *H. japonica* (R). Dominant brown algae included *Saccharina latissima* (C) and *Dictyota dichotoma* (F). Commoner, conspicuous elements of the fauna included *Cerianthus lloydii* (C), *Chaetopterus variopedatus* (F), species of *Hyas* and *Macropodia* (both F), *Carcinus maenas* (F), *Asterias rubens* (F), *Pomatoschistus pictus* (F) and large bivalve siphons (F).	SS.SMp. Mrl.Pcal. R

Table 3.1 continued

Site	Location	Date	Position (transect start)	Position (transect end)	Transect bearing (°M)	Depth transect start (m)	Depth transect end (m)	Habitat description	Biotope
Y10T	Loch Ailort	06-Aug-14	56.84677 -5.72784	56.84682 -5.72745	82	6.7	7.2	Poorly sorted substrate of maerl and shell gravel with fairly dense pebbles, shells and scattered cobbles. A rock outcrop came within 1.5 m of the transect line near the start. Some stones were encrusted with *Lithothamnion glaciale* but the dominant free-living maerl species was *Phymatolithon calcareum*, with 30 - 40% cover of live thalli (C) and around 50% cover of dead material. Quadrat measures of maerl cover averaged 39% for live and 50% for dead material. A red algal turf with a coverage of around 30% was dominated by *Asparagopsis armata* (C) and *Phyllophora crispa* (F). *Heterosiphonia japonica* was generally rare, but dominated the algal turf on the rock outcrop. Brown algae included *Dictyota dichotoma* (C), *Halidrys siliquosa* (C), *Chorda filum* (C) and the kelps *Laminaria hyperborea* (C) and *Saccharina latissima* (C). Dominant faunal elements included *Lacuna vincta* (A), *Cerianthus lloydii* (F), serpulid worms (F) and *Pododesmus patelliformis* (F) on pebbles and shells, *Macropodia* sp. (F), *Neopentadactyla mixta* (F), *Luidia ciliaris* (F) and large bivalve siphons (F).	SS.SMp.Mrl.Pcal.R

Table 3.2. SACFOR abundance estimates of epibiota within band transects at five maerl sites derived by MNCR phase 2 diver survey. Nomenclature follows *WoRMS (2014)*.

Taxon	Transect				
	C6T	**O3T**	**S6T**	**Z59T**	**Y10T**
Porifera indet.			R		
Sycon ciliatum		P		P	P
Cliona caledoniae		P			
Cliona celata	P			P	R
Amphilectus fucorum			R	O	R
Halecium sp.?		P		O	
Halecium halecinum					R
Abietinaria abietina				O	
Kirchenpaueria pinnata				R	R
Nemertesia ramosa				O	R
Aglaophenia pluma					R
Sertularella sp.?				P	R
Obelia geniculata	P		R		
Obelia sp.?				O	
Alcyonium digitatum				P	
Cerianthus lloydii			C	C	F
Anemonia viridis			P	P	O
Urticina sp.				P	
Metridium senile				P	
Sagartia elegans				P	P
Halcampa chrysanthellum	P		O		
Chaetopterus variopedatus				F	P
Eupolymnia sp.?	P				
Lanice conchilega	P	P		O	O
Hydroides norvegicus	F	P		P	F
Spirobranchus lamarcki					P
Spirobranchus triqueter	F	P	R	R	F
Spirobranchus spp.	F				
Serpula vermicularis					P
Protula tubularia		P			
Spirorbinae indet.				P	P
Verruca stroemia		P		P	P
Balanus balanus	P	P		P	P
Balanus crenatus		P		P	F
Caridea indet.	P			P	O
Pandalus montagui	P				
Crangon crangon	P				
Pagurus bernhardus	F	F	O	O	P
Anapagurus hyndmanni			P		
Galathea intermedia		P		P	P
Pisidia longicornis				P	
Hyas sp.	P			F	
Hyas araneus					P
Inachus phalangium				P	
Inachus dorsettensis				P	

Table 3.2 continued

Taxon	Transect				
	C6T	O3T	S6T	Z59T	Y10T
Inachus sp.					P
Macropodia rostrata	O	P		F	F
Cancer pagurus				P	
Liocarcinus corrugatus	O		O		
Liocarcinus depurator	O	O	O	O	O
Liocarcinus pusillus	P				
Necora puber			P	P	
Carcinus maenas	P			F	P
Callochiton septemvalvis				P	
Leptochiton asellus		P			
Tonicella rubra			P		
Gibbula magus	P		P		O
Gibbula cineraria	P		O	P	P
Gibbula tumida	P				
Tectura sp.					O
Tectura virginea				P	
Lacuna vincta	A		A	P	A
Rissoa parva	A		P	P	P
Bittium reticulatum			P		P
Buccinum undatum				O	
Nassarius incrassatus					P
Natica egg cases		P	P	P	
Polycera faeroensis			P	P	
Lomanotus marmoratus				P	
Glycymeris glycymeris	F				
Pecten maximus			P		P
Aequipecten opercularis				P	O
Anomiidae sp.				P	
Heteranomia squamula	P	P			
Monia patelliformis					F
Venus casina				P	
Ensis sp.			F	F	F
Clausinella fasciata		P			
Polititapes rhomboides	P				
Lutraria angustior?	O	P			
Cephalopoda eggs		P			
Crisia aculeata					P
Crisia denticulata					P
Crisia eburnea				P	
Crisia ramosa				P	
Membranipora membranacea			R	R	P
Electra pilosa	P		R	P	P
Cradoscrupocellaria reptans			R	P	P
Scrupocellaria scruposa		P		O	R
Celleporella hyalina	P				
Escharoides mamillata	P				
Antedon bifida			O		
Crinoidea juv. indet.					P

Table 3.2 continued

Taxon	Transect				
	C6T	O3T	S6T	Z59T	Y10T
Luidia ciliaris		P	P	P	F
Astropecten irregularis				P	
Crossaster papposus			P	P	P
Henricia sp.				P	
Asterias rubens	C	F	F	F	
Marthasterias glacialis			P		
Ophiothrix fragilis	P		P		
Ophiura albida				P	
Amphiura spp.		P			
Echinus esculentus				P	P
Psammechinus miliaris				P	
Neopentadactyla mixta	P	F	F	P	F
Clavelina lepadiformis					P
Diplosoma listerianum	P		R	P	R
Corella parallelogramma	P	P			
Ascidiella aspersa	P		P		
Ascidiella scabra		P			
Ascidiella spp. juv.			P	P	O
Ascidia mentula	P			P	R
Botryllus schlosseri			R		P
Botrylloides leachii			R		
Pyura microcosmus					P
Pyura tessellata		P			
Molgula manhattensis				P	
Gadus morhua	P		P		P
Trisopterus minutus	P	P		P	P
Myoxocephalus scorpius					O
Taurulus bubalis	P	P	P		
Agonus cataphractus	P				
Ctenolabrus rupestris			P		P
Pholis gunnellus	O		O	O	O
Callionymus lyra	O	p	P	P	P
Pomatoschistus pictus	P		P	F	P
Pomatoschistus minutus?	F				
Eutrigla gurnardus		P			
Rhodophyta sp. encrusting		R			
Erythrotrichia carnea	P		P	P	P
Porphyropsis coccinea	R				
Colaconema sp.	P		P	R	P
Scinaia interrupta			P		P
Asparagopsis armata	O		R	P	C
Bonnemaisonia asparagoides	R		O	C	O
Bonnemaisonia hamifera		R	P	R	R
Dilsea carnosa				R	R
Dudresnaya verticillata			R		R
Grateloupia sp.			R		
Peyssonnelia dubyi			P	R	P
Corallinaceae pink crusts	R			P	R

Table 3.2 continued

Taxon	Transect				
	C6T	O3T	S6T	Z59T	Y10T
Corallinaceae pink crust on *Phyllophora*				P	P
Corallina officinalis			R		P
Lithothamnion glaciale					P
Lithothamnion glaciale?				P	
Mesophyllum lichenoides?				R	
Phymatolithon calcareum	C	F	A	R	C
Phyllophora crispa	R	R		F	F
Polyides rotunda					P
Plocamium cartilagineum	R		P	P	P
Halarachnion ligulatum				R	
Calliblepharis ciliata				R	
Cystoclonium purpureum	R			R	
Rhodophyllis divaricata	P			R	R
Cruoria pellita					P
Cordylecladia erecta				R	O
Chylocladia verticillata			R		R
Aglaothamnion tenuissimum				R	
Ceramium sp.	R				P
Ceramium virgatum			R		
Plumaria plumosa					R
Pterothamnion plumula		R	R	R	P
Acrosorium ciliolatum		R			
Apoglossum ruscifolium				R	R
Delesseria sanguinea	R	R			R
Membranoptera alata			R		
Nitophyllum punctatum	R			R	
Phycodrys rubens		R		R	
Heterosiphonia japonica	R	R	R	R	R
Heterosiphonia plumosa		R		C	P
Brongniartella byssoides	O		F	P	P
Polysiphonia sp.	P	R			P
Polysiphonia elongata				R	
Polysiphonia furcellata			R		
Pterosiphonia parasitica					R
Rhodomela lycopodioides				R	
Ectocarpus fasciculatus	R		P	R	
Hincksia sp.?	P				
Pseudolithoderma extensum	P	R		P	P
Stilophora tenella				R	
Sauvageaugloia divaricata?			R		
Cutleria multifida					R
Sphacelaria sp.?				P	
Sphacelaria cirrosa	R		P		P
Sphacelaria fusca			P	P	P
Sphacelaria plumula					P
Dictyota dichotoma	F	R	A	F	C
Sporochnus pedunculatus	O		P		
Desmarestia aculeata	C		O		

Table 3.2 continued

Taxon	Transect				
	C6T	**O3T**	**S6T**	**Z59T**	**Y10T**
Desmarestia viridis			R		
Asperococcus bullosus			R		R
Punctaria latifolia				R	
Dictyosiphon foeniculaceus					R
Scytosiphon lomentaria			R		
Chorda filum	P		A		C
Laminaria hyperborea		F	F		C
Saccharina latissima	C		C	C	C
Halidrys siliquosa			R		C
Ulva compressa	R				R
Ulva sp.	R			R	R
Ulva rigida			R		
Cladophora sp.				R	
Cladophora sericea			R		
Rhizoclonium riparium			R		
Ostreobium quekettii		P		P	
No. taxa	**74**	**47**	**79**	**111**	**109**

Table 3.3. Percentage of total sediment sample collected by sieves at 0.5 phi interval mesh sizes at five maerl transect sites.

Sieve (phi)	Transect				
	O3T	Z59T	S6T	C6T	Y10T
-3.50	0.58	1.41	0.93	0.21	0.56
-3.00	1.36	0.56	1.26	1.56	2.83
-2.50	1.37	1.67	8.16	5.60	4.40
-2.00	2.27	1.48	10.17	8.42	4.70
-1.50	9.50	3.75	19.82	15.07	10.51
-1.00	20.98	7.28	17.97	15.55	13.88
-0.50	34.88	10.80	13.49	21.24	16.12
0.00	13.22	8.76	4.15	12.69	9.51
0.50	3.12	11.49	1.49	3.69	7.29
1.00	1.69	15.38	1.37	2.43	5.91
1.50	1.34	15.55	1.18	1.72	6.09
2.00	1.60	8.33	1.85	2.00	5.37
2.50	1.17	3.30	3.61	2.43	3.15
3.00	1.00	1.70	2.46	4.03	1.84
3.50	0.45	1.62	1.78	1.38	0.83
4.00	0.22	1.43	0.90	0.35	0.54
>4	5.26	5.48	9.40	1.63	6.46

Table 3.4. Particle size characteristics of sediments from five maerl transect sites. $MD_{ø}$ = median grain diameter in phi units, Md_{μ} = median grain diameter in microns, $QD_{ø}$ = phi quartile deviation.

Transect	$MD_{ø}$	MD_{μ}	$QD_{ø}$	% gravel	% coarse sand	% medium sand	% fine sand	% silt/clay
O3T	-0.80	1741	0.23	5.59	83.39	2.94	2.84	5.26
Z59T	0.60	660	0.40	5.13	57.46	23.88	8.06	5.48
S6T	-1.22	2329	0.90	20.52	58.29	3.03	8.76	9.40
C6T	-0.90	1866	0.35	15.79	70.67	3.71	8.19	1.63
Y10T	-0.60	1516	1.19	12.49	63.24	11.45	6.36	6.46

Table 3.5. Abundance of infauna recorded in each of four replicate 10.3 cm diameter cores collected from band transects at five maerl sites. *Nomenclature follows WoRMS (2014).*

Taxa	Replicate																			
	S6T1	**S6T2**	**S6T3**	**S6T4**	**C6T1**	**C6T2**	**C6T3**	**C6T4**	**O3T1**	**O3T2**	**O3T3**	**O3T4**	**Y10T1**	**Y10T2**	**Y10T3**	**Y10T4**	**Z59T1**	**Z59T2**	**Z59T3**	**Z59T4**
Porifera sp	1						1													
Cerianthus lloydii		1																		
Edwardsia claparedii	1																			
Platyhelminthes spp			2												1					
Nemertea spp	3	2			1			1	1	2	1	1		1	3	2		2		
Tubulanus polymorphus			1																	
Nematoda spp	38	2	7	1	3	20	15	30	25	7	14	21	11	29	51	21	4	1	11	4
Spadella cephaloptera						1														
Golfingia sp juv																		1		
Golfingia (Golfingia) margaritacea	3		1										6	6	10	3				
Golfingia (Golfingia) vulgaris vulgaris					1			4												
Golfingia (Golfingia) elongata	5											1	3	1	6		1		1	
Nephasoma (Nephasoma) minutum?									6	3	11	12								
Pisione remota									2	2		2		2	10	1	1			
Enipo elisabethae								1								1				
Harmothoe spp juv/indet		1	4	2	2		1	2					1			6				
Malmgreniella mcintoshi															1	1				
Malmgreniella arenicolae																	1			
Harmothoe viridis				3																

Table 3.5 continued

Taxa	Replicate																			
	S6T1	S6T2	S6T3	S6T4	C6T1	C6T2	C6T3	C6T4	O3T1	O3T2	O3T3	O3T4	Y10T1	Y10T2	Y10T3	Y10T4	Z59T1	Z59T2	Z59T3	Z59T4
Malmgreniella darbouxi													1							
Pholoe inornata	3	1	5	4	1		2				1	1	1		1	2	2		1	
Pholoe baltica																			1	
Pseudomystides limbata		1			1							1		1	1					
Eumida sp indet													1							
Eumida sanguinea	3													2	1	1	1		1	
Nereiphylla sp indet										1										
Lacydonia miranda					1															
Glycera lapidum	3				1		1	4	2			1	2	1	2	1	6	1		
Goniadella gracilis																	1	1		1
Ephesiella abyssorum	1				2				3		1	1							1	
Hesionidae sp indet												1	1							
Gyptis propinqua								1					1							
Hesiospina aurantiaca				1	5	3	1	8					2	3	1	12	1		3	
Kefersteinia cirrata							2			1				1	1		1			
Oxydromus pallidus							1													
Eurysyllis tuberculata	1		4	2								1				1			1	
Syllis parapari ?									1		3									
Syllis fasciata ?												1					1		1	
Syllis spp indet									1											
Syllis sp H										1										
Syllis sp E					2	1		4				3	4	3	15	1	7	4		4
Trypanosyllis (Trypanosyllis) coeliaca	1		1	1			1	2					1	2	2	3	1			
Odontosyllis gibba					1		1					1								
Sphaerosyllis bulbosa						5	4	8	7		16	4	3	4	9	10	2		1	

Table 3.5 continued

Taxa	Replicate																			
	S6T1	S6T2	S6T3	S6T4	C6T1	C6T2	C6T3	C6T4	O3T1	O3T2	O3T3	O3T4	Y10T1	Y10T2	Y10T3	Y10T4	Z59T1	Z59T2	Z59T3	Z59T4
Sphaerosyllis hystrix						1		1												
Sphaerosyllis taylori	4		1				2							1	2	1				
Prosphaerosyllis tetralix						1														
Nereididae sp juv									1											
Micronereis variegata																			1	
Neanthes nubila		1																		
Pareurythoe borealis	1											1								
Aponuphis bilineata												1						1		1
Lysidice unicornis	1		1	1	1		1					1	9	14	5	8	2			1
Scoletoma magnidentata							1													
Protodorvillea kefersteini					2	1			3	1	1					1	5	1	6	
Aricidea (Acmira) cerrutii															1			1		
Paradoneis lyra	1													1				1		
Spionidae sp indet									1											
Aonides paucibranchiata						2	1							1			1		2	
Laonice bahusiensis																	1		2	
Dipolydora caulleryi																			1	
Dipolydora flava														1						
Aurospio banyulensis								1						2	1	1	1			
Pseudopolydora pulchra		1																		
Scolelepis korsuni																				1
Microspio mecznikowianus														1	1	5				
Caulleriella alata																			1	
Tharyx killariensis																	1			

Table 3.5 continued

Taxa	Replicate																			
	S6T1	**S6T2**	**S6T3**	**S6T4**	**C6T1**	**C6T2**	**C6T3**	**C6T4**	**O3T1**	**O3T2**	**O3T3**	**O3T4**	**Y10T1**	**Y10T2**	**Y10T3**	**Y10T4**	**Z59T1**	**Z59T2**	**Z59T3**	**Z59T4**
Chaetozone zetlandica																		1		
Pherusa plumosa		1																		
Macrochaeta clavicornis	3		1						1											
Mediomastus fragilis	12	14	7		3		2							1		1	14	3	24	1
Notomastus latericeus							2	1	1				2	2	1	2	2	4		1
Maldanidae spp indet	1	3	1																	
Lumbriclymene minor					2			1						1	3	1				
Leiochone johnstoni		1			1	1	1						1							
Euclymene oerstedi		1													1					
Praxillella affinis		1		1															1	
Ophelia celtica												1								
Scalibregma celticum																	1			
Polygordius spp	6		24		1	19		5	6	1		12			1		2		2	
Protodrilus sp?						2														
Galathowenia oculata			1																	
Owenia borealis			2																	
Trichobranchidae sp juvs				1										1	1					
Trichobranchus glacialis			1																	
Eupolymnia nesidensis			1	2																
Phisidia aurea																	1		2	
Pista mediterranea													1		1	1			3	2
Pista bansei		1														1	1			
Amaeana trilobata																	1			
Polycirrus norvegicus	4			1										1		1	3	1	5	3
Sabellidae sp indet														1				1		
Chone duneri													14	5	12				1	
Euchone southerni														2	2	5			1	1

Table 3.5 continued

Taxa	Replicate																			
	S6T1	**S6T2**	**S6T3**	**S6T4**	**C6T1**	**C6T2**	**C6T3**	**C6T4**	**O3T1**	**O3T2**	**O3T3**	**O3T4**	**Y10T1**	**Y10T2**	**Y10T3**	**Y10T4**	**Z59T1**	**Z59T2**	**Z59T3**	**Z59T4**
Serpulidae sp indet																1				
Hydroides norvegicus								2					1	2	1	3				
Spirobranchus sp indet														1						
Spirobranchus lamarcki								1					1	1	1	2				
Spirobranchus triqueter	1													1		2				
Serpula vermicularis														2	1	1				
Tubificidae sp A														1						
Tubificoides benedii		20	6	1																
Enchytraeidae sp B																			2	1
Grania sp					1	1						1		2	12	7	2		7	3
Callipallene brevirostris	1												1	1	2					1
Cirripedia spp					1				1		1									1
Verruca stroemia				1																
Ostracoda spp								1								2			1	
Heteromysis (Heteromysis) norvegica						4	1	6												
Gammaridea spp										1										
Apherusa bispinosa	2				6	4		1	1		2		2		3					
Oedicerotidae sp							1													
Gitana sarsi								1										1		
Leucothoe incisa	2																	1		
Urothoe elegans				1																
Urothoe marina																	6	5		1
Harpinia crenulata				1																
Metaphoxus fultoni				1	1		1	2	3		2	1	1	3	3	2				
Lysianassa ceratina																2				
Lysianassa plumosa	1	1	2										2	1	1	2				

Table 3.5 continued

Taxa	Replicate																			
	S6T1	S6T2	S6T3	S6T4	C6T1	C6T2	C6T3	C6T4	O3T1	O3T2	O3T3	O3T4	Y10T1	Y10T2	Y10T3	Y10T4	Z59T1	Z59T2	Z59T3	Z59T4
Socarnes erythrophthalmus	6		3	1	6	10	17	15	5								1		5	
Tmetonyx similis				1																
Austrosyrrhoe fimbriatus			2				1								1					
Liljeborgia kinahani	8		11	1	3	2	3	1								1				
Idunella mollis						1														
Nototropis vedlomensis						2				2					2		1		1	1
Dexamine thea				1																
Guernea (Guernea) coalita									1	2				1						
Animoceradocus semiserratus			1	3	7	2	5	7	1		2		1	3						
Cheirocratus sp female				1	1										1			1		
Cheirocratus assimilis																		1		
Cheirocratus sundevalli							1						1							
Othomaera othonis				1	1													1		
Gammaropsis lobata					3	3														
Gammaropsis maculata																				1
Gammaropsis cornuta											1									
Isaeidae spp female			1								1				1					
Microprotopus maculatus			1																	
Leptocheirus hirsutimanus	17		1	1			1	2					6	6	2	2		1		
Leptocheirus pectinatus				5	1		9	9									1			
Microdeutopus versiculatus				1									2							

Table 3.5 continued

Taxa	Replicate																			
	S6T1	S6T2	S6T3	S6T4	C6T1	C6T2	C6T3	C6T4	O3T1	O3T2	O3T3	O3T4	Y10T1	Y10T2	Y10T3	Y10T4	Z59T1	Z59T2	Z59T3	Z59T4
Crassicorophium bonellii		1		5												1				
Caprella acanthifera	1																			
Pseudoprotella phasma													1							
Gnathia praniza								1							3	3				
Gnathia vorax							1	1												
Anthura gracilis				1																
Eurydice pulchra														1						
Cymodoce truncata											1									
Tanaidacea spp indet								2												
Pseudoparatanais batei			1																	
Tanaopsis graciloides		1																		
Paratyphlotanais microcheles								7												
Vaunthompsonia cristata			2		1		1					1		1		1				
Paguridae sp juv/indet																	1			
Anapagurus hyndmanni		2	1	2																
Cestopagurus timidus												1								
Galathea intermedia									1		5		3							
Pisidia longicornis		1		5																
Rhopalomenia aglaopheniae	1																			
Leptochiton asellus	2			2	2		1		3		2	1	1		1	2				
Leptochiton cancellatus	4		3	3	7		2		9	6	12	6	2	5	2	10			3	2
Lepidochitona (Lepidochitona) cinerea			3	1																

Table 3.5 continued

Taxa	Replicate																			
	S6T1	S6T2	S6T3	S6T4	C6T1	C6T2	C6T3	C6T4	O3T1	O3T2	O3T3	O3T4	Y10T1	Y10T2	Y10T3	Y10T4	Z59T1	Z59T2	Z59T3	Z59T4
Callochiton septemvalvis															1		1			
Acanthochitona crinita		1		1																
Tectura virginea				1																
Patella pellucida								1												
Gibbula tumida					1						1									1
Rissoa parva					2										2					
Pusillina inconspicua													1							
Alvania beanii				3	1															
Onoba semicostata	1		2																	
Buccinum undatum juvs				2																
Cylichna cylindracea								1												
Retusa truncatula										2		1								
Nudibranchia sp A																1				
Nudibranchia sp B				1																
Cadulus sp?									1											
Crenella decussata									2		3									
Musculus subpictus													1							
Modiolus modiolus juvs		1													1	1				
Limatula subauriculata											1				1					
Pectinidae spp juv																				
Palliolum tigerinum												1								
Aequipecten opercularis																3				
Heteranomia squamula													2	1	2	6				
Lucinoma borealis		2	1																	
Kurtiella bidentata	32	3	84	3				1				1			4	7				
Goodallia triangularis	1								9		9	10			1					

Table 3.5 continued

Taxa	Replicate																			
	S6T1	**S6T2**	**S6T3**	**S6T4**	**C6T1**	**C6T2**	**C6T3**	**C6T4**	**O3T1**	**O3T2**	**O3T3**	**O3T4**	**Y10T1**	**Y10T2**	**Y10T3**	**Y10T4**	**Z59T1**	**Z59T2**	**Z59T3**	**Z59T4**
Cardiidae sp indet					1															
Parvicardium pinnulatum											1		1		1					
Parvicardium scabrum				1					2		2			2	5	7	1	1	1	1
Spisula elliptica										1										
Phaxas pellucidus																	1			
Gari tellinella			1	1				2	11		5	7				1	2	1	1	1
Abra alba				1																
Gouldia minima										1	2									
Dosinia sp juv			2																	
Dosinia exoleta									2								2			1
Polititapes rhomboides									1		1								1	
Clausinella fasciata									6	1	10	6		1						
Timoclea ovata																			1	
Mya truncata																			1	
Hiatella arctica	2		1	5									1			2				
Thracia phaseolina					2	2		1							3	1				
Thracia villosiuscula																			1	
Phoronis sp													1			2				
Antedon bifida juvs							1									5				
Asteroidea spp juv				1		1						1	1		1	2			1	
Ophiothrix fragilis		1																		
Ophiocomina nigra				1																
Amphiuridae spp juvs										1	4	4								
Amphipholis squamata juvs	37	5	49	32	19	30	27	61	4		5		1	6	8	8	11		5	5
Psammechinus miliaris				5					1		1									
Echinocyamus pusillus												1				1				
Ocnus sp indet				1																
Leptosynapta minuta						1			1			1								

Table 3.5 continued

Taxa	Replicate																			
	S6T1	S6T2	S6T3	S6T4	C6T1	C6T2	C6T3	C6T4	O3T1	O3T2	O3T3	O3T4	Y10T1	Y10T2	Y10T3	Y10T4	Z59T1	Z59T2	Z59T3	Z59T4
Enteropneusta sp		1																		
Chironomidae sp										1										

Table 3.6. Community descriptors for the infauna from each of four replicate 10.3 cm diameter cores collected from band transects at five maerl sites. *Diversity indices include the Shannon-Wiener function using* $\log_e$ (H'_e) and $\log_2$ (H'_2) and Peliou's evenness index (J').

Replicate	Abundance	No. Taxa	J'	H'_e	H'_2
C6T1	98	38	0.88	3.187	4.60
C6T2	120	25	0.78	2.496	3.60
C6T3	113	34	0.78	2.756	3.98
C6T4	200	38	0.74	2.704	3.90
O3T1	126	35	0.86	3.043	4.39
O3T2	37	19	0.91	2.676	3.86
O3T3	122	31	0.86	2.961	4.27
O3T4	112	35	0.82	2.924	4.22
S6T1	215	37	0.77	2.793	4.03
S6T2	72	28	0.80	2.651	3.83
S6T3	243	39	0.67	2.438	3.52
S6T4	119	49	0.84	3.254	4.70
Z59T1	96	40	0.88	3.247	4.69
Z59T2	37	24	0.93	2.967	4.28
Z59T3	105	38	0.84	3.054	4.41
Z59T4	40	24	0.94	2.976	4.29
Y10T1	99	40	0.87	3.213	4.64
Y10T2	133	47	0.84	3.248	4.69
Y10T3	214	56	0.80	3.217	4.64
Y10T4	185	58	0.89	3.623	5.23

Table 3.7. Quadrat (50 x 50 cm) measures of maerl and non-maerl substrates along 25 m x 4 m wide band transects by two recorders, GE (Graham Epstein) and LK (Lisa Kamphausen). Quadrat positioned along the transect using random numbers to the left (Lx) or right (Rx) of the transect tape. Quadrat displacement shows random lateral offset from the tape; 1 = contiguous with the tape, 2 = 0.5 m , 3 = 1.0 m, 4 = 1.5 m. Recording method: 1 = quadrat position only assessed by one worker, 2 = assessed by both workers with quadrat unmoved, 2R = assessed by both workers but quadrat relaid at position. Red figures denote possible underestimation according to surveyor.

Transect	Recorder	Quadrat	Transect distance (m)	Quadrat displace-ment	Live maerl (%)	Dead maerl (%)	Other substrate (%)	Recording method
C6T	GE	L1	0.00	3	25	75	0	2
C6T	GE	L2	4.13	4	20	80	0	2
C6T	GE	L3	5.22	3	20	70	10	2
C6T	GE	L4	6.04	1	20	70	10	2
C6T	GE	L5	7.30	2	25	75	0	2
C6T	GE	L6	8.74	2	20	75	5	2
C6T	GE	L7	14.56	1	25	75	0	2
C6T	GE	L8	17.36	3	10	90	0	2
C6T	GE	L9	21.29	2	15	75	10	2
C6T	GE	L10	22.20	1	20	80	0	2
C6T	GE	R1	0.37	2	15	80	5	2
C6T	GE	R2	2.06	3	40	55	5	2
C6T	GE	R3	5.91	1	30	65	5	2
C6T	GE	R4	6.56	1	15	75	10	2
C6T	GE	R5	13.57	3	25	60	15	2
C6T	GE	R6	14.92	3	10	90	0	2
C6T	GE	R7	17.27	1	15	85	0	2
C6T	GE	R8	18.41	4	15	75	10	2
C6T	GE	R9	20.44	4	20	80	0	2
C6T	GE	R10	23.67	2	10	85	5	2
C6T	LK	L1	0.00	3	35	65	0	2
C6T	LK	L2	4.13	4	35	65	0	2
C6T	LK	L3	5.22	3	25	75	0	2
C6T	LK	L4	6.04	1	30	70	0	2
C6T	LK	L5	7.30	2	40	60	0	2
C6T	LK	L6	8.74	2	35	65	0	2
C6T	LK	L7	14.56	1	35	65	0	2
C6T	LK	L8	17.36	3	20	80	0	2
C6T	LK	L9	21.29	2	35	65	0	2
C6T	LK	L10	22.20	1	25	75	0	2
C6T	LK	R1	0.37	2	25	75	0	2
C6T	LK	R2	2.06	3	50	50	0	2
C6T	LK	R3	5.91	1	45	55	0	2

Table 3.7 continued

Transect	Recorder	Quadrat	Transect distance (m)	Quadrat displace-ment	Live maerl (%)	Dead maerl (%)	Other substrate (%)	Recording method
C6T	LK	R4	6.56	1	20	80	0	2
C6T	LK	R5	13.57	3	50	50	0	2
C6T	LK	R6	14.92	3	20	80	0	2
C6T	LK	R7	17.27	1	35	65	0	2
C6T	LK	R8	18.41	4	30	70	0	2
C6T	LK	R9	20.44	4	40	60	0	2
C6T	LK	R10	23.67	2	30	70	0	2
O3T	GE	L1	0.00	3	5	94	1	1
O3T	GE	L2	4.13	4	15	85	0	1
O3T	GE	L3	5.22	3	3	87	10	1
O3T	GE	L4	6.04	1	7	88	5	1
O3T	GE	L5	7.30	2	2	93	5	1
O3T	GE	L6	8.74	2	6	89	5	1
O3T	GE	L7	14.56	1	4	86	10	2R
O3T	GE	L8	17.36	3	17	73	10	2R
O3T	GE	L9	21.29	2	4	86	10	2R
O3T	GE	L10	22.20	1	5	80	15	2
O3T	GE	R6	14.92	3	8	82	10	2R
O3T	GE	R7	17.27	1	14	81	5	2R
O3T	GE	R8	18.41	4	7	83	10	2R
O3T	GE	R10	23.67	2	12	83	5	2
O3T	LK	R1	0.37	2	20	80	0	1
O3T	LK	R2	2.06	3	25	75	0	1
O3T	LK	R3	5.91	1	5	95	0	1
O3T	LK	R4	6.56	1	7	93	0	1
O3T	LK	R5	13.57	3	5	95	0	1
O3T	LK	R6	14.92	3	10	90	0	2R
O3T	LK	R7	17.27	1	25	75	0	2R
O3T	LK	R8	18.41	4	15	85	0	2R
O3T	LK	R9	20.44	4	10	90	0	1
O3T	LK	R10	23.67	2	20	80	0	2
O3T	LK	L7	14.56	1	10	90	0	2R
O3T	LK	L8	17.36	3	20	80	0	2R
O3T	LK	L9	21.29	2	7	93	0	2R
O3T	LK	L10	22.20	1	10	90	0	2
S6T	GE	L1	0.00	3	40	60	0	1
S6T	GE	L2	4.13	4	90	10	0	1
S6T	GE	L3	5.22	3	12	88	0	1
S6T	GE	L4	6.04	1	17	78	5	1
S6T	GE	L5	7.30	2	95	5	0	1

Table 3.7 continued

Transect	Recorder	Quadrat	Transect distance (m)	Quadrat displace-ment	Live maerl (%)	Dead maerl (%)	Other substrate (%)	Recording method
S6T	GE	L6	8.74	2	95	5	0	2R
S6T	GE	L7	14.56	1	60	40	0	2R
S6T	GE	L8	17.36	3	95	2	3	2R
S6T	GE	L9	21.29	2	20	75	5	2R
S6T	GE	L10	22.20	1	80	15	5	2
S6T	GE	R6	14.92	3	20	75	5	2R
S6T	GE	R7	17.27	1	20	75	5	2R
S6T	GE	R8	18.41	4	45	50	5	2R
S6T	GE	R9	20.44	4	30	65	5	2R
S6T	GE	R10	23.67	2	35	60	5	2
S6T	LK	R1	0.37	2	60	40	0	1
S6T	LK	R2	2.06	3	90	10	0	1
S6T	LK	R3	5.91	1	90	10	0	1
S6T	LK	R4	6.56	1	70	30	0	1
S6T	LK	R5	13.57	3	80	15	5	1
S6T	LK	R6	14.92	3	50	40	10	2R
S6T	LK	R7	17.27	1	35	65	0	2R
S6T	LK	R8	18.41	4	35	65	0	2R
S6T	LK	R9	20.44	4	60	40	0	2R
S6T	LK	R10	23.67	2	40	55	5	2
S6T	LK	L6	8.74	2	98	2	0	2R
S6T	LK	L7	14.56	1	60	35	5	2R
S6T	LK	L8	17.36	3	93	7	0	2R
S6T	LK	L9	21.29	2	40	55	5	2R
S6T	LK	L10	22.20	1	60	40	0	2
Z59T	GE	L1	0.00	3	2	8	90	2
Z59T	GE	L2	4.13	4	2	28	70	2
Z59T	GE	L3	5.22	3	8	32	60	2
Z59T	GE	L4	6.04	1	2	38	60	2
Z59T	GE	L5	7.30	2	3	32	65	2
Z59T	GE	L6	8.74	2	5	15	80	1
Z59T	GE	L7	14.56	1	2	23	75	1
Z59T	GE	L8	17.36	3	1	6	93	1
Z59T	GE	L9	21.29	2	10	40	50	1
Z59T	GE	L10	22.20	1	15	25	60	2
Z59T	GE	R1	0.37	2	3	47	50	2
Z59T	GE	R2	2.06	3	3	47	50	2
Z59T	GE	R3	5.91	1	2	28	70	2
Z59T	GE	R4	6.56	1	2	28	70	2
Z59T	GE	R5	13.57	3	4	26	70	2

Table 3.7 continued

Transect	Recorder	Quadrat	Transect distance (m)	Quadrat displace-ment	Live maerl (%)	Dead maerl (%)	Other substrate (%)	Recording method
Z59T	GE	R10	23.67	2	2	18	80	2
Z59T	LK	R1	0.37	2	5	20	75	2
Z59T	LK	R2	2.06	3	3	15	82	2
Z59T	LK	R3	5.91	1	4	5	91	2
Z59T	LK	R4	6.56	1	2	5	93	2
Z59T	LK	R5	13.57	3	6	5	89	2
Z59T	LK	R6	14.92	3	5	5	90	1
Z59T	LK	R7	17.27	1	15	10	75	1
Z59T	LK	R8	18.41	4	3	5	92	1
Z59T	LK	R9	20.44	4	1	10	89	1
Z59T	LK	R10	23.67	2	3	3	94	2
Z59T	LK	L1	0.00	3	3	1	96	2
Z59T	LK	L2	4.13	4	5	10	85	2
Z59T	LK	L3	5.22	3	7	5	88	2
Z59T	LK	L4	6.04	1	2	20	78	2
Z59T	LK	L5	7.30	2	3	10	87	2
Z59T	LK	L10	22.20	1	15	5	80	2
Y10T	GE	L1	0.00	3	20	65	15	2
Y10T	GE	L2	4.13	4	85	5	10	2
Y10T	GE	L3	5.22	3	15	50	35	2
Y10T	GE	L4	6.04	1	30	65	10	2
Y10T	GE	L5	7.30	2	75	20	5	2
Y10T	GE	L6	8.74	2	12	73	15	1
Y10T	GE	L7	14.56	1	15	80	5	1
Y10T	GE	L8	17.36	3	30	65	5	1
Y10T	GE	L9	21.29	2	20	70	10	1
Y10T	GE	L10	22.20	1	5	75	20	1
Y10T	GE	R1	0.37	2	15	75	10	2
Y10T	GE	R2	2.06	3	25	65	15	2
Y10T	GE	R3	5.91	1	85	10	5	2
Y10T	GE	R4	6.56	1	75	15	10	2
Y10T	GE	R5	13.57	3	15	45	45	2
Y10T	LK	R1	0.37	2	30	68	2	2
Y10T	LK	R2	2.06	3	45	48	7	2
Y10T	LK	R3	5.91	1	70	20	10	2
Y10T	LK	R4	6.56	1	75	10	15	2
Y10T	LK	R5	13.57	3	30	65	5	2
Y10T	LK	R6	14.92	3	35	60	5	1
Y10T	LK	R7	17.27	1	70	25	5	1
Y10T	LK	R8	18.41	4	65	30	5	1

Table 3.7 continued

Transect	Recorder	Quadrat	Transect distance (m)	Quadrat displace-ment	Live maerl (%)	Dead maerl (%)	Other substrate (%)	Recording method
Y10T	LK	R9	20.44	4	25	75	0	1
Y10T	LK	R10	23.67	2	10	65	25	1
Y10T	LK	L1	0.00	3	25	70	5	2
Y10T	LK	L2	4.13	4	85	10	5	2
Y10T	LK	L3	5.22	3	30	15	55	2
Y10T	LK	L4	6.04	1	65	25	10	2
Y10T	LK	L5	7.30	2	80	5	15	2

Table 3.8. Site details for the video survey of maerl bed extent. Time given as BST as this matches the video overlay display.

Site	Date	Latitude start	Long-itude start	Latitude end	Long-itude end	Depth start (m)	Depth end (m)	Gear	Time start (BST)	Time end (BST)
C6E2	2/8/14	56.76815	-5.89105	56.76787	-5.89133	4.8	4.8	Diver	16:43:34	16:47:38
C6N5	23/7/14	56.76485	-5.89710	56.76490	-5.89747	6.5	5.6	Dropdown	10:06:31	10:09:24
C6S1	23/7/14	56.76322	-5.89278	56.76347	-5.89338	6.5	6.2	Dropdown	10:23:40	10:26:49
C6W1	23/7/14	56.76285	-5.89825	56.76320	-5.89880	6.1	6.5	Dropdown	11:42:26	11:45:20
O3E4	23/7/14	56.82173	-5.86950	56.82172	-5.86938	10.5	10.2	Dropdown	16:51:31	16:56:46
O3N1	23/7/14	56.82412	-5.87637	56.82428	-5.87600	16.2	14.8	Dropdown	17:24:32	17:26:55
O3S1	23/7/14	56.82273	-5.87725	56.82290	-5.87688	15.8	16.0	Dropdown	17:02:49	17:06:24
O3W3	23/7/14	56.82362	-5.87725	56.82363	-5.87693	16.1	15.7	Dropdown	17:19:09	17:20:39
O3X	23/7/14	56.82257	-5.87305	56.82280	-5.87275	13.4	13.5	Dropdown	17:40:10	17:43:44
S6E2	31/7/14	56.85303	-5.74688	56.85293	-5.74593	5.4	5.5	Dropdown	08:08:51	08:11:55
S6N2	31/7/14	56.85367	-5.75248	56.85360	-5.75188	5.0	3.4	Dropdown	07:53:04	07:55:47
S6W3	31/7/14	56.85291	-5.75459	56.85301	-5.75496	3.8	4.0	Mini dropdown	11:17:27	11:21:00
Y10E6	28/7/14	56.84668	-5.72570	56.84685	-5.72412	4.9	15.5	Dropdown	17:35:24	17:35:37
Y10S1	31/7/14	56.84582	-5.72818	56.84563	-5.72835	6.0	5.5	Dropdown	09:20:05	09:22:44
Y10W1	31/7/14	56.84770	-5.73663	56.84750	-5.73607	5.4	4.8	Dropdown	08:46:16	08:50:43
Y10W2	31/7/14	56.84762	-5.73183	56.84757	-5.73175	7.4	6.7	Dropdown	08:57:54	09:00:28
Z59E1	27/7/14	56.78687	-5.87048	56.78678	-5.87027	7.6	7.3	Dropdown	15:22:27	15:26:47
Z59NW1	27/7/14	56.78747	-5.87377	56.78753	-5.87342	11.5	10.9	Dropdown	15:00:10	15:08:25
Z59SE3	27/7/14	56.78593	-5.87092	56.78550	-5.87013	7.3	5.2	Dropdown	15:31:09	15:35:34

Table 3.9. Substrates, biota and biotopes recorded during the video survey of maerl bed extent.

Site	Substrate	Biota	Biotope	Comments
C6E2	Maerl	Live *Phymatolithon calcareum* (F) supporting algal turf of *Dictyota dichotoma* (F), filamentous reds (F), *Asperococcus* sp. (P) and *Desmarestia aculeata*? (R); *Chorda filum* (A). *Carcinus maenas* (P), *Cerianthus lloydii* (P)	SS.SMp.Mrl.Pcal.R	
C6N5	Maerl in low waves	Poor lighting but probably dense live maerl (locally C) in troughs. Algal turf with c. 20% cover including filamentous reds (P) and *Desmarestia aculeata* (O); *Chorda filum* (C), *Saccharina latissima* (O). *Liocarcinus* sp. (P), *Asterias rubens* (O)	SS.SMp.Mrl.Pcal.R	
C6S1	Waves of maerl and sand	Live *Phymatolithon calcareum* concentrated in troughs (where probably C). Algal turf includes filamentous reds (O-F), *Desmarestia aculeata* (O-F), with *Saccharina latissima* (C) and *Chorda filum* (P). *Asterias rubens* (P)	SS.SMp.Mrl.Pcal.R	
C6W1	Medium? sand with scattered dead maerl	Algal turf with c. 40% cover including filamentous reds (C), *Saccharina latissima* (F), *Chorda filum* (F), *Desmarestia aculeata* (P) and *Ulva* sp. (R). *Asterias rubens* (P), *Carcinus maenas* (O)	SS.SMp.KSwSS.LsacR.Sa	
O3E4	Coarse sand and maerl gravel	Sparse algal tufts, including filamentous reds (O), *Desmarestia aculeata* (drift?), drift weed, juvenile gadoids (P), Paguridae sp. (P). Live *Phymatolithon calcareum* may be present but at very low density (R)	SS.SCS.CCS	Uncertain biotope
O3N1	Waves of maerl/maerl gravel	Dense live *Phymatolithon calcareum* - overall C but locally A in troughs. *Neopentadactyla mixta* P, clumps of filamentous red algae (O), *Lanice conchilega* (P). Good example of deep maerl bed	SS.SMp.Mrl.Pcal.Nmix	
O3S1	Waves of maerl/maerl gravel with pebbles in troughs	Sparse tufts of filamentous red algae (R); juvenile gadoids (P), *Liocarcinus* sp. (P). Pebbles encrusted with pink coralline algae and a few thalli of live *Phymatolithon calcareum* in troughs but density very low (<1% - R)	SS.SCS.CCS	

Table 3.9 continued

Site	Substrate	Biota	Biotope	Comments
O3W3	Waves of maerl/maerl gravel with pebbles in troughs	Pebbles encrusted with pink coralline algae. Dense live *Phymatolithon calcareum* in troughs (where C in narrow band). *Neopentadactyla mixta* (O)	SS.SMp.Mrl.Pcal.Nmix	
O3X	Coarse sand and maerl gravel with scattered pebbles and cobbles	Cobbles support sparse *Laminaria hyperborea* (F) and foliose (R) and filamentous (R) red algae. Patches of sparse live *Phymatolithon calcareum* present but generally at very low density (R - <1%). *Asterias rubens* (O), *Liocarcinus* sp. (O), *Callionymus* sp. (P), juvenile gadoids (P)	SS.SCS.CCS	Uncertain biotope. Possible sparse maerl bed in places
S6E2	Pebbles	Pebbles support serpulid worms (P) and dense algal turf dominated by *Dictyota dichotoma* (A) and filamentous reds (C) including *Asparagopsis armata*; *Saccharina latissima* (P), *Halidrys siliquosa* (P), foliose reds (P), Juvenile gadoids (P)	SS.SMp.KSwSS.LsacR.CbPb	Uncertain biotope
S6N2	Maerl	Dense live *Phymatolithon calcareum* (A) supporting dense algal turf dominated by browns, especially *Dictyota dichotoma* (C-A); *Saccharina latissima* (C), *Chorda filum* (P), *Asperococcus bullosus* (P), *Halidrys siliquosa* (P), filamentous red (P). *Cerianthus lloydii* (P), juvenile gadoids (P)	SS.SMp.Mrl.Pcal.R	
S6W3	Maerl	Live *Phymatolithon calcareum* (C) supporting dense algal turf dominated by browns, especially *Dictyota dichotoma* (C-A) and filamentous reds (C) including *Asparagopsis armata*; *Saccharina latissima* (O), *Laminaria hyperborea* (O), *Chorda filum* (A), *Cerianthus lloydii* (C), *Asterias rubens* (F)	SS.SMp.Mrl.Pcal.R	
Y10E6	Maerl, pebbles and cobbles	Brief glimpse of patch of live *Phymatolithon calcareum* maerl (O-F) amongst areas of bedrock, boulders and cobbles	SS.SMp.Mrl.Pcal.R	Maerl ID checked in lab
Y10S1	Maerl on sand	Live maerl (C - largely *Phymatolithon calcareum*) and supporting algal turf dominated by filamentous reds including *Asparagopsis armata*; foliose reds (P), *Dictyota dichotoma* (P), *Saccharina latissima* (P), *Chorda filum* (P). *Liocarcinus* sp. (P), *Cerianthus lloydii* (P), *Pholis gunnellus* (P)	SS.SMp.Mrl.Pcal.R	Maerl ID checked in lab

Table 3.9 continued

Site	Substrate	Biota	Biotope	Comments
Y10W1	Pebbles, cobbles and maerl gravel	Patchy kelp with *Laminaria hyperborea* (C, locally A) and *Saccharina latissima* (P). *Halidrys siliquosa* (F), *Dictyota dichotoma* (C, locally A), foliose and filamentous red algae (P) including *Asparagopsis armata*). Live maerl, presumably largely *Phymatolithon calcareum*, widely present and probably at least F locally. *Echinus esculentus* (P)	SS.SMp.Mrl.Pcal.R, IR.MIR.KT.XKTX	Uncertain biotope
Y10W2	Pebbles, cobbles and maerl	Live maerl (F-C - largely *Phymatolithon calcareum*). Stones encrusted with pink coralline algae (P) and serpulid worms (P) and, together with maerl, supporting short, thin algal turf including *Dictyota dichotoma* (P) and foliose and filamentous red algae including *Asparagopsis armata* (P). *Laminaria hyperborea* (P), *Chorda filum* (P), *Ulva* sp. (R), *Echinus esculentus* (P), *Ctenolabrus rupestris* (P)	SS.SMp.Mrl.Pcal.R	
Z59E1	Medium sand with surface scatter of shell gravel, dead maerl and shells, dense locally	Fairly sparse and patchy algal turf (c. 10-15% cover) with filamentous reds (P), *Ulva* sp. (R), *Saccharina latissima* (O) and *Chorda filum* (R); *Phymatolithon calcareum* (R). *Cerianthus lloydii* (C), *Asterias rubens* (O), Paguridae spp. (P), *Carcinus maenas* (O)	SS.SMp.KSwSS.LsacR.Sa	Uncertain biotope due to algal sparcity
Z59NW1	Gravel and coarse sand with scattered shells and pebbles, locally dense	Sparse tufts of algae including reds (R), *Saccharina latissima* (O), *Chorda filum* (O). *Cerianthus lloydii* (C), *Neopentadactyla mixta* (P), *Asterias rubens* (O), *Henricia* sp. (R), *Carcinus maenas* (O), *Liocarcinus* sp. (O), Gobiidae sp. (P), juvenile gadoids (P), hydroids (R) including *Halecium halecinum*?, *Metridium senile* (R), *Amphilectus fucorum*? (R)	SS.SCS.CCS.Nmix	
Z59SE3	Coarse sand, gravel and scattered shells, dense locally	Fairly sparse and patchy algal turf (c. 10-15% cover) with filamentous reds (F-C), foliose reds (R), *Ulva* sp. (R), *Saccharina latissima* (F) and *Chorda filum* (R); *Phymatolithon calcareum* (R). *Cerianthus lloydii* (P), *Asterias rubens* (O), *Carcinus maenas* (O), Gobiidae sp. (P), juvenile gadoids (P),	SS.SMp.KSwSS.LsacR.Sa	Uncertain biotope due to algal sparcity

Table 3.10. Positional data for the 2003 maerl extent dropdown video survey. The coordinates reported in Moore et al. *(2004) are shown, together with corrected WGS84 coordinates. Assumed errors due to incorrect geodetic datum usage are shown in red.*

Site	Reported position				WGS84 position			
	Latitude start	Longitude start	Latitude end	Longitude end	Latitude start	Longitude start	Latitude end	Longitude end
O3W1	56.82427	-5.88008			56.82427	-5.88008		
O3W2	56.82398	-5.87827			56.82398	-5.87827		
O3W3	56.82363	-5.87728			56.82363	-5.87728		
O3E1	56.82288	-5.87423			56.82288	-5.87423		
O3E2	56.82245	-5.87347	56.82223	-5.87333	56.82245	-5.87347	56.82223	-5.87333
O3E3	56.82173	-5.87252			56.82173	-5.87252		
O3E4	56.82313	-5.87587			56.82313	-5.87587		
C6N1	56.76572	-5.89835			56.76572	-5.89835		
C6N2	56.76702	-5.90152			56.76702	-5.90152		
C6N3	56.76798	-5.90363			56.76798	-5.90363		
C6N4	56.76630	-5.89980			56.76630	-5.89980		
C6N5	56.76490	-5.89708			56.76490	-5.89708		
C6S1	56.76323	-5.89280			56.76323	-5.89280		
C6S2	56.76307	-5.89263			56.76307	-5.89263		
C6S3	56.76397	-5.89462			56.76397	-5.89462		
C6W1	56.76292	-5.89832			56.76292	-5.89832		
C6W2	56.76165	-5.90128			56.76165	-5.90128		
C6W3	56.76068	-5.90530			56.76068	-5.90530		
C6E1	56.76663	-5.89272			56.76663	-5.89272		
C6E2	56.76815	-5.89105			56.76815	-5.89105		
C6E3	56.76572	-5.89448			56.76572	-5.89448		
S6S1	56.84970	-5.75136	56.84982	-5.75162	56.84949	-5.75246	56.84960	-5.75272
S6S2	56.85159	-5.75121	56.85174	-5.75132	56.85137	-5.75231	56.85152	-5.75242
S6S3	56.85036	-5.75085	56.85055	-5.75132	56.85014	-5.75196	56.85033	-5.75243
S6S4	56.85207	-5.75191	56.85229	-5.75205	56.85185	-5.75301	56.85207	-5.75315
S6N1	56.85442	-5.75125	56.85411	-5.75146	56.85420	-5.75236	56.85389	-5.75256

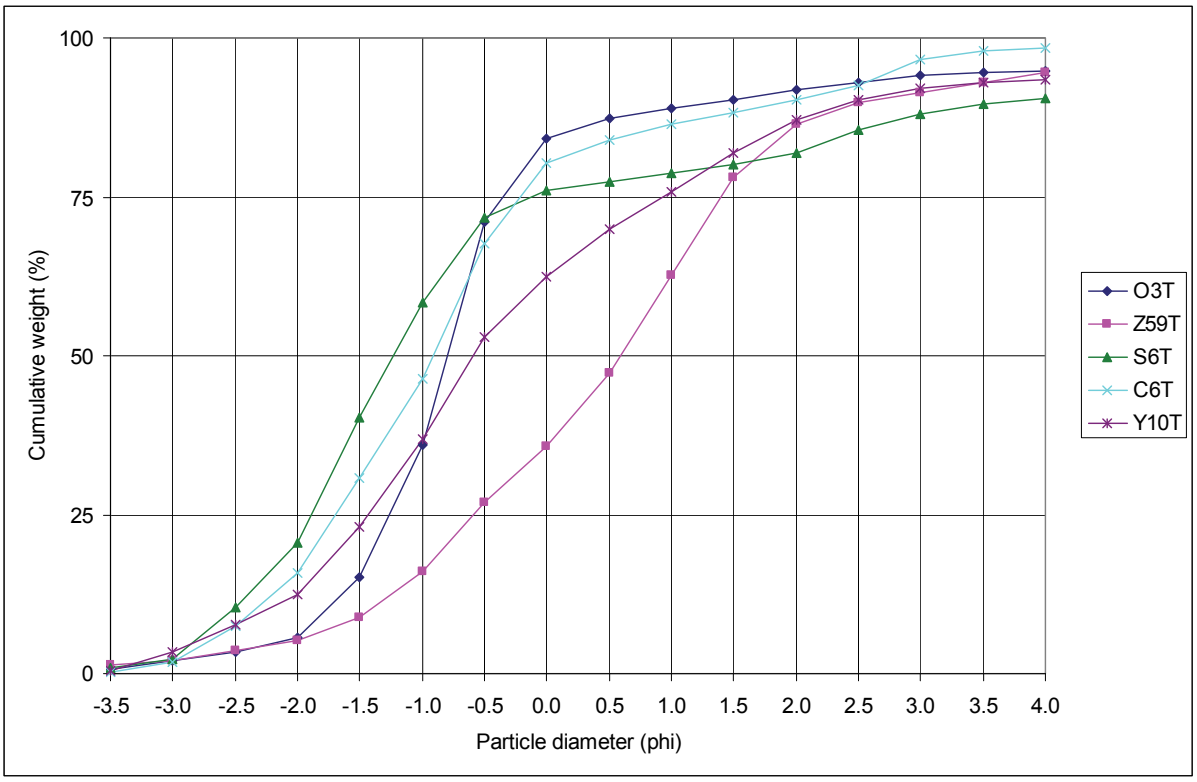
Table 3.10 continued

Site	Reported position				WGS84 position			
	Latitude start	Longitude start	Latitude end	Longitude end	Latitude start	Longitude start	Latitude end	Longitude end
S6N2	56.85393	-5.75115	56.85393	-5.75114	56.85371	-5.75226	56.85371	-5.75225
S6N3	56.85353	-5.75133	56.85360	-5.75167	56.85331	-5.75244	56.85338	-5.75277
S6N4	56.85328	-5.75125	56.85378	-5.75151	56.85306	-5.75236	56.85356	-5.75261
S6W1	56.85343	-5.75822	56.85345	-5.75871	56.85321	-5.75932	56.85323	-5.75981
S6W2	56.85319	-5.75575	56.85325	-5.75610	56.85297	-5.75685	56.85303	-5.75720
S6W3	56.85313	-5.75319	56.85318	-5.75353	56.85291	-5.75430	56.85296	-5.75463
S6E1	56.85284	-5.74273	56.85281	-5.74247	56.85262	-5.74384	56.85260	-5.74357
S6E2	56.85306	-5.74548	56.85341	-5.74607	56.85285	-5.74658	56.85320	-5.74718
S6E3	56.85306	-5.74905	56.85313	-5.74925	56.85285	-5.75016	56.85291	-5.75036
S6E4	56.85304	-5.74728	56.85326	-5.74756	56.85282	-5.74838	56.85304	-5.74867
Y10W1	56.84774	-5.73521	56.84810	-5.73603	56.84753	-5.73632	56.84789	-5.73714
Y10W2	56.84758	-5.73066	56.84812	-5.73067	56.84737	-5.73178	56.84790	-5.73178
Y10E1	56.85374	-5.71224	56.85410	-5.71182	56.85353	-5.71335	56.85388	-5.71293
Y10E2	56.85299	-5.71349	56.85353	-5.71307	56.85277	-5.71461	56.85331	-5.71419
Y10E3	56.85148	-5.71340	56.85162	-5.71341	56.85126	-5.71451	56.85141	-5.71452
Y10E4	56.84820	-5.71774	56.84835	-5.71726	56.84799	-5.71886	56.84813	-5.71836
Y10E5	56.84610	-5.71762	56.84608	-5.71766	56.84588	-5.71873	56.84587	-5.71878
Y10E6	56.84681	-5.72460	56.84699	-5.72458	56.84659	-5.72571	56.84677	-5.72569
Y10N1	56.84894	-5.72739	56.84915	-5.72730	56.84872	-5.72850	56.84893	-5.72840
Y10N2	56.85038	-5.72718	56.85059	-5.72688	56.85017	-5.72830	56.85037	-5.72799
Y10S1	56.84592	-5.72713	56.84617	-5.72710	56.84570	-5.72825	56.84595	-5.72821
Y10S2	56.84543	-5.72688	56.84556	-5.72702	56.84521	-5.72798	56.84534	-5.72813
Z59S1	56.78536	-5.87134	56.78540	-5.87128	56.78515	-5.87243	56.78519	-5.87236
Z59S2	56.78301	-5.87011	56.78310	-5.87000	56.78280	-5.87120	56.78289	-5.87108
Z59SE1	56.78448	-5.86768	56.78452	-5.86772	56.78427	-5.86876	56.78431	-5.86880
Z59SE2	56.78328	-5.86600	56.78324	-5.86600	56.78307	-5.86708	56.78303	-5.86708
Z59SE3	56.78614	-5.86981	56.78621	-5.86972	56.78593	-5.87090	56.78600	-5.87081

Table 3.10 continued

Site	Reported position				WGS84 position			
	Latitude start	Longitude start	Latitude end	Longitude end	Latitude start	Longitude start	Latitude end	Longitude end
Z59NE1	56.78898	-5.86745	56.78896	-5.86738	56.78877	-5.86854	56.78874	-5.86847
Z59NE2	56.78739	-5.86889	56.78796	-5.86880	56.78718	-5.86998	56.78775	-5.86989
Z59NE3	56.78728	-5.87033	56.78731	-5.87015	56.78707	-5.87141	56.78710	-5.87123
Z59NE4	56.78698	-5.87107	56.78702	-5.87098	56.78677	-5.87215	56.78681	-5.87207
Z59NW1	56.78766	-5.87268	56.78773	-5.87267	56.78745	-5.87376	56.78752	-5.87375
Z59NW2	56.79007	-5.87567	56.79009	-5.87569	56.78985	-5.87676	56.78988	-5.87678

Figure 3.1. Particle size analysis of sediment collected at maerl transect sites, showing cumulative weight of sediment retained on sieves at 0.5 phi intervals.



ANNEX 4: INSHORE DEEP MUD SURVEY DATA

Table 4.1. Site details for the video survey of inshore deep mud. Time given as BST as this matches the video overlay display.

Site	Date	Latitude start	Longitude start	Latitude end	Longitude end	Depth start (m)	Depth end (m)	Time start (BST)	Time end (BST)
DM01	25/07/2014	56.88608	-5.74713	56.88643	-5.74627	33.1	31.5	12:29:38	12:36:00
DM02	25/07/2014	56.88808	-5.76273	56.88832	-5.76238	31.3	31.1	12:13:38	12:19:37
DM03	25/07/2014	56.88160	-5.76022	56.88187	-5.75967	37.4	37.3	11:57:08	12:03:48
DM04	25/07/2014	56.87908	-5.77340	56.87908	-5.77223	36.3	36.9	11:41:07	11:48:18
DM05	25/07/2014	56.87280	-5.77835	56.87308	-5.77847	43.3	42.8	10:41:27	10:48:36
DM06	25/07/2014	56.88510	-5.79260	56.88537	-5.79312	30.6	30.4	11:23:01	11:29:00
DM07	25/07/2014	56.88202	-5.79545	56.88232	-5.79508	33.1	32.2	11:01:37	01:09:38
DM08	25/07/2014	56.86683	-5.79090	56.86663	-5.79135	45.6	45.0	10:24:06	10:31:07
DM09	25/07/2014	56.85842	-5.80167	56.85848	-5.80207	40.4	39.4	10:06:09	10:12:16
DM10	24/07/2014	56.84330	-5.79320	56.84357	-5.79228	36.3	35.9	17:08:45	17:13:41
DM11	24/07/2014	56.84422	-5.80333	56.84432	-5.80222	39.3	39.0	16:46:36	16:51:43
DM12	25/07/2014	56.86280	-5.81998	56.86238	-5.81975	40.1	38.8	09:48:57	09:55:25
DM13	25/07/2014	56.87472	-5.86290	56.87482	-5.86278	33.7	33.7	09:23:16	09:29:13
DM14	25/07/2014	56.85935	-5.86532	56.85933	-5.86547	46.5	46.5	08:56:31	09:01:14
DM15	24/07/2014	56.84423	-5.85967	56.84403	-5.85868	65.2	66.6	15:26:21	15:35:41
DM16	24/07/2014	56.82620	-5.91663	56.82623	-5.91585	58.3	58.0	14:07:00	14:11:50
DM17	22/07/2014	56.80210	-5.95130	56.80207	-5.95025	41.8	37.7	12:45:40	12:50:36
DM18	22/07/2014	56.77233	-5.91877	56.77217	-5.91825	32.9	32.7	15:51:28	15:55:01
DM19	28/07/2014	56.86330	-5.70975	56.86347	-5.70872	49.1	41.5	15:36:39	15:41:24
DM20	28/07/2014	56.86818	-5.70198	56.86848	-5.70145	34.3	33.6	15:25:01	15:27:35
DM21	28/07/2014	56.87235	-5.69483	56.87247	-5.69430	34.1	33.3	15:13:28	15:16:19
DM22	28/07/2014	56.87523	-5.68995	56.87522	-5.68940	30.2	29.6	15:03:34	15:06:10
DM23	28/07/2014	56.87172	-5.68675	56.87178	-5.68608	27.7	27.4	14:49:44	14:55:14
DM24	28/07/2014	56.87228	-5.68032	56.87247	-5.67967	22.0	20.7	14:38:10	14:41:17
DM25	28/07/2014	56.87710	-5.68500	56.87732	-5.68437	18.8	12.8	14:25:47	14:30:43

Table 4.2. Substrates, biota and biotopes recorded during the video survey of inshore deep mud.

Site	Substrate	Biota	Biotope1	Comments
DM01	Soft mud	Fairly lightly burrowed mud with *Nephrops norvegicus* (C) and possibly *Jaxea nocturna* (P). A few small mounds (<20 cm diameter), probably *Callianassa subterranea* (P), and some larger ones of *Maxmuelleria lankesteri* (P). *Amphiura* spp. (S), *Funiculina quadrangularis* (F), *Virgularia mirabilis* (O)	SS.SMu.CFiMu.SpnMeg.Fun	Could also be attributed to MegMax
DM02	Soft mud	Fairly lightly burrowed mud with *Nephrops norvegicus* (C), *Jaxea nocturna?* (P) and *Calocaris macandreae*? (P). A few small mounds (<20 cm diameter), possibly *Callianassa subterranea* (P) and a few large of *Maxmuelleria lankesteri* (P). *Amphiura* spp. (S), *Funiculina quadrangularis* (O), *Virgularia mirabilis* (O, locally F)	SS.SMu.CFiMu.SpnMeg.Fun	Could also be attributed to MegMax
DM03	Soft mud	Moderately well-burrowed mud with *Nephrops norvegicus* (C), *Jaxea nocturna* (P) and possibly Calocaris macandreae (P) A few small mounds (<20 cm diameter) and a few large, with *Callianassa subterranea* and *Maxmuelleria lankesteri* probably present. *Amphiura* spp. (S), *Funiculina quadrangularis* (F), *Virgularia mirabilis*? (P)	SS.SMu.CFiMu.SpnMeg.Fun	Could also be attributed to MegMax
DM04	Soft mud	Well-burrowed mud visually dominated by the burrows of *Nephrops norvegicus* (C) and *Maxmuelleria lankesteri* (P), including some large mounds. Other burrowers include *Jaxea nocturna* (P) and probably *Calocaris macandreae* (P). Many small mounds (<20 cm diameter) including those of *Callianassa subterranea* (P). *Virgularia mirabilis* (O, locally F), *Funiculina quadrangularis* (O), *Amphiura* spp. (S), small teleosts (P), *Liocarcinus* sp. (P)	SS.SMu.CFiMu.SpnMeg.Fun	Could also be attributed to MegMax
DM05	Soft mud	Very poor visibility. *Nephrops norvegicus* burrows (P), *Calocaris macandreae*? (P), small mounds (<20 cm diameter; P) including probably those of *Callianassa subterranea* (P) and sparse large mounds of *Maxmuelleria lankesteri* (P). *Amphiura* spp. (S), *Chaetopterus variopedatus*? (P)	SS.SMu.CFiMu.MegMax	
DM06	Soft mud	Fairly lightly burrowed mud, with *Nephrops norvegicus* (F-C) and sparse small mounds (<20 cm diameter) including probably those of *Callianassa subterranea* (P). *Virgularia mirabilis* (F), *Funiculina quadrangularis* (O), *Amphiura* spp. (S)	SS.SMu.CFiMu.SpnMeg.Fun	

Table 4.2 continued

Site	Substrate	Biota	Biotope1	Comments
DM07	Soft mud	Fairly lightly burrowed mud, with *Nephrops norvegicus* (F) and possibly *Maxmuelleria lankesteri* (P) and *Callianassa subterranea* (P). *Virgularia mirabilis* (F), *Funiculina quadrangularis* (O), *Amphiura* spp. (S)	SS.SMu.CFiMu.SpnMeg.Fun	Could also be attributed to MegMax
DM08	Soft mud	Moderately well-burrowed mud with *Nephrops norvegicus* (C). A few small mounds (<20 cm diameter) and a few large of *Maxmuelleria lankesteri* (P). Possible indications of the presence of *Callianassa subterranea*, *Jaxea nocturna* and *Calocaris macandreae*. *Amphiura* spp. (S), *Virgularia mirabilis* (R)	SS.SMu.CFiMu.MegMax	
DM09	Soft mud	Fairly well-burrowed mud with *Nephrops norvegicus* (C). Small (<20 cm diameter) mounds (F) and a few larger mounds of *Maxmuelleria lankesteri* (P). *Callianassa subterranea* shafts are visible and *Calocaris macandreae* and *Jaxea nocturna* may be present. *Virgularia mirabilis* (R), *Amphiura* spp. (P)	SS.SMu.CFiMu.MegMax	
DM10	Soft mud	Fairly well-burrowed mud with *Nephrops norvegicus* (C). Small (<20 cm diameter) mounds (F) and a few larger mounds of *Maxmuelleria lankesteri* (P). Burrows of *Callianassa subterranea* are evident (P) and *Calocaris macandreae* may be present. *Virgularia mirabilis* (R), *Amphiura* spp. (S), *Asterias rubens* (P), *Liocarcinus* sp. (O), Pleuronectiformes sp. (P), teleosts spp. (P)	SS.SMu.CFiMu.MegMax	
DM11	Soft mud	Fairly well-burrowed mud with *Nephrops norvegicus* (C; 1 animal seen), *Callianassa subterranea* (P) and possibly *Calocaris macandreae* (P) and *Jaxea nocturna* (P). Some low mounds are suggestive of *Maxmuelleria lankesteri* (P). *Amphiura* spp. (A), *Goneplax rhomboides* (P), *Virgularia mirabilis* (F), *Funiculina quadrangularis*? (1 highly uncertain specimen), *Liocarcinus* sp. (P), teleost sp. (P)	SS.SMu.CFiMu.MegMax	Uncertain biotope
DM12	Soft mud	Fairly well-burrowed mud with *Nephrops norvegicus* (C), *Jaxea nocturna* (P), probably *Calocaris macandreae* (P) and possibly *Goneplax rhomboides* (P). Mounds present (F) including relatively small mounds of *Maxmuelleria lankesteri* (P). Inhalant and exhalent openings of *Callianassa subterranea* are evident (P). Pleuronectiformes sp. (P)	SS.SMu.CFiMu.MegMax	

Table 4.2 continued

Site	Substrate	Biota	Biotope1	Comments
DM13	Soft mud	Visibility very poor but burrows of *Nephrops norvegicus* present and possibly *Callianassa subterranea* (P). Sparse large mounds of *Maxmuelleria lankesteri*, *Virgularia mirabilis* (O)	SS.SMu.CFiMu.MegMax	Uncertain biotope
DM14	Soft mud	Fairly well-burrowed mud with *Nephrops norvegicus* (C) and some small (<20 cm diameter) and a few larger mounds, possibly *Maxmuelleria lankesteri* (P). Other burrow features suggest the presence of *Jaxea nocturna*, *Callianassa subterranea*, *Calocaris macandreae* and *Thracia convexa*.	SS.SMu.CFiMu.MegMax	Uncertain biotope
DM15	Soft mud	Fairly heavily mounded sediment with some large *Maxmuelleria lankesteri* mounds. Megafaunal burrows including *Nephrops norvegicus* (C) and possibly *Callianassa subterranea*, *Jaxea nocturna* and *Calocaris macandreae*. *Virgularia mirabilis?* (R), Teleost spp. (P) including Triglidae sp. (P), *Processa nouveli holthuisi*? (P)	SS.SMu.CFiMu.MegMax	
DM16	Soft mud	Poor visibility. A repeated run with steep camera angle. Heavily mounded sediment with large mounds of *Maxmuelleria lankesteri*. Megafaunal burrows include *Nephrops norvegicus* (1 animal seen) and possibly *Callianassa subterranea* (P), *Calocaris macandreae* (P) and *Jaxea nocturna* (P).	SS.SMu.CFiMu.MegMax	
DM17	Mud	Very dense mounds, including those of *Maxmuelleria lankesteri* (P). Burrows include those of *Nephrops norvegicus* (P, 2 animals seen), *Goneplax rhomboides* (P, 1 animal seen) and possibly *Callianassa subterranea* (P). *Lesueurigobius friesii*? (P), *Munida rugosa* (P), *Luidia ciliaris* (P), small teleosts (P), *Liocarcinus* sp. (P)	SS.SMu.CFiMu.MegMax	
DM18	Soft mud	Moderately densely mounded sediment including those of *Maxmuelleria lankesteri* (P). *Nephrops norvegicus* (P) and *Callianassa subterranea* (P) burrows, *Pennatula phosphorea* (R), *Liocarcinus* sp.? (R), small teleosts (P)	SS.SMu.CFiMu.MegMax	
DM19	Mud	Sediment with black anaerobic marbling and patches of *Beggiatoa*. Dense emergent faunal tubes?, possibly *Polydora* sp. (C-A), and *Oxydromus flexuosus* (P). *Asterias rubens* (P), small teleosts (P), *Scyliorhinus* sp.? (P), *Metridium senile* (R), clumps of *Protanthea simplex* on drift algae (O)	SS.SMu.IFiMu.Beg	

Table 4.2 continued

Site	Substrate	Biota	Biotope1	Comments
DM20	Mud	Sediment with black anaerobic marbling and patches of *Beggiatoa*. Dense emergent faunal tubes?, possibly *Polydora* sp. (A), and *Oxydromus flexuosus* (C). *Asterias rubens* (O), *Ophiura ophiura* (P), small teleosts (P), Pleuronectiformes sp. (P)	SS.SMu.IFiMu.Beg	
DM21	Mud	Sediment with black anaerobic marbling. Dense emergent faunal tubes?, possibly *Polydora* sp. (A), and *Oxydromus flexuosus* (C). Sparse small burrows evident. *Asterias rubens* (F), small teleosts (P), Pleuronectiformes sp. (P), *Protanthea simplex* (R), Ophiuroidea sp. (R)	SS.SMu.IFiMu.Beg	
DM22	Mud	Sediment with black anaerobic marbling and patches of *Beggiatoa*. Dense emergent faunal tubes?, possibly *Polydora* sp. (A), and *Oxydromus flexuosus* (C). *Asterias rubens* (O)	SS.SMu.IFiMu.Beg	
DM23	Mud	Sediment with black anaerobic marbling and patches of *Beggiatoa*. Dense emergent faunal tubes?, possibly *Polydora* sp. (A), and *Oxydromus flexuosus* (C). *Ophiura ophiura* (O), small teleosts (P)	SS.SMu.IFiMu.Beg	
DM24	Mud	*Ophiura ophiura* (F), *Asterias rubens* (F), *Oxydromus flexuosus*? (F), *Cerianthus lloydii* (O), small teleosts (P)	SS.SMu.IFiMu.Beg	Uncertain biotope. Probably transitional
DM25	Sandy mud	*Nephrops norvegicus* burrows (C), large mounds of *Maxmuelleria lankesteri* (O) and small mounds also present. Probable inhalent shafts of *Callianassa subterranea,* possible burrows of *Calocaris macandreae* and possible *Thracia convexa* siphon holes. Clumps of *Protanthea simplex* (P) attached to stones? and possibly to *Chaetopterus variopedatus* tubes (O). *Amphiura* spp. (locally A), *Asterias rubens* (O), *Aequipecten opercularis* (R), *Inachus* sp. (P), *Pagurus prideaux* (R) with *Adamsia carciniopados* (R), small teleosts (P) including *Lesueurigobius friesii*?, *Ascidiella aspersa*? (R)	SS.SMu.CFiMu.MegMax	

Table 4.3. Details of infaunal sampling for the inshore deep mud survey. At stations where single grab samples were collected, the fauna retained on a 1 mm sieve was subjected to quantitative laboratory analysis.

Site	Date	Time (UT)	Position	Depth (m)	Sediment type	Fauna	# grabs	Gear
DM01	06/08/2014	09:14-09:21	56.88610 -5.74722 to 56.88487 -5.75313	33.0 - 36.0		Dense *Amphiura* spp.		Naturalist dredge
DM02	25/07/2014	13:53:49	56.88812 -5.76287	31.1	soft mud	*Amphiura* spp., spatangid test material	3	van Veen
DM02	06/08/2014	09:33-09:39	56.88812 -5.76287 to 56.88562 -5.76428	31.0 - 39.0		Dense *Amphiura* spp.		Naturalist dredge
DM03	25/07/2014	12:20:23	56.88165 -5.76034	37.3	soft mud	Several remains spatangid tests, *Amphiura* spp. (S)	5	van Veen
DM03	06/08/2014	08:45-09:00	56.88165 -5.76034 to 56.88038 -5.76457	37.8 - 37.9		*Brissopsis lyrifera* 1, many *Amphiura* spp.		Naturalist dredge
DM03	25/07/2014	13:16:17	56.88165 -5.76034	37.4	soft mud	*Amphiura* spp.	1	van Veen
DM04	06/08/2014	09:49-09:59	56.87914 -5.77361 to 56.87507 -5.77902	36.3 - 38.5		Dense *Amphiura* spp.		Naturalist dredge
DM05	25/07/2014	16:05:49	56.87285 -5.77836	42.9	soft mud	*Amphiura* spp., spatangid test material	3	van Veen
DM07	25/07/2014	14:33:39	56.88204 -5.79570	32.9	soft mud	*Amphiura* spp. (S), spatangid test material, *Virgularia* 1	5	van Veen
DM07	06/08/2014	10:12-10:22	56.88253 -5.79403 to 56.88052 -5.79722	33.0 - 33.6		Dense *Amphiura* spp.		Naturalist dredge
DM07	06/08/2014	10:33-10:43	56.88250 -5.79428 to 56.88073 -5.79732	33.1 - 33.4		Dense *Amphiura* spp., several *Virgularia*		Naturalist dredge
DM07	25/07/2014	14:33:39	56.88205 -5.79553	32.9	soft mud	*Amphiura* spp.	1	van Veen
DM10	26/07/2014	09:45:03	56.84330 -5.79302	36.4	sandy mud	*Amphiura* spp. (S), large pieces spatangid test material	5	van Veen

Table 4.3 continued

Site	Date	Time (UT)	Position	Depth (m)	Sediment type	Fauna	# grabs	Gear
DM10	26/07/2014	10:31:41	56.84328 -5.79300	36.7	sandy mud	*Amphiura* spp. (S)	1	van Veen
DM12	26/07/2014	09:05:23	56.86282 -5.81999	40	soft mud	*Jaxea* 3, spatangid test material	3	van Veen
DM13	26/07/2014	08:22:05	56.87469 -5.86299	34	soft mud	*Amphiura* spp. (A-S), large pieces spatangid test material	3	van Veen
DM15	24/07/2014	08:42:18	56.84418 -5.85967	64.8	soft mud	*Calocaris* 1	3	van Veen
DM18	22/07/2014	13:59:14	56.77234 -5.91887	33.1	soft mud	*Amphiura filiformis* 3, *A. chiajei* 1	3	van Veen
DM21	28/07/2014	10:03:09	56.87238 -5.69475	34.3	sulphur-ous soft mud	Many dead *Abra* valves, nothing live	3	van Veen
DM24	28/07/2014	10:35:30	56.87228 -5.68035	21.4	sulphur-ous, wobbly soft mud	Echiuran?, polychaete	3	van Veen
DM25	28/07/2014	11:15:25	56.87722 -5.68462	16.5	sandy mud	*Amphiura* spp. (S), *Chaetopterus*	5	van Veen
DM25	28/07/2014	11:55:20	56.87723 -5.68457	16.5	sandy mud		1	van Veen

Table 4.4. Percentage of total sediment sample collected by sieves at 0.5 phi interval mesh sizes at the inshore deep mud survey sites.

Sieve (phi)	Site			
	DM03	DM07	DM10	DM25
-3.50	0.00	0.00	0.00	0.00
-3.00	0.00	0.00	0.00	0.00
-2.50	0.00	0.00	0.00	0.00
-2.00	0.00	0.00	0.00	0.11
-1.50	2.02	0.00	0.02	0.00
-1.00	1.37	0.14	0.46	0.22
-0.50	1.23	1.60	1.25	0.61
0.00	1.67	1.24	0.97	0.97
0.50	1.25	0.86	1.06	0.96
1.00	1.21	0.47	1.13	1.30
1.50	1.19	0.32	1.22	1.82
2.00	1.07	0.24	2.77	3.59
2.50	1.21	0.43	3.95	8.47
3.00	1.07	0.92	23.34	14.91
3.50	0.70	0.43	22.46	12.59
4.00	0.81	0.58	10.99	16.53
>4	85.19	92.77	30.40	37.94

Table 4.5. Particle size characteristics of sediments at the inshore deep mud survey sites. $MD_{ø}$ = median grain diameter in phi units, Md_{μ} = median grain diameter in microns, $QD_{ø}$ = phi quartile deviation.

Site	$MD_{ø}$	MD_{μ}	$QD_{ø}$	% gravel	% coarse sand	% medium sand	% fine sand	% silt/clay
DM03	>4	ND	ND	0.00	8.75	2.27	3.80	85.19
DM07	>4	ND	ND	0.00	4.31	0.56	2.36	92.77
DM10	3.30	102	ND	0.00	4.88	3.99	60.73	30.40
DM25	3.65	80	ND	0.11	4.06	5.40	52.50	37.94

Table 4.6. Abundance of infauna (no./0.1m^2) in samples from the inshore deep mud quantitative grab survey. Nomenclature follows WoRMS (2014).

Taxon	**Site**			
	DM03G	**DM07G**	**DM10G**	**DM25G**
Virgularia mirabilis		1		
Edwardsia claparedii	1			
Nemertea spp			1	1
Tubulanus polymorphus			1	1
Cerebratulus sp			1	
Golfingia (Golfingia) elongata			2	1
Pisione remota	1			
Polynoidae spp indet	2			
Pholoe baltica	3	5	4	5
Glycera alba			1	
Glycera unicornis			2	1
Sphaerodorum gracilis			1	
Podarkeopsis capensis	1		1	
Oxydromus flexuosus			1	
Ancistrosyllis sp	1		2	1
Litocorsa stremma			8	4
Nephtyidae spp juv	1	1	3	1
Nephtys incisa	2	1	5	1
Abyssoninoe hibernica	4	2	5	
Levinsenia gracilis	1	1		
Prionospio fallax			2	6
Prionospio cf *multibranchiata*			8	
Spiophanes bombyx			2	
Spiophanes kroyeri			2	
Magelona alleni			1	
Magelona minuta	2		10	22
Chaetozone setosa				3
Tharyx killariensis				1
Diplocirrus glaucus	1	1	6	
Mediomastus fragilis				2
Notomastus sp			1	1
Scalibregma inflatum			1	1
Owenia borealis			3	
Galathowenia oculata				1
Pectinariidae spp juv			4	
Amphictene auricoma			1	
Melinna palmata			2	
Ampharete falcata			1	
Ampharete octocirrata				1
Polycirrus sp			1	
Tubificoides amplivasatus	1			
Iphinoe serrata			1	
Scutopus ventrolineatus			9	
Falcidens crossotus			2	
Turritella communis			4	
Hyala vitrea	7	2	27	1

Table 4.6 continued

Taxon	Site			
	DM03G	DM07G	DM10G	DM25G
Cylichna cylindracea			11	1
Nuculidae sp juv			1	
Nucula nitidosa			1	3
Myrtea spinifera			1	1
Thyasira spp juv			1	3
Thyasira flexuosa			5	2
Kurtiella bidentata	4	1	46	1
Abra spp juv			6	
Abra nitida			1	
Mysia undata			1	
Corbula gibba			3	1
Phoronis sp			17	2
Ophiuroidea spp juv		1	3	6
Amphiura chiajei	7	3	2	5
Amphiura filiformis	24	22	12	5
Leptosynapta bergensis	2		1	
Labidoplax buskii	1			

Table 4.7. Abundance and diversity measures for infauna from the quantitative grab samples collected during the inshore deep mud survey. J' = Pielou evenness index, H' = Shannon-Wiener diversity index based on different log bases.

Site	Total abundance	No. taxa	J'	H'(log_{10})	H'(log_2)
DM03	66	18	0.79	0.99	3.28
DM07	41	10	0.68	0.68	2.25
DM10	238	46	0.81	1.34	4.46
DM25	85	27	0.83	1.19	3.94

Table 4.8. Summary of all records of circalittoral fine mud biotopes from the Sound of Arisaig area (including Loch nan Uamh) from Marine Recorder. BSL = below sea level, BCD = below chart datum.

Record code	Year	Habitat	Depth BSL (m)	Depth BCD (m)	Description	Biotope	Reference
101	1989	Soft mud at 38m (dredge sample)	40 - 40	38 - 38	Soft mud dredged at 38m with biological dredge. *Amphiura* spp. abundant, *Brissopsis lyrifera* frequent and *Virgularia mirabilis* present.	SS.SMu.CFiMu.BlyrAchi	Howson, 1990
102	1989	Soft mud at 31m (dredge)		31.5 - 31.5	Soft mud dredged with biological and anchor dredge. Little brought up but very large numbers of *Amphiura* spp., and *Brissopsis lyrifera* present.	SS.SMu.CFiMu.BlyrAchi	Howson, 1990
105	1989	Mud plain at -39m	43 - 43	39 - 39	Soft mud heavily burrowed by megafauna (possibly including *Nephrops* and *Maxmuelleria*). *Virgularia mirabilis* common, *Amphiura* spp. extremely common. Some *Ophiura ophiura*. *Brissopsis lyrifera* present.	SS.SMu.CFiMu.BlyrAchi	Howson, 1990
128	2003	Mud	25.5 - 24.8	21.8 - 21.1	Brittlestar arms emerging from mud (S), *Ophiura ophiura*? R	SS.SMu.CFiMu.BlyrAchi	Moore *et al*., 2004
129	2003	mud with occasional boulders	20.1 - 10.1	16.3 - 6.3	Ophiuroids (probably *Amphiura*) S, *Chaetopterus* (very large) (A), *Protanthea* on *Chaetopterus* (C/A), *Aequipecten* (O), *Inachus*? (R), *Cerianthus* (O), *Asterias* (R)	SS.SMu.CFiMu.BlyrAchi	Moore *et al*., 2004
130	2003	soft mud	38 - 37.6	34.2 - 33.8	Ophiuroid arms?? (S), *Asterias* (O), *Corella*? (R)	SS.SMu.CFiMu.BlyrAchi	Moore *et al*., 2004
100	1989	Sloping mud -8 to -26 metres.	28 - 10	26 - 8	An even slope of soft mud from -8 to -26 metres. The sediment is more jelly-like at depth, and with a diatom film shallower. *Amphiura filiformis* abundant, relatively little other life except sparse *Virgularia mirabilis* and *Pagurus bernhardus*. Some ascidians loose on the sediment towards the top of the habitat. Some burrows but not many.	SS.SMu.CFiMu.SpnMeg	Howson, 1990
103	1989	Soft mud plain, extensively burrowed, at -27 m	30 - 30	27 - 27	Uneven plain of soft mud at -27 m bcd. Many megafauna burrows, most quite large (2 cm diameter or more), but no signs of the occupants. Little life noted on the surface of the mud. *Virgularia mirabilis* occasional.	SS.SMu.CFiMu.SpnMeg	Howson, 1990

Table 4.8 continued

Record code	Year	Habitat	Depth BSL (m)	Depth BCD (m)	Description	Biotope	Reference
104	1989	Burrowed mud at 32 metres.		32 - 32	Extensively burrowed mud plain with many *Amphiura chiajei* and *A. filiformis*. *Brissopsis lyrifera* present. Several tall *Virgularia mirabilis*. *Nephrops norvegicus* responsible for many of the burrows; others unidentified. *Maxmuelleria lankesteri* probably responsible for small volcanoes.	SS.SMu.CFiMu.SpnMeg	Howson, 1990
106	2003	Soft Mud	27 - 27	25.2 - 25.2	Soft mud extensively burrowed by *Goneplax rhomboides*.	SS.SMu.CFiMu	Seasearch, 2003 (unpublished)
107	1998	Soft sediment with dense burrows	25 - 15	24.1 - 14.1	Soft sediment with dense *Nephrops* burrows. *Virgularia* and *Cerianthus* also common. As the depth decreased, substrate became more shelly/sandy and therefore harder and *Nephrops* burrows decreased. Depth 14.1-24.1m bcd	SS.SMu.CFiMu.SpnMeg	Howson and Donnan 2000
108	1998	Seapens and burrowing megafauna in circalittoral mud.	25 - 23	24.5 - 22.5	Soft mud plain with abundant *Nephrops* burrows, numerous small vertical burrows (Thalassinid shrimps). Gobies common (probably Fries'). *Virgularia* rare, empty *Turritella* shells abundant. Depth 22.5-24.5m bcd.	SS.SMu.CFiMu.SpnMeg	Howson and Donnan 2000
109	1998	Plain of sandy mud with shell fragments	24 - 13		Plain of sandy mud with shell fragments supporting *Nephrops* and *Virgularia*, depth 13-24m bsl.	SS.SMu.CFiMu.SpnMeg	Howson and Donnan 2000
110	1998	Soft burrowed mud	30.4 -		Soft burrowed mud with *Nephrops norvegicus*, surveyed to depth of 30.4m bsl.	SS.SMu.CFiMu.SpnMeg	Howson and Donnan 2000
111	1998	Mud burrowed by Nephrops norvegicus.	24 - 17	23 - 16	Plain of fairly firm mud with some shell debris extensively burrowed by *Nephrops norvegicus*. There were numerous other unidentified burrows, a few *Virgularia* and little else. Depth 16-23m bcd.	SS.SMu.CFiMu.SpnMeg	Howson and Donnan 2000

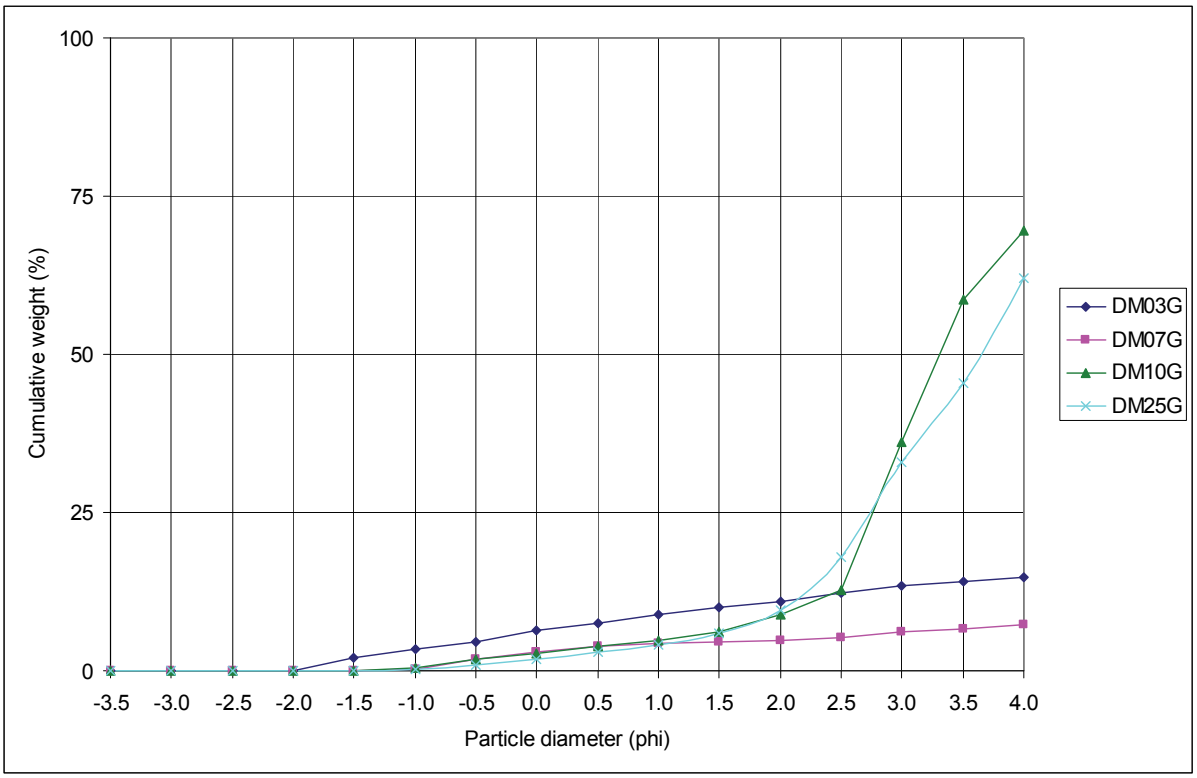
Table 4.8 continued

Record code	Year	Habitat	Depth BSL (m)	Depth BCD (m)	Description	Biotope	Reference
112	1998	Nephrops burrows, Pagurus sp. and Munida rugosa on muddy¹shell gravel.	25.7 - 22	24.8 - 20	Muddy shell gravel slope punctuated with *Nephrops* burrows. Little conspicuous macrofauna was encountered, only *Pagurus bernhardus* and *Pagurus prideaux* and *Munida rugosa* (taking over *Nephrops* burrows). No *Nephrops* were encountered during the diving. Depth 20-24.8m bcd.	SS.SMu.CFiMu.SpnMeg	Howson and Donnan 2000
113	1998	Sandy mud with Nephrops and Virgularia.	41994		Sandy mud with *Nephrops* and *Virgularia*, depth 12-21m bsl.	SS.SMu.CFiMu.SpnMeg	Howson and Donnan 2000
114	1998	Soft burrowed mud with Nephrops norvegicus.	25.8 - 25.5		Soft burrowed mud with *Nephrops norvegicus*, depth surveyed 25.5-25.8 m bsl.	SS.SMu.CFiMu.SpnMeg	Howson and Donnan 2000
115	1998	Burrowed mud	38 -		Burrowed mud with *Nephrops norvegicus*, surveyed to depth of 38m bsl.	SS.SMu.CFiMu.SpnMeg	Howson and Donnan 2000
116	1998	Plain of fine sandy mud	18.2 -		Plain of fine sandy mud with algal debris. No other marine life. Surveyed to depth of 18.2m bsl.	SS.SMu.CFiMu	Howson and Donnan 2000
117	2003	Hummocked mud	61.3 - 59.8	60 - 58.5	Megafaunal burrows	SS.SMu.CFiMu.SpnMeg	Moore *et al*., 2004
118	2003	Hummocked mud	59.4 - 59	58.3 - 57.9		SS.SMu.CFiMu.SpnMeg	Moore *et al*., 2004
119	2003	Hummocked mud	58.2 - 58.2	57.3 - 57.3	Megafaunal burrows. *Liocarcinus* (R)	SS.SMu.CFiMu.SpnMeg	Moore *et a*l., 2004
120	2003	Hummocked mud	44.4 - 41.7	43.6 - 40.9	Megafaunal burrows	SS.SMu.CFiMu.SpnMeg	Moore *et al*., 2004
121	2003	Hummocked mud	48.4 - 47.5	47.6 - 46.7	Megafaunal burrows possibly present	SS.SMu.CFiMu.SpnMeg	Moore *et al*., 2004
122	2003	Hummocked mud	34.6 - 33.9	33.7 - 33		SS.SMu.CFiMu.SpnMeg	Moore *et al*., 2004

Table 4.8 continued

Record code	Year	Habitat	Depth BSL (m)	Depth BCD (m)	Description	Biotope	Reference
123	2003	Hummocked mud	24.1 - 21.9	22.7 - 20.5	*Virgularia* (C), drift algae (P)	SS.SMu.CFiMu.SpnMeg	Moore *et al*., 2004
124	2003	Hummocked mud	31.6 - 30	30.4 - 28.8	Megafaunal burrows, *Sabella pavonina*? (R)	SS.SMu.CFiMu.SpnMeg	Moore *et al*., 2004
125	2003	Maerl gravel	32.8 - 32.5	30.7 - 30.4	*Virgularia* (C), *Aequipecten* (R), *Luidia* (R)	SS.SMu.CFiMu.SpnMeg	Moore *et a*l., 2004
126	2003	Mud	29.8 - 29.2	26.7 - 26.1	Megafaunal burrows	SS.SMu.CFiMu.SpnMeg	Moore *et al*., 2004
127	2003	Silty sand	20 - 19.5	18 - 17.5	Megafaunal burrows, *Liocarcinus* (F), *Virgularia* (O)	SS.SMu.CFiMu.SpnMeg	Moore *et al*., 2004
131	2003	hummocked mud	37.9 - 32.5	37.1 - 31.7	*Virgularia*? (O)	SS.SMu.CFiMu.SpnMeg	Moore *et al*., 2004
132	2003	hummocked mud	62.2 - 62.2	60.7 - 60.7	Megafaunal burrows	SS.SMu.CFiMu.SpnMeg	Moore *et al*., 2004

Figure 4.1. Particle size analysis of sediment collected at inshore deep mud survey stations, showing cumulative weight of sediment retained on sieves at 0.5 phi intervals.



ANNEX 5: LOG OF SPECIMENS COLLECTED

All taxon names follow the nomenclature of WoRMS (2014). Material deposited in the National Museums of Scotland (NMS).

Table 5.1 Specimen reference collection from the SCM and inshore deep mud grab surveys.

Specimen	Sample
Virgularia mirabilis	DM07G
Cerianthus lloydii	A10G
Actiniaria sp	R2G
Edwardsia claparedii	DM03G
Platyhelminthes spp	C5G
Nemertea spp	DM10G
Tubulanus polymorphus	DM10G
Cerebratulus sp	DM10G
Nematoda	C5G
Priapulus caudatus	C5G
Golfingia (Golfingia) elongata	DM10G
Thysanocardia procera	C9G
Phascolion (Phascolion) strombus strombus	C5G
Pisione remota	DM03G
Aphrodita aculeata juv	A10G
Polynoidae spp juv	C5G
Polynoidae spp indet	DM03G
Malmgrenia andreapolis	T6G
Malmgreniella arenicolae	P4G
Pholoe inornata	C5G
Pholoe baltica	DM03G
Sigalion sp juv	P8G
Sigalion mathildae	E5G
Sthenelais sp indet	P4G
Sthenelais limicola	C9G
Eteone longa agg	C5G
Pseudomystides limbata	O1G
Phyllodoce groenlandica	C8G
Phyllodoce mucosa	P8G
Phyllodoce rosea	T6G
Eulalia mustela	A2G
Eumida bahusiensis	C9G
Eumida sanguinea	O1G
Paranaitis kosteriensis	A10G
Lacydonia miranda	A2G
Glycera alba	DM10G
Glycera celtica	G7G
Glycera fallax	S1G
Glycera lapidum	O1G
Glycera tridactyla	E5G
Glycera unicornis	DM10G
Glycinde nordmanni	C9G
Goniada maculata	C5G
Goniadella gracilis	A2G
Sphaerodorum gracilis	DM10G

Table 5.1 continued

Specimen	**Sample**
Hesionidae sp juv	S4G
Podarkeopsis capensis	S1G
Hesiospina aurantiaca	O1G
Psamathe fusca	A2G
Oxydromus flexuosus	DM10G
Ancistrosyllis sp	DM03G
Litocorsa stremma	DM10G
Syllis spp indet	A2G
Trypanosyllis (Trypanosyllis) coeliaca	O1G
Syllis hyalina	O1G
Syllis parapari	O1G
Syllis garciai	O1G
Syllis licheri	A2G
Syllis pontxioi	A2G
Amblyosyllis formosa	A2G
Syllides convolutus	S4G
Parexogone hebes	C8G
Exogone (Exogone) naidina	S1G
Exogone (Exogone) verugera	G3G
Sphaerosyllis bulbosa	O1G
Sphaerosyllis taylori	C8G
Eunereis longissima	A2G
Platynereis dumerilii	E5G
Nephtyidae spp juv	DM03G
Aglaophamus agilis	A10G
Nephtys cirrosa	K3G
Nephtys hombergii	C5G
Nephtys kersivalensis	C8G
Nephtys incisa	DM03G
Nephtys longosetosa	K3G
Nephtys assimilis	A10G
Aponuphis bilineata	C8G
Nothria sp	K3G
Marphysa bellii	G3G
Lysidice unicornis	A10G
Lumbrineridae spp juv	C5G
Lumbrineris cingulata/aniara	C5G
Abyssoninoe hibernica	DM03G
Parougia eliasoni	S4G
Protodorvillea kefersteini	C8G
Schistomeringos neglecta	A2G
Leitoscoloplos mammosus	C5G
Scoloplos (Scoloplos) armiger	A10G
Aricidea (Aricidea) wassi	C8G
Aricidea (Acmira) catherinae	C5G
Aricidea (Acmira) cerrutii	C8G
Levinsenia gracilis	DM03G
Paradoneis lyra	C5G

Table 5.1 continued

Specimen	Sample
Apistobranchus tullbergi	C9G
Poecilochaetus serpens	S1G
Aonides oxycephala	C8G
Aonides paucibranchiata	C8G
Laonice bahusiensis	C5G
Malacoceros fuliginosus	S4G
Dipolydora coeca	C9G
Dipolydora caulleryi	Q1AG
Dipolydora quadrilobata	G3G
Prionospio fallax	DM10G
Aurospio banyulensis	S4G
Prionospio cirrifera	A10G
Prionospio cf *multibranchiata*	DM10G
Pseudopolydora cf *paucibranchiata*	T6G
Pseudopolydora pulchra	A10G
Scolelepis (Scolelepis) squamata	Z17G
Spio sp	T6G
Spio armata agg	Q1AG
Paraspio decorata	K3G
Spio filicornis	A10G
Spio martinensis	S1G
Spiophanes bombyx	DM10G
Spiophanes kroyeri	DM10G
Magelona alleni	DM10G
Magelona filiformis	C8G
Magelona minuta	DM03G
Magelona johnstoni	P8G
Caulleriella alata	C8G
Chaetozone setosa	DM25G
Chaetozone gibber	G7G
Chaetozone christiei	C8G
Chaetozone sp D	C8G
Cirriformia tentaculata	S4G
Aphelochaeta sp	G7G
Tharyx killariensis	DM25G
Monticellina sp	C5G
Diplocirrus glaucus	DM03G
Capitella spp	C5G
Mediomastus fragilis	DM25G
Notomastus sp	DM10G
Peresiella clymenoides	A10G
Arenicola marina	L1G
Maldanidae spp juv	C5G
Clymenura sp	C9G
Euclymene oerstedi	S1G
Praxillella affinis	C5G
Ophelia borealis	Z17G
Travisia forbesii	K3G
Ophelina acuminata	C8G

Table 5.1 continued

Specimen	Sample
Polyophthalmus pictus	S4G
Scalibregma inflatum	DM10G
Scalibregma celticum	A10G
Polygordiidae spp	O1G
Owenia borealis	DM10G
Galathowenia oculata	DM25G
Pectinariidae spp juv	DM10G
Amphictene auricoma	DM10G
Lagis koreni	G3G
Ampharetidae sp indet	S1G
Melinna palmata	DM10G
Ampharete falcata	DM10G
Ampharete lindstroemi	G7G
Amphicteis gunneri	P4G
Ampharete octocirrata	DM25G
Sosane sulcata	S1G
Terebellides stroemii	C9G
Phisidia aurea	A10G
Pista bansei	S1G
Pista mediterranea	A10G
Polycirrus sp	DM10G
Streblosoma intestinale	C9G
Chone duneri	S4G
Paradialychone filicaudata	S4G
Euchone rubrocincta	T6G
Euchone southerni	A10G
Jasmineira caudata	C5G
Serpulidae spp indet	S4G
Hydroides elegans	S4G
Spirobranchus lamarcki	S4G
Tubificoides amplivasatus	DM03G
Enchytraeidae sp	A10G
Endeis spinosa	R2G
Anoplodactylus petiolatus	C9G
Cirripedia spp	A2G
Nebalia sp indet	S4G
Apherusa bispinosa	O1G
Monoculodes carinatus	S4G
Perioculodes longimanus	S1G
Pontocrates arenarius	S4G
Synchelidium maculatum	G7G
Amphilochoides serratipes	S4G
Gitanopsis bispinosa	O1G
Leucothoe lilljeborgi/incisa	A2G
Urothoe elegans	C5G
Urothoe marina	A10G
Harpinia antennaria	C5G
Metaphoxus fultoni	O1G
Phoxocephalus holbolli	G3G

Table 5.1 continued

Specimen	Sample
Acidostoma obesum	P4G
Hippomedon denticulatus	I9G
Socarnes filicornis	S4G
Nototropis falcatus	R2G
Atylus vedlomensis	O1G
Dexamine spinosa	P8G
Dexamine thea	G3G
Guernea (Guernea) coalita	A10G
Ampelisca brevicornis	C8G
Ampelisca tenuicornis	C5G
Ampelisca typica	C8G
Bathyporeia elegans	G3G
Bathyporeia pilosa	G3G
Gammaridae spp	E5G
Abludomelita obtusata	T6G
Animoceradocus semiserratus	A2G
Cheirocratus spp indet (female)	O1G
Cheirocratus assimilis	G7G
Cheirocratus intermedius	P8G
Maerella tenuimana	P8G
Gammaropsis cornuta	C8G
Microprotopus maculatus	P8G
Photis longicaudata	G7G
Ericthonius sp indet (female)	P8G
Ericthonius difformis	P8G
Jassa sp indet (female)	R2G
Jassa falcata	R2G
Aoridae spp indet (female)	A10G
Aora gracilis	P8G
Autonoe denticarpus	Q1AG
Leptocheirus hirsutimanus	A10G
Leptocheirus pectinatus	A10G
Crassicorophium crassicorne	G3G
Siphonoecetes (Centraloecetes) kroyeranus	C8G
Caprella acanthifera	S4G
Pariambus typicus	C8G
Phtisica marina	G3G
Isopoda sp?	I9G
Gnathia sp indet (female)	R2G
Cirolanidae sp juv	A2G
Natatolana borealis	A2G
Araphura brevimanus	T6G
Leptognathia paramanca	S4G
Tanaopsis graciloides	C8G
Bodotria arenosa	O1G
Iphinoe serrata	DM10G
Iphinoe trispinosa	A10G
Eudorella truncatula	C5G
Nannastacus brevicaudatus	O1G

Table 5.1 continued

Specimen	**Sample**
Pseudocuma simile	K3G
Diastylis lucifera	P4G
Diastylis rugosa	K3G
Paguridae spp juv	C5G
Galathea sp juv	C5G
Pisidia longicornis	C5G
Achaeus cranchii	O1G
Liocarcinus navigator	C5G
Scutopus ventrolineatus	DM10G
Chaetoderma nitidulum	C5G
Falcidens crossotus	DM10G
Polyplacophora spp juv	O1G
Leptochiton asellus	O1G
Testudinalia testudinalis	S4G
Patella pellucida	P8G
Gibbula sp juv	S4G
Skenea serpuloides	G3G
Lacuna vincta	P8G
Rissoa parva	L1G
Pusillina sarsii	G3G
Onoba semicostata	S4G
Turritella communis	DM10G
Eulima bilineata	O1G
Melanella alba	Q1AG
Vitreolina philippi	S4G
Euspira nitida	C8G
Hyala vitrea	DM03G
Nassarius reticulatus	R2G
Cylichna cylindracea	DM10G
Philine spp	C9G
Retusa obtusa	Q1AG
Retusa umbilicata	K3G
Bivalvia sp	I9G
Nuculidae sp juv	DM10G
Nucula nitidosa	DM10G
Nucula nucleus	O1G
Nucula sulcata	K3G
Mytilidae spp juv	S4G
Glycymeris glycymeris juv	O1G
Limatula gwyni	A2G
Pectinidae spp juv	T6G
Anomiidae spp juv	C5G
Lucinoma borealis	C5G
Myrtea spinifera	DM10G
Thyasira spp juv	DM10G
Thyasira flexuosa	DM10G
Devonia perrieri	C5G
Kurtiella bidentata	DM03G
Tellimya ferruginosa	P8G

Table 5.1 continued

Specimen	**Sample**
Tellimya tenella	C8G
Astartidae spp juv	I9G
Goodallia triangularis	O1G
Cardiidae spp juv	S1G
Acanthocardia sp juv	P4G
Parvicardium scabrum	S4G
Spisula sp juv	A2G
Spisula elliptica	A2G
Ensis spp juv	A10G
Phaxas pellucidus	C8G
Tellina tenuis	Z17G
Tellina fabula	C5G
Moerella donacina	C8G
Gari spp juv	O1G
Gari fervensis	P8G
Gari tellinella	O1G
Abra spp juv	DM10G
Abra alba	C5G
Abra nitida	DM10G
Abra prismatica	S1G
Arctica islandica juv	Z17G
Dosinia spp juv	C5G
Dosinia exoleta	A2G
Tapes sp juv	O1G
Polititapes aureus	O1G
Chamelea striatula	C5G
Clausinella fasciata	O1G
Timoclea ovata	O1G
Mysia undata	DM10G
Mya sp juv	G3G
Corbula gibba	DM10G
Hiatella arctica	S4G
Thracioidea spp juv	C8G
Thracia phaseolina	C8G
Thracia villosiuscula	R2G
Cochlodesma praetenue	C8G
Phoronis sp	DM10G
Asteroidea spp juv	O1G
Ophiuroidea spp juv	DM07G
Amphiura chiajei	DM03G
Amphiura filiformis	DM03G
Amphipholis squamata	O1G
Echinoidea spp juv	C5G
Echinocyamus pusillus	O1G
Echinocardium sp juv	Z17G
Echinocardium cordatum	E5G
Holothuroidea sp indet	Q1AG
Cucumariidae spp juv	Q1AG
Leptosynapta bergensis	DM03G

Table 5.1 continued

Specimen	**Sample**
Labidoplax buskii	DM03G
Oestergrenia digitata	C9G
Ascidiidae spp juv	O1G
Ascidiella aspersa	S4G
Branchiostoma lanceolatum	A2G
Ammodytidae sp juv	O1G
Chaetognatha sp	A10G

Table 5.2. Specimen reference collection from the SCM maerl infaunal core survey.

Specimen	**Sample**
PORIFERA sp	S6T1
Cerianthus lloydii	S6T2
Edwardsia claparedii	S6T1
PLATYHELMINTHES spp	Y10T3
Tubulanus polymorphus	S6T3
Spadella cephaloptera	C6T2
Golfingia (Golfingia) margaritacea	Y10T1
Golfingia (Golfingia) vulgaris vulgaris	C6T1
Golfingia (Golfingia) elongata	Z59T3
Nephasoma (Nephasoma) minutum?	O3T1
Pisione remota	Z59T1
Enipo elisabethae	C6T4
Enipo elisabethae	Y10T4
Malmgreniella mcintoshi	Y10T3
Malmgreniella arenicolae	Z59T1
Malmgreniella darbouxi	Y10T1
Harmothoe viridis	S6T4
Pholoe inornata	C6T1
Pholoe baltica	Z59T3
Pseudomystides limbata	C6T1
Eumida sanguinea	Z59T1
Nereiphylla sp indet	O3T2
Lacydonia miranda	C6T1
Glycera lapidum	C6T1
Goniadella gracilis	Z59T1
Ephesiella abyssorum	C6T1
Gyptis propinqua	C6T4
Hesiospina aurantiaca	C6T1
Oxydromus pallidus	C6T3
Eurysyllis tuberculata	Z59T3
Syllis fasciata?	Z59T1
Syllis parapara?	O3T1
Syllis sp H	O3T2
Trypanosyllis (Trypanosyllis) coeliaca	C6T3
Odontosyllis gibba	C6T1
Sphaerosyllis bulbosa	C6T2
Sphaerosyllis hystrix	C6T2
Sphaerosyllis taylori	C6T3
Prosphaerosyllis tetralix	C6T2
Micronereis variegata	Z59T3
Neanthes nubila	S6T2

Table 5.2 continued

Specimen	Sample
Pareurythoe borealis	O3T4
Aponuphis bilineata	Z59T2
Lysidice unicornis	C6T1
Scoletoma magnidentata	C6T3
Aricidea (Acmira) cerrutii	Z59T2
Paradoneis lyra	Z59T2
Aonides paucibranchiata	C6T2
Laonice bahusiensis	Z59T3
Dipolydora caulleryi	Z59T3
Dipolydora flava	Y10T2
Aurospio banyulensis	C6T4
Scolelepis korsuni	Z59T4
Microspio mecznikowianus	Y10T2
Caulleriella alata	Z59T3
Tharyx killariensis	Z59T1
Chaetozone zetlandica	Z59T2
Pherusa plumosa	S6T2
Macrochaeta clavicornis	O3T1
Lumbriclymene minor	C6T1
Leiochone johnstoni	C6T1
Praxillella affinis	Z59T3
Ophelia celtica	O3T4
Scalibregma celticum	Z59T1
Polygordius lacteus	C6T1
Polygordius lacteus	O3T1
Protodrilus sp	C6T4
Galathowenia oculata	S6T3
Owenia borealis	S6T3
Trichobranchidae sp juvs	Y10T2
Trichobranchus glacialis	S6T3
Eupolymnia nesidensis	S6T3
Phisidia aurea	Z59T1
Phisidia aurea	Z59T3
Pista bansei	Z59T1
Pista mediterranea	Z59T3
Amaeana trilobata	Z59T1
Polycirrus norvegicus	Z59T1
Sabellidae sp indet	Y10T2
Chone duneri	Z59T3
Euchone southerni	Z59T3
Hydroides norvegicus	C6T4
Spirobranchus triqueter	Y10T2

Table 5.2 continued

Specimen	Sample
Serpula vermicularis	Y10T2
Tubificidae sp A	Y10T2
Enchytraeidae sp B	Z59T3
Callipallene brevirostris	Z59T4
Verruca stroemia	S6T4
OSTRACODA spp	Z59T1
Heteromysis (Heteromysis) norvegica	C6T2
Apherusa bispinosa	C6T1
Oedicerotidae sp	C6T3
Gitana sarsi	C6T4
Leucothoe incisa	Z59T2
Urothoe elegans	S6T3
Urothoe marina	Z59T1
Harpinia crenulata	S6T4
Metaphoxus fultoni	C6T1
Lysianassa ceratina	Y10T4
Lysianassa plumosa	Y10T1
Socarnes erythrophthalmus	C6T1
Tmetonyx similis	S6T4
Austrosyrrhoe fimbriatus	C6T3
Liljeborgia kinahani	C6T1
Idunella mollis	C6T2
Nototropis vedlomensis	C6T2
Dexamine thea	S6T4
Guernea (Guernia) coalita	O3T1
Animoceradocus semiserratus	C6T1
Cheirocratus sp ♀	C6T1
Cheirocratus assimilis	Z59T2
Cheirocratus sundevallii	C6T3
Othomaera othonis	C6T1
Gammaropsis lobata	C6T1
Gammaropsis maculata	Z59T4
Gammaropsis cornuta	O3T3
Leptocheirus hirsutimanus	C6T3
Leptocheirus pectinatus	C6T1
Microdeutopus versiculatus	Y10T1
Caprella acanthifera	S6T1
Pseudoprotella phasma	Y10T1
Gnathia vorax	C6T3
Anthura gracilis	S6T4
Cymodoce truncata	O3T3
Pseudoparatanais batei	S6T3

Table 5.2 continued

Specimen	**Sample**
Tanaopsis graciloides	S6T2
Paratyphlotanais microcheles	C6T4
Vauntompsonia cristata	C6T1
Anapagurus hyndmanni	S6T2
Cestopagurus timidus	O3T4
Galathea intermedia	O3T1
Pisidia longicornis	S6T2
Rhopalomenia aglaopheniae	S6T1
Leptochiton asellus	C6T1
Leptochiton cancellatus	C6T1
Callochiton septemvalvis	Z59T1
Acanthochitona crinita	S6T2
Tectura virginea	S6T4
Patella pellucidum	C6T4
Gibbula tumida	C6T1
Rissoa parva	C6T1
Pusillina inconspicua	Y10T1
Alvania beanii	C6T1
Alvania beanii	S6T4
Onoba semicostata	S6T1
Buccinum undatum juvs	S6T4
Cylichna cylindracea	C6T4
Retusa truncatula	O3T2
NUDIBRANCHIA sp A	Y10T4
NUDIBRANCHIA sp B	S6T4
Cadulus sp?	O3T1
Crenella decussata	O3T1
Musculus subpictus	Y10T1
Modiolus modiolus (juvs)	Y10T3
Limatula subauriculata	O3T3
Palliolum tigerinum	O3T4
Aequipecten opercularis	Y10T3
Heteranomia squamula	Y10T1
Goodallia triangularis	O3T1
Parvicardium scabrum	Z59T1
Spisula elliptica	O3T2
Phaxas pellucidus	Z59T1
Gari tellinella	C6T4
Abra alba	S6T4
Gouldia minima	O3T2
Dosinia exoleta	Z59T1
Clausinella fasciata	O3T1

Table 5.2 continued

Specimen	**Sample**
Timoclea ovata	Z59T3
Mya truncata	Z59T3
Hiatella arctica	Y10T1
Thracia phaseolina	Z59T3
Thracia villosiuscula	Z59T3
Ophiothrix fragilis	S6T2
Ophiocomina nigra	S6T4
Amphipholis squamata (juvs)	C6T1
Psammechinus miliaris	O3T1
Echinocyamus pusillus	O3T4
Ocnus sp indet	S6T4
Leptosynapta minuta	C6T2
ENTEROPNEUSTA sp	S6T2

ANNEX 6: SITE ATTRIBUTE TABLE FOR THE SUBTIDAL SANDBANKS FEATURE FOR THE SOUND OF ARISAIG SAC, WITH THE RESULTS OF THE 2014 SITE CONDITION MONITORING SURVEY

Attribute	Target	Method	Result
Extent	No reduction in extent of inshore sublittoral sediment habitat allowing for natural succession or known cyclical change.	At six year intervals review activities and events with the potential to reduce extent of feature such as land reclamation, shoreline development and dredging operations. At six year intervals survey the extent of specified biotopes by point station survey such as video.	No human activities identified likely to have influenced the extent of the feature. The 2014 point site video survey of 137 stations recorded sedimentary biotopes at 133 sites compared to 134 sites in 2003. This minor difference was believed to be due to a slight locational difference at one site between the two surveys. There is no evidence for a temporal change in the extent of the feature.
Topography	No change in topography of the sediment allowing for natural responses to hydrodynamic regime.	At six year intervals review activities and events with the potential to modify the topography such as land reclamation, shoreline development, dredging operations and land use, and assess change in topography by bathymetric survey where it is considered likely to have occurred.	No activities or events are known to have occurred since the last monitoring exercisethat are likely to have caused changes in the topography of the sediment. Allowing for positional and meteorological differences between the baseline and 2014 surveys, no significant temporal variation in topography was identified.

Attribute	Target	Method	Result
Distribution and spatial pattern of biotopes	Maintain the distribution and/or spatial arrangement of biotopes allowing for natural succession/known cyclical change. The following biotopes should be recorded where they were found during the baseline video survey: SS.SMp.Mrl.Pcal.R, SS.SMp.Mrl.Pcal.Nmix, SS.SMp.SSgr.Zmar, SS.SCS.CCS.Nmix, SS.SSa.IMuSa.EcorEns, SS.SMu.CSaMu.VirOphPmax, SS.SMp.KSwSS	At six year intervals assess biotope distribution by point station survey.	The only confirmed examples of temporal biotope change included the loss of examples of target biotopes at three sites in 2014, caused by an increase in the fine sediment fractions leading to the replacement of SS.SCS.CCS by SS.SSa.IFiSa at two sites and the replacement of SS.SSa.IMuSa.EcorEns by SS.SSa.CMuSa at the third site. These changes are consistent with sediment redistribution resulting from natural temporal variation in wave action and they are not considered to represent an indication of unfavourable condition of the attribute.
Sediment character: sediment type	No change in composition of sediment types across the feature allowing for natural succession/known cyclical change. Assess change in terms of percentage silt/clay, fine sand, medium sand, coarse sand and gravel. Percentage as defined in Hiscock (1996) should not deviate from baseline by +/- 10% at each station. (Hiscock K. 1996. Marine Nature Conservation Review: Rationale and Methods. Peterborough: JNCC).	At six year intervals perform particle size analysis at sites representing the range of sediment types identified. At six year intervals review activities and events with the potential to modify sediment type such as shoreline development, dredging operations and land use.	Temporal change in the percentage of sediment fractions exceeded 10% at a number of sites, although this was considered to be probably due to natural temporal variation in wave action or due to the problems of sampling poorly sorted and spatially variable sediments.
Extent of sub-feature or representative/ notable biotopes	No reduction in extent of the inshore sublittoral sediment biotopes identified for the site (maerl and eelgrass) allowing for natural succession/ known cyclical change.	At six year intervals survey the extent of the following biotopes by point station survey such as video: SS.SMp.Mrl.Pcal.R, SS.SMp.Mrl.Pcal.Nmix, SS.SMp.SSgr.Zmar	Both the main video survey in 2014, as well as the localised spot video surveys of maerl extent at the five maerl beds examined by MNCR phase 2 surveys, revealed no reduction in extent of any of the target biotopes.

Attribute	Target	Method	Result
Species composition of representative or notable biotopes	No decline in biotope quality due to change in species composition, reduction in species richness or change in abundance of notable species allowing for natural succession/ known cyclical change. The same maerl species should be recorded where they were found during the baseline survey. No reduction in the abundance of living maerl.	At six year intervals assess species richness and composition at 25 sites representative of the inshore sediment biotopes of which 5 should be maerl and 2 eelgrass. Change at maerl sites to be identified with the aid of appropriate statistical analyses. At six year intervals assess the density of total living maerl at the 5 maerl sites as percentage cover estimates by diving, as a minimum.	The infaunal grab survey of representative sediment biotopes revealed no temporal changes in species richness or composition that could be considered indicative of deterioration of the habitat. A halving of species richness at one eelgrass site was believed to be possibly due to the patchiness of the habitat. There was variation in the maerl species recorded during the 2003 and 2014 surveys, but this difference was considered to probably result from misidentification of taxa in the baseline survey. A reduction in the abundance of living maerl was recorded at one site; however, this was considered to be possibly due to patchiness. No good evidence of significant temporal change in living maerl abundance was acquired at any site.

* This method has been changed from previous Site Attribute Tables

www.snh.gov.uk

ISBN: 978-1-78391-208-7

Policy and Advice Directorate, Great Glen House,
Leachkin Road, Inverness IV3 8NW
T: 01463 725000

You can download a copy of this publication from the SNH website.

recycle

Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad