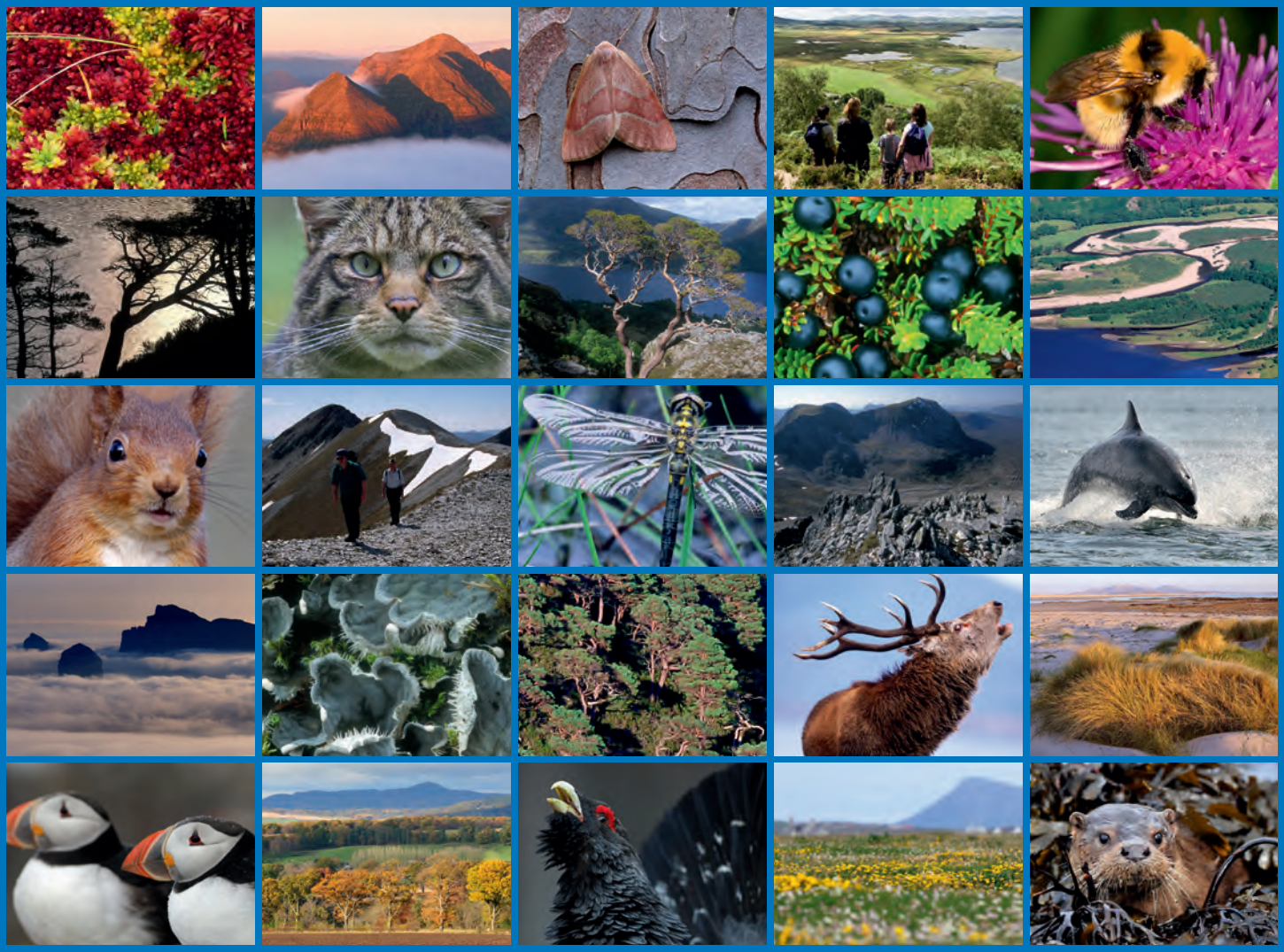
Scottish Natural Heritage
Commissioned Report No. 808

2014 site condition monitoring survey and biotope mapping of the intertidal sediment flats of the Kentra Bay and Moss SSSI



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COMMISSIONED REPORT

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2014 site condition monitoring survey and biotope mapping of the intertidal sediment flats of the Kentra Bay and Moss SSSI

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COMMISSIONED REPORT

Summary

2014 site condition monitoring survey and biotope mapping of the intertidal sediment flats of the Kentra Bay and Moss SSSI

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Keywords

Benthos; mudflat; sandflat; monitoring; survey; biotope; mapping.

Background

In addition to terrestrial and saltmarsh features, Kentra Bay and Moss SSSI is also noted for its sediment flats, which form one of the most extensive areas of this feature on the coast of the western highlands. The principal purpose of the current study (2014) was to carry out site condition monitoring (SCM) of the site in order to identify any deterioration in the condition of the mudflat 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 resurvey the representative, relocatable transects established in 2003.

As there has been no previous mapping of the distribution of sediment flat habitats within the SSSI, this formed an additional objective of the current study. The SCM survey results were therefore supplemented by additional ground truthing to map the distribution of sediment flat biotopes.

Main findings

- There was no evidence for a decline in the extent of the mudflat feature within the SSSI.

- All biotopes recorded during the baseline survey were still present within the SSSI in 2014. There was little temporal change in the distribution of biotopes. Localised changes in the presence of two biotopes, **LS.LSa.FiSa.Po** and **LS.LBR.Lmus.Myt.Sa**, are considered to have resulted from natural temporal variability in hydrodynamic conditions and in the success of the *Lanice conchilega* and *Mytilus edulis* populations.

- There was no reduction in the frequency of occurrence of the positive indicator species, *Arenicola marina*, *Hediste diversicolor*, *Scrobicularia plana* and *Cerastoderma edule*. A slight perceived reduction in *Corophium volutator* may have resulted from natural temporal variability or possibly misidentification of corophiid material during the baseline survey.

- The invasive alga, *Sargassum muticum*, was recorded at one monitoring station. However, the low density indicated that it should not be considered to be causing a reduction in the condition of the habitat.

- Little temporal change in sediment composition, topography, or depth of the anoxic layer was recorded. Such changes that were observed are consistent with natural variability.

- No significant impacts on the condition of the feature from anthropogenic activities were observed. A recorded instance of sediment removal from the shore at Arivegaig prior to 2013 appears to have led to no significant localised reduction in the condition of the habitat.

- The conclusion from the 2014 SCM survey is that the mudflat feature of the Kentra Bay and Moss SSSI should be assigned to the condition category "Favourable Maintained".

- Biotope mapping of the sediment flats revealed the presence of 11 sedimentary biotopes, although most of the outer, more exposed, half of the flats was occupied by **LS.LSa.FiSa.Po**, with **LS.LSa.MuSa.MacAre** dominating the inner half of the flats. The most sheltered and innermost regions of the SSSI supported **LS.LSa.MuSa.HedMacEte**, **LS.LMu.MEst.HedMac**, **LS.LMu.MEst.HedMacScr** and **LS.LMx.GvMu.HedMx**. Three, relatively sparse mussel beds (**LS.LBR.LMus.Myt.Sa**) were recorded.

- Two examples of priority marine features were encountered during the survey work. Egg wrack beds (**LR.LLR.FVS.Ascmac**) were recorded at three locations and one specimen of the native oyster, *Ostrea edulis*, at a single location.

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Table of Contents **Page**

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1. INTRODUCTION

Kentra Bay and Moss is a Site of Special Scientific Interest (SSSI), notified in March 1990 under the Wildlife and Countryside Act 1981. Located immediately to the north of the Ardnamurchan peninsula on the Scottish west coast (Figure 1), it comprises a total area of 997.3 ha, including raised mire, saltmarsh, woodland and tidal flats. The tidal sedimentary areas represent one of the most extensive examples of tidal flats on the coast of north-west Scotland, and they are consequently of some importance as a wintering area for wading birds and wildfowl. It is these tidal flat habitats which are the focus of this report.

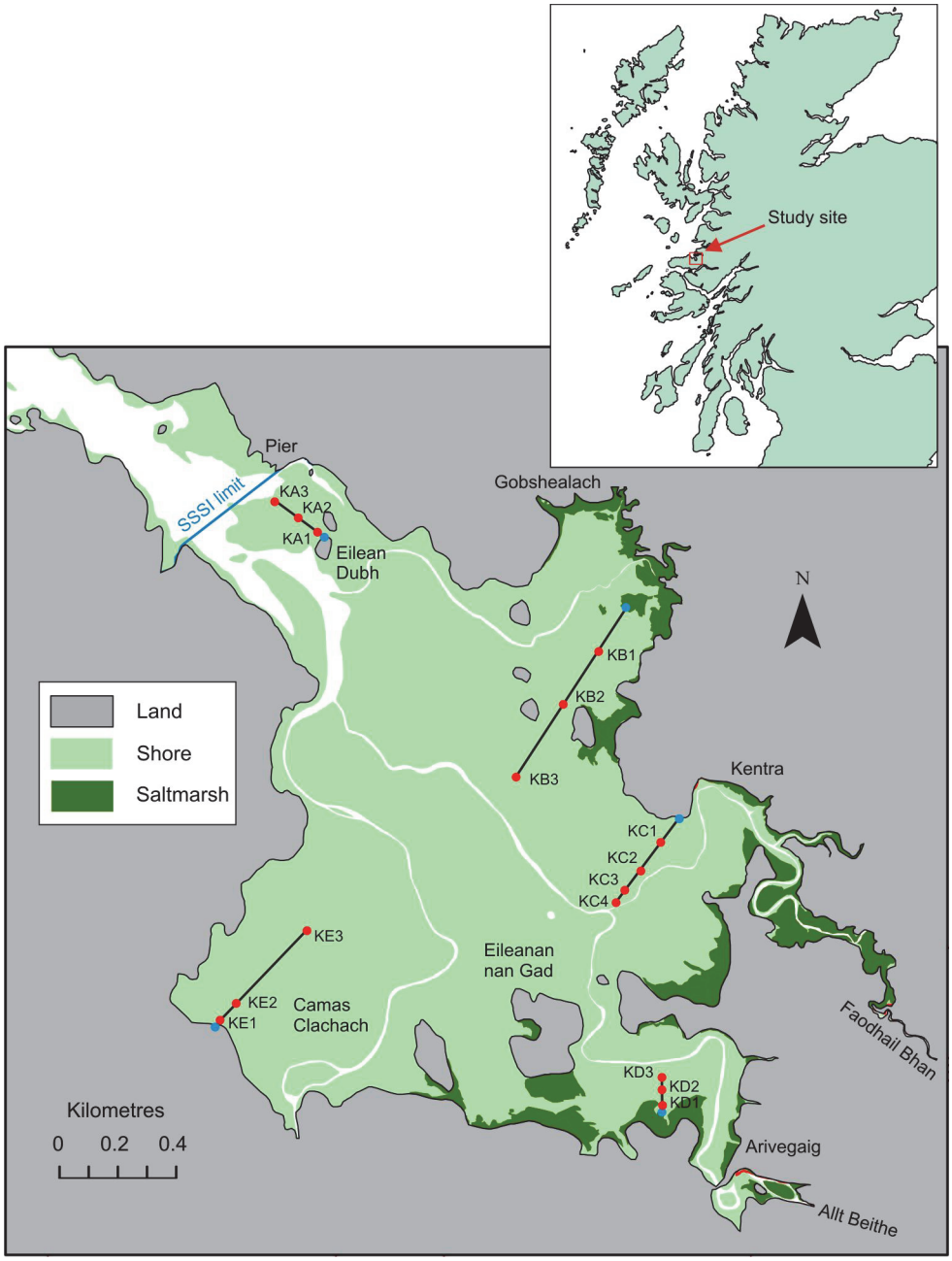


Figure 1. Location and map of Kentra Bay, showing SCM transects. The position of transect stations is shown in red, and permanent transect markers in blue.

The principal objective of the work described in this report was to carry out site condition monitoring (SCM) of the Kentra Bay and Moss SSSI in order to assess the condition of the notified mudflats 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 littoral sediment (JNCC, 2004). JNCC (2004) lists ten attributes of littoral sediment habitats and corresponding targets that could form the basis of site condition monitoring (Table 1). These targets have been incorporated into the monitoring plan for the SSSI and are detailed in the Site Attribute Table (Annex 2).

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

Attribute	Target
Extent	No change in extent of littoral sediment habitat
Biotope composition	Maintain the variety of biotopes identified for the site
Distribution of biotopes	Maintenance of the distribution of biotopes
Sediment character: sediment type	No change in composition of sediment types across the feature
Sediment character: redox layer	Black layer depth should not deviate in relation to the baseline
Sediment character: organic carbon content	Organic carbon content should not increase in relation to baseline
Extent of sub-feature	No change in extent of the littoral sediment biotope(s) identified for the site
Species composition of representative or notable biotopes	No decline in biotope quality as a result of change in species composition or removal of notable species
Species population measures: - population structure of a species - presence or abundance of specified species	Maintain age/size class structure of a (named) species. Maintain presence or abundance of positive indicator species. No increase in presence or abundance of negative indicator species.
Topography	No alteration in topography of the littoral sediment

A further aim of the 2014 work was to produce a biotope map of the littoral sediment habitats of the SSSI.

Prior to 2003 there is a single biotope record in Marine Recorder relating to the intertidal sediment flats of Kentra Bay. Powell *et al*. (1980) examined the flats during a 1979 survey of the shores of north-west Scotland. Their description of the area has been interpreted in Marine Recorder as indicating the presence of the biotope **LS.LSa.FiSa.Po** over much of the bay.

A baseline SCM survey was carried out in 2003 (Lyndon *et al*., 2004), involving the establishment of a series of 16 relocatable stations along five transects across the sediment flats. These were believed to reflect the biological and environmental diversity of the sedimentary habitats (Figure 1). Each transect was initially divided into a number of zones that appeared to represent the different shore levels, substrates and possible biotopes, with a sample station identified within each zone. At each station one 3.4 cm diameter core sample was taken for particle size analysis and eight pooled 10.3 cm diameter cores for faunal analysis, which was supplemented by a 1 m^2 dig-over. The depth of the anaerobic layer was recorded and photos and videos taken, including five replicate photo quadrats of the sediment surface. The transect profile was measured using a surveyor's level to record height and distance of all stations and zone boundaries from the permanent transect marker, and to record the height in relation to sea level, and hence chart datum.

Ten sediment flat biotopes were recorded in 2003. Muddy, estuarine habitats were restricted to the innermost and most sheltered region of the bay (**LS.LMu.UEst.Hed**, **LS.LMu.MEst.HedMacScr**) and to the top of the shore in the south-west (**LS.LMu.MEst.HedMac**), both areas being in close proximity to sources of freshwater. Most of the bay was floored by slightly silty sand, with a tendency for **LS.LSa.FiSa.Po** to occur in the lower and more exposed regions and **LS.LSa.MuSa.CerPo** and **LS.LSa.MuSa.MacAre** in the higher and more sheltered parts. A mussel bed with fairly sparse clumps of *Mytilus edulis* on gravelly sand (**LS.LBR.LMus.Myt.Sa**) was recorded at one station and a denser bed nearby.

Kentra Bay is situated in a relatively remote location, with only relatively small-scale centres of habitation and industry within the catchment. The SSSI is currently unlikely to be under major threat from anthropogenic activities, although there are some possible sources of influence. For instance, there is periodic access to the intertidal flats by tourists and there is evidence of quad-bikes using the mudflats (Lyndon *et al*., 2004).

There is also evidence of historic dumping of refuse, in particular old cars, on the shore, which may, in addition to any direct impact, encourage further tipping in the same area Lyndon *et al*., 2004). An act of tyre dumping is known to have taken place prior to March 2012 at Arivegaig at the head of Kentra Bay (SNH, pers. comm.). The tyres were placed along the margins of a ditch outflow and at the saltmarsh/sediment flat interface and partly covered with sediment removed from the adjacent mudflat. The sediment removal led to the creation of craters discernible in 2012 and 2013 (Figure 11B). The tyres were subsequently largely removed, which may have resulted in additional damage.

2. METHODS

2.1 Site condition monitoring

The methodology followed that employed in the 2003 baseline survey (Lyndon *et al*., 2004). Survey transects were worked at the same five locations (Figure 1), with a total of 16 stations, representing perceived different habitat zones, relocated along the transects using dGPS. Although the notified sediment flat feature for the Kentra Bay and Moss SSSI is 'mudflats', mudflat biotopes graded into sandflat biotopes along some of the transects and so both habitat types were considered to fall within the remit of the 2014 survey work (see Discussion section for further comment). Some minor adjustment of station positions was necessary to ensure they were lined up along the transect, as they were in 2003. Zone boundaries from 2003 were also relocated and marked, as were any perceived changes in these boundaries. Alignment was checked using a surveyor's level. Initial slight misalignment was probably due to GPS error.

The vertical height of stations and all zone boundaries was determined relative to the permanent transect marker at the head of the transect using a surveyor's level. As the transect markers had been levelled to the water's edge in 2003, all heights could be expressed in relation to chart datum. The surveyor's level was also employed to measure the horizontal distances of stations and boundaries from the transect marker. However, a few errors were later noted in some of the greater distances, so these were checked against distances determined from dGPS positions, and adjusted where necessary.

At each station, eight cores of 10.3 cm diameter and 15 cm depth were taken for analysis of the infauna, along with a single core of 3.4 cm diameter and 20 cm depth for particle size analysis (PSA). The eight infaunal cores were pooled in a single bucket and sieved on site using a 1 mm mesh. These samples were preserved in 5% buffered formalin in seawater until analysis. The PSA samples were transferred from the core to labelled polythene grip-seal bags and kept in these until analysis. At one station on each transect four replicate samples for infaunal analysis were taken, the stations being selected to represent the range of habitats present. Each sample consisted of eight pooled cores, as above.

At each station a record was made of any surficial biota by photographing five replicate, randomly placed 0.25 m^2 quadrats, and by noting incidental visual records. In addition, approximately 1 m^2 of sediment was dug-over, using a spade, to a depth of about 30 cm to check for the presence of any infauna which might not have been effectively sampled by the cores (e.g. larger bivalves and polychaetes), and estimates of their density made using the SACFOR semi-quantitative scale (Hiscock, 1996). Specimens from this dig-over were noted and some retained for confirmation of identity.

All position fixing employed the WGS84 datum.

The macrobenthos from the core samples was sorted, identified and counted by Sue Hamilton (Currie, Midlothian). All other faunal samples were processed by Colin Moore.

The silt/clay fraction of the sediment samples was separated by puddling a sample of known weight, which had been soaked overnight in sodium hexametaphosphate (6.2 g/l in distilled water), through a 63 μm sieve. Sediment retained on this sieve was oven dried and then dry sieved using a sieve stack of -4 to 4 phi at 0.5 phi intervals. The sediment grain size parameters, median grain size and phi quartile deviation, were obtained by interpolation of the cumulative weight percentage curves.

Beach profiles, based on surveyor's level measurements of intertidal height and range were graphed using Microsoft Excel.

Based on the physico-chemical characteristics of the sediment and the characterisation of the fauna obtained from cores and *in situ* observations, each transect station, and the zone along the transect represented by that station, was assigned a biotope according to the 2004 habitat classification system (Connor *et al*., 2004). To aid this process and to facilitate temporal comparisons with data from the baseline survey, species data for all stations were transformed to the SACFOR abundance scale and investigated using non-metric multidimensional scaling of the SACFOR abundances employing Bray-Curtis similarity and Primer software (Primer-E Ltd, Ivybridge).

2.2 Biotope mapping

To aid biotope mapping aerial imagery was available from May 2007 and July 2013. As the more recent material was recorded close to high tide, the 2007 imagery was largely used within ArcGIS 9.3 for preparation of a wireframe map of the sediment flats, which involved their division into 26 polygons (Figure 2). This was based on regional variation in the appearance of the imagery, which was assumed to, at least in part, reflect variation in habitat type. Data from the 2003 SCM transects (Lyndon *et al*., 2004) was also used in the process.

The wireframe map with aerial imagery was available in the field on a series of laminated sheets. It was also uploaded to a large-screen, sunlight-readable, differential GPS receiver (Garmin Montana 600). One team of 2 - 3 recorders surveyed the area, largely within three hours either side of low water springs by walking each of the polygons where possible, employing target notes at fixed locations to record the characteristics of the habitat (Figure 2, Annex 3 - Table 3.1). Where appropriate, descriptions of habitats between target point positions were also recorded, with the surveyors' track continuously recorded by a GPS data logger. Field data collected to aid subsequent biotope identification included physical habitat characteristics, biotic surface features and the infauna revealed by digging over an area of c. 1 m^2, with retention of specimens where necessary for laboratory identification. In many cases it was also felt necessary to supplement dig-over material by sieving sediment from an area of c. 0.07 m^2 (based on spade width measurements) using a 1 mm mesh. Field observations were supplemented by still and video photography. The wireframe laminates were used for sketching the distribution of perceived habitats in the field and to aid investigation of conspicuous features on the aerial imagery. In general, biotope ascription to areas was deferred until the results of infaunal analysis were available and, in view of the limited information available at individual target sites, biotopes were assigned to areas, rather than individual sites. Preliminary sketches of the distribution of biotopes were produced within ArcGIS 10.2 using the drawing facility, with the finalised map converted into biotope polygons. To provide context, the adjacent saltmarsh habitat was incorporated into the final map based on the results of a June 2012 SNH survey. The biotope mapping GIS project employed the OSGB 1936 coordinate system and British National Grid projection.

Figure 2. Wire frame map of Kentra Bay overlying 2007 aerial imagery, showing numbered polygons in yellow, 2014 target note sites (red markers), 2014 human impact record sites (pink markers) and 2014 SCM stations (blue markers).

3. RESULTS

3.1 Site condition monitoring

Profile, positional and sedimentary information recorded along the transects are given in Table 1.1 (Annex 1), while the transect profiles, together with those from the 2003 baseline survey, are graphed in Figures 4 - 8, which also show the transect zones with allocated biotopes. The results from particle size analysis of the sediment at each transect station are given in detail in Table 1.2 (Annex 1), graphed in Figures 1.1 - 1.5 (Annex 1) and presented as summary descriptors in Table 1.3 (Annex 1).

Infaunal abundance from core sampling is shown in Table 1.4 (Annex 1) and SACFOR estimates of the abundance of biota from surface observations and the digging over of sediment in Table 1.5 (Annex 1). These data sets have been combined and expressed as SACFOR values in Table 1.6 (Annex 1). As replicate core samples had been taken at certain stations, to ensure consistency between stations and between years only the first core of replicate series has been used in producing this table.

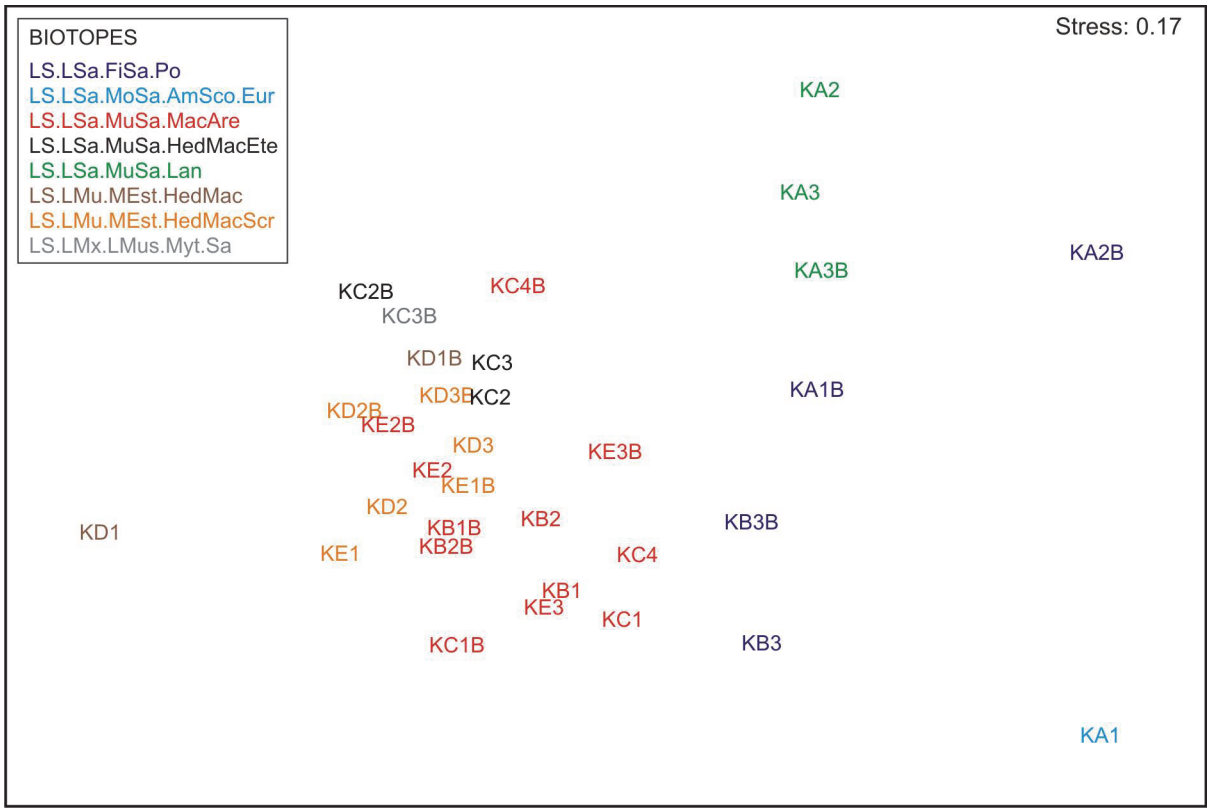


Figure 3. Non-metric multidimensional scaling ordination of macrofaunal abundance data (transformed to SACFOR scale) from Kentra Bay SCM transect stations from the current survey and from the 2003 baseline survey. Station labels are colour coded to correspond with the assigned biotopes. Baseline survey station labels have the suffix 'B'.

MDS ordination of the SACFOR values from this latter table is presented in Figure 3, which also includes the data from the 2003 survey. This clearly shows the difference in species composition between the more exposed sites in the outer and central region of the sediment flats on the right of the plot, and the more sheltered sites on the left. This plot aided biotope ascription and some clustering of similar biotope records is apparent, although final biotope ascription took into account specific characterising species and environmental factors.

Taxon richness values at survey stations are compared for both 2003 and 2014 in Table 2. As not all taxa were grouped in the same way in both years (e.g. oligochaetes), the data are expressed using the 2003 taxon groupings.

Table 2. Taxon richness recorded at the SCM transect stations in 2003 and 2014.

Station	Survey	
	2003	2014
KA1	12	4
KA2	20	30
KA3	20	33
KB1	16	13
KB2	17	15
KB3	14	8
KC1	12	10
KC2	17	18
KC3	18	19
KC4	8	10
KD1	12	7
KD2	22	15
KD3	13	20
KE1	15	14
KE2	17	19
KE3	15	16

The biotope mapping survey (Section 3.2) provided an improved understanding of the biotope composition in Kentra Bay and this facilitated a revision of the biotopes ascribed to the transect stations in 2003. The original and revised biotopes, together with those allocated in 2014 are provided in Table 3.

Table 3. Original and revised biotopes assigned to the SCM transect stations in the 2003 baseline survey and in 2014.

Station	2003 (original)	2003 (revised)	2014
KA1	LS.LSa.FiSa.Po	LS.LSa.FiSa.Po	LS.LSa.MoSa.AmSco.Eur
KA2	LS.LSa.FiSa.Po.Ncir	LS.LSa.FiSa.Po	LS.LSa.MuSa.Lan
KA3	LS.LSa.MuSa.Lan	LS.LSa.MuSa.Lan	LS.LSa.MuSa.Lan
KB1	LS.LSa.MuSa.MacAre	LS.LSa.MuSa.MacAre	LS.LSa.MuSa.MacAre
KB2	LS.LSa.MuSa.CerPo	LS.LSa.MuSa.MacAre	LS.LSa.MuSa.MacAre
KB3	LS.LSa.FiSa.Po	LS.LSa.FiSa.Po	LS.LSa.FiSa.Po
KC1	LS.LSa.MuSa.MacAre	LS.LSa.MuSa.MacAre	LS.LSa.MuSa.MacAre
KC2	LS.LSa.MuSa.HedMacEte	LS.LSa.MuSa.HedMacEte	LS.LSa.MuSa.HedMacEte
KC3	LS.LBR.LMus.Myt.Sa	LS.LBR.LMus.Myt.Sa	LS.LSa.MuSa.HedMacEte
KC4	LS.LSa.FiSa.Po	LS.LSa.MuSa.MacAre	LS.LSa.MuSa.MacAre
KD1	LS.LMu.UEst.Hed	LS.LMu.MEst.HedMac	LS.LMu.MEst.HedMac
KD2	LS.LMu.MEst.HedMacScr	LS.LMu.MEst.HedMacScr	LS.LMu.MEst.HedMacScr
KD3	LS.LMu.MEst.HedMacScr	LS.LMu.MEst.HedMacScr	LS.LMu.MEst.HedMacScr
KE1	LS.LMu.MEst.HedMac	LS.LMu.MEst.HedMacScr	LS.LMu.MEst.HedMacScr
KE2	LS.LSa.MuSa.CerPo	LS.LSa.MuSa.MacAre	LS.LSa.MuSa.MacAre
KE3	LS.LSa.MuSa.CerPo	LS.LSa.MuSa.MacAre	LS.LSa.MuSa.MacAre

3.1.1 Transect KA (Figure 4)

The transect contained a short upper region of dry, unconsolidated, medium sand supporting a sparse fauna including *Eurydice pulchra* and *Scolelepis squamata* (**LS.LSa.MoSa.AmSco.Eur**). This gave way to a region of moist, rippled medium sand with scattered maerl gravel supporting large numbers of *Lanice conchilega* (**LS.LSa.MuSa.Lan**). This biotope continued into the lowest zone, where the sediment became waterlogged. In addition to *Lanice*, the sediment here supported sparse *Sargassum muticum* attached to stones and shell material.

There was little temporal change in the profile of the transect, apart from a loss of around 30 cm of sediment on the lower shore. Sediment composition changed very little between the survey years (Table 1.3, Annex 1).

Figure 4 shows the relatively large temporal change in species composition at stations KA1 and KA2, although these are in fact reflections of diversity differences, with a temporal reduction in taxon richness at KA1 from 12 to 4 and increase at KA2 from 20 to 30. KA3 also showed an increase from 20 to 33. A two-way analysis of variance (ANOVA) revealed no overall significant change in diversity along the transect as a whole.

Temporal differences in biotopes were recorded within the upper two zones of the shore. Whereas in 2003 **LS.LSa.FiSa.Po** extended throughout this region, as a result of upshore encroachment of the *Lanice* population, most of this area in 2014 was assigned to **LS.LSa.MuSa.Lan**. The faunally impoverished band of dry sand at the top of the shore (**LS.LSa.MoSa.AmSco.Eur**) was not recorded in 2003, although contemporaneous photographs suggest that a much narrower strip of this habitat may have been present in that year, below which the sand appears to be damper and more compacted than in 2014.

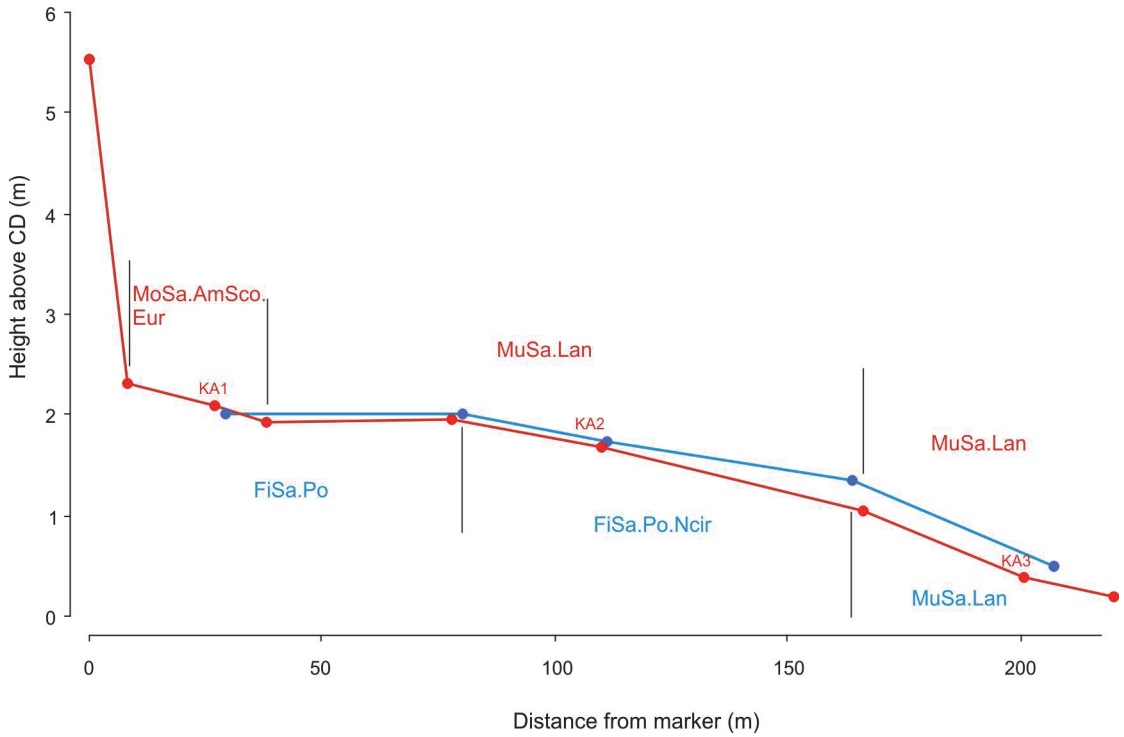


Figure 4. Comparison of profiles of transect KA in 2014 (red) and 2003 (blue), showing component zones, delineated by vertical lines, and corresponding biotopes.

Connor *et al*., (2004) comment that the infauna of the biotope recorded along most of the transect in 2003 (**LS.LSa.FiSa.Po**) may be affected significantly by seasonal changes in the

degree of wave action, with winter storms causing destabilisation of sediment and faunal loss. This transect is located in the most wave-exposed region of the Kentra sediment flats within an area of undulating sand banks and close to expanses of megarippled sediment, visible on the aerial imagery. Recorded temporal changes in the physical and biological conditions along the transect are consistent with natural variation that one would expect at such a hydrodynamic location.

3.1.2 Transect KB (Figure 5)

The transect runs for much of its length through the northern sheltered embayment at Gobshealach, where it was split into an upper zone of slightly muddy fine sand and a lower zone of medium sand. In both zones the waterlogged sediment displayed a similar fauna (see Figure 5), dominated by abundant *Arenicola marina* and *Cerastoderma edule*, and including *Macoma balthica*, *Peringia ulvae* and *Nephtys hombergii* (**LS.LSa.MuSa.MacAre**). The transect continued south of the bay onto the more exposed central region of Kentra flats, where the sediment of clean medium sand lost *Macoma* and *Peringia* but included amphipods and polychaetes suggestive of **LS.LSa.FiSa.Po**. Although the characteristic polychaete, *Nephtys cirrosa*, was not recorded here in 2014, it was found in the same area during the biotope mapping exercise and was recorded here in 2003.

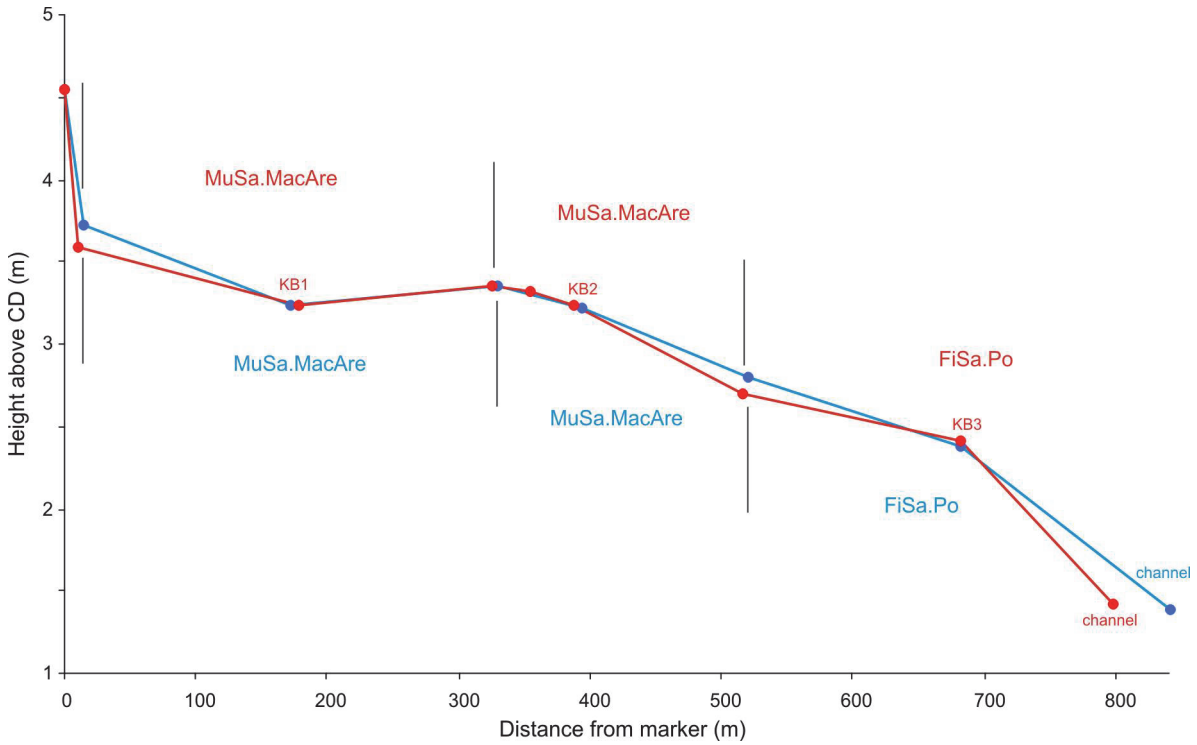


Figure 5. Comparison of profiles of transect KB in 2014 (red) and 2003 (blue), showing component zones, delineated by vertical lines, and corresponding biotopes.

There was little temporal change in the transect profile (Figure 5), apart from some movement in the course of the channel at the bottom of the transect. Sediment composition (Table 1.3, Annex 1) and the sequence and distribution of biotopes were similar in both years. ANOVA revealed no significant temporal difference in taxon richness values along the transect as a whole, although at station KB3 only 8 taxa were recorded in 2014 compared to 14 in 2003. (Table 2). The replicated core sample data (Table 1.4, Annex 1) shows that this level of difference is present even between replicate samples at the same site.

3.1.3 Transect KC (Figure 6)

The transect passed through an area of predominantly medium sand but including elevated banks where the sand was covered in varying amounts of scattered gravel. Waterlogged, slightly muddy sand at the top and bottom of the shore supported a similar fauna (see Figure 6) of low diversity (10 taxa) including abundant *Arenicola marina*, with *Cerastoderma edule*, *Nephtys hombergii*, *Pygospio elegans* and oligochaetes (**LS.LSa.MuSa.MacAre**). Two drier, gravelly sand zones around the middle of the transect harboured a similar fauna, but one that was distinct from that of the wetter top and bottom zones (Figure 6). This was of higher diversity (20 - 21 taxa) and, although containing the same dominant taxa found in the sand patches, the density of *Arenicola* was depressed, but it was accompanied by *Hediste diversicolor*, *Capitella capitata*, *Corophium volutator* and, at KC2, which was slightly muddy, *Eteone longa* (**LS.LSa.MuSa.HedMacEte**). The gravel banks were separated by a small patch of muddy sand that was not sampled but is probably referable to **LS.LSa.MuSa.MacAre**.

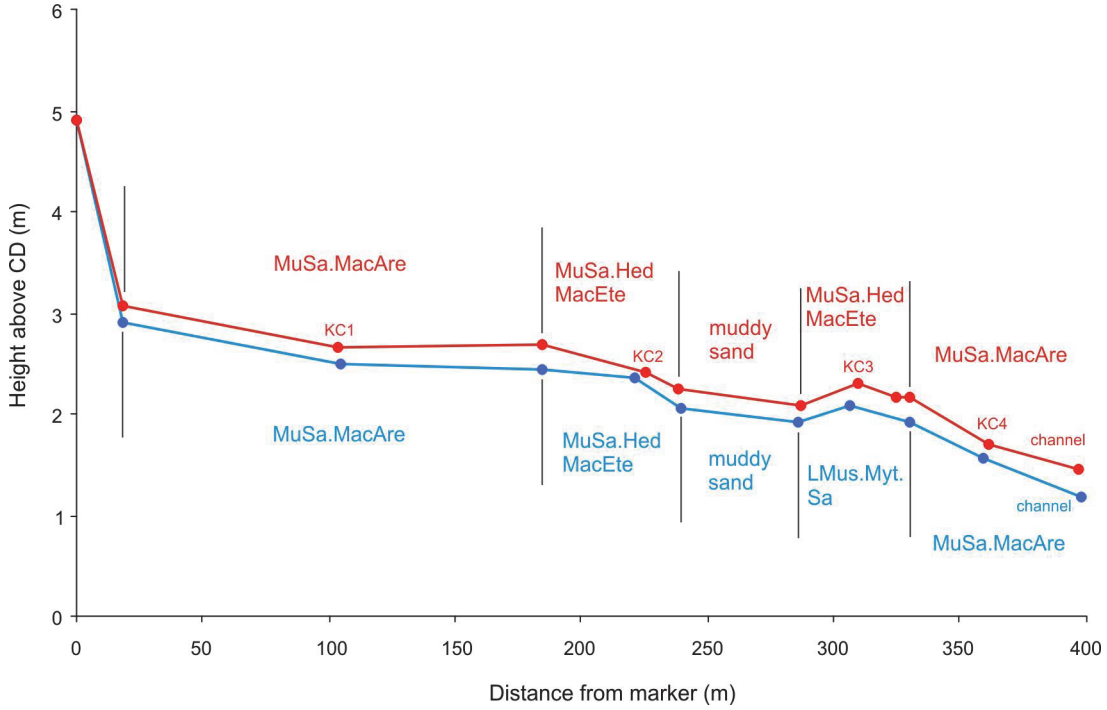


Figure 6. Comparison of profiles of transect KC in 2014 (red) and 2003 (blue), showing component zones, delineated by vertical lines, and corresponding biotopes.

The sequence and distribution of biotopes along the transect is almost exactly the same as that found in 2003 (Figure 6). The only exception is that the lower gravel bank in 2003 supported a sparse mussel bed (**LS.LBR.LMus.Myt.Sa**), although otherwise the fauna was similar (Figure 6). Mussels were also present in 2014 but were only occasional at station KC3, although elsewhere in the zone they were locally frequent. Lyndon *et al*. (2004) reported the presence of a dense mussel bed, starting approximately 15 m west of station KC3 in 2003. The biotope mapping survey recorded the presence of a mussel bed, where *Mytilus edulis* was common, around 80 m to the west of KC3, so some localised reduction in *Mytilus* density appears to have taken place. Taxon richness values recorded along the transect were very similar in 2003 and 2014 (Table 2). In 2014 a member of the public brought the attention of the surveyors to a live specimen of the native oyster, *Ostrea edulis*, that had been found in the vicinity of station KC4. This species is a priority marine feature (see SNH, 2014).

The transect profile in 2014 closely mirrored that in 2003. A slight offset of around 17 cm is likely to be due to a minor difference in the location of the start of the transect, due to the disappearance of the marker stake. It should be noted that a large height difference (1.08 m) was recorded between station KC2 and the upper boundary of this zone in 2003. Inspection of contemporaneous photographic imagery of the transect and recalculation of the tidal height of KC2 based on time-stamped video footage of the imminent flooding of the station, indicates that the true height difference was probably 0.08 m, a figure which has been employed in constructing Figure 6. Some temporal change in gravel content of the sediment was recorded along the transect, with maximum change at KC4, where there was a reduction of 23% and a concomitant increase in sand content (Table 1.3, Annex 1). Such a difference might be expected from natural translocation along a transect exhibiting scattered gravel patches.

3.1.4 Transect KD (Figure 7)

At the top of this transect saltmarsh, with a small creek at its lower edge, gave way to a shore of waterlogged, muddy sand with scattered gravel. Three zones were recognised. The lower two zones supported a similar fauna (Figure 7) of fairly dense *Scrobicularia plana*, together with *Arenicola marina*, *Hediste diversicolor*, *Peringia ulvae*, *Corophium volutator*, *Cerastoderma edule* and oligochaetes. These zones have been ascribed to the biotope **LS.LMu.MEst.HedMacScr**. The lower zone (KD3) was of firmer sediment with a mud content of only 5% (Table 1.3, Annex 1), atypically low for the biotope. The uppermost zone had a similar, but relatively impoverished fauna supporting only 7 taxa, in comparison to 15 - 20 for the lower zones (Table 2). In particular, *Arenicola* was absent and *Scrobicularia* much sparser. Although Table 1.6 (Annex 1) records *Scrobicularia* as common here, this is based on the first of four replicate cores. *Scrobicularia* was absent in the three remaining cores and in the sediment dig-over. *Hediste diversicolor* was abundant here and *Macoma balthica* common. The zone has been assigned to the biotope **LS.LMu.MEst.HedMac**.

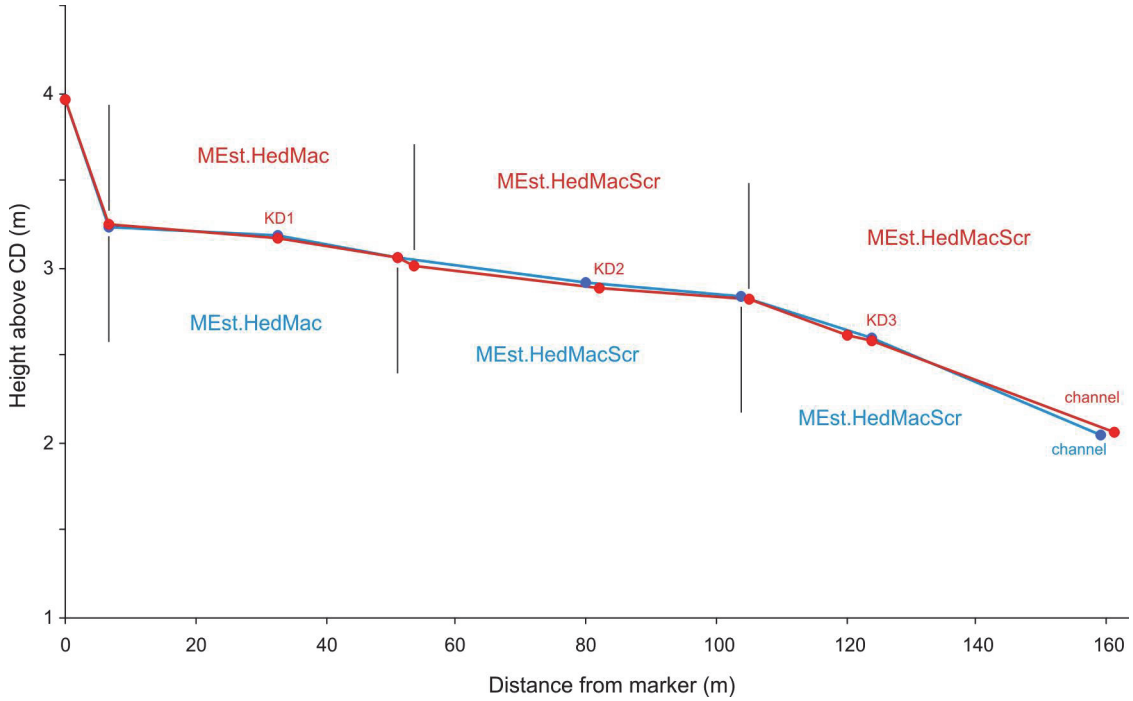


Figure 7. Comparison of profiles of transect KD in 2014 (red) and 2003 (blue), showing component zones, delineated by vertical lines, and corresponding biotopes.

The transect profile, as well as the sequence and distribution of biotopes (Figure 7) and taxon richness (Table 2) closely match those recorded in 2003. Species composition in the

lower two zones are similar in both years, although a green algal mat present in zone KD2 was absent in 2014. There was a greater temporal disparity in species composition in the upper zone (Figure 7). In 2003 the composition was relatively closer to that of the lower zones with more shared species, such as *Arenicola marina* and *Pygospio elegans*.

Sediment composition along the transect was similar in both survey years, except for an increase in the mud content of 23% at station KD2 (Table 1.3, Annex 1). Given that Lyndon *et al.* (2004) noted the presence of a sandier sediment layer at about 4 cm depth, the localised recorded change at KD2 may reflect spatial variability in the depth of this coarser stratum.

3.1.5 Transect KE (Figure 8)

A band of waterlogged, flat muddy sand with scattered cobbles occupied the upper shore supporting dense *Scrobicularia plana*, *Arenicola marina*, *Peringia ulvae* and *Hediste diversicolor* (**LS.LMu.MEst.HedMacScr**). This upper zone gave way to a region of waterlogged, slightly muddy sand with scattered cobbles and a patchy coverage by a filamentous green algal mat. The fauna was similar to that of the upper zone, although the abundance of *Hediste* and *Scrobicularia* were much reduced. This area has been assigned to the biotope **LS.LSa.MuSa.MacAre**, although it appears to be intermediate between this biotope and **LS.LMu.MEst.HedMacScr** of the adjacent zone, as might be expected from the proximity of the perceived zonal boundary (Figure 8). With further progression down the shore cobbles were lost, the algal mat reduced in density, and the sand was formed into dense *Arenicola* hummocks, with *Cerastoderma edule*, *Macoma balthica* and a patchy green algal mat also present (**LS.LSa.MuSa.MacAre**).

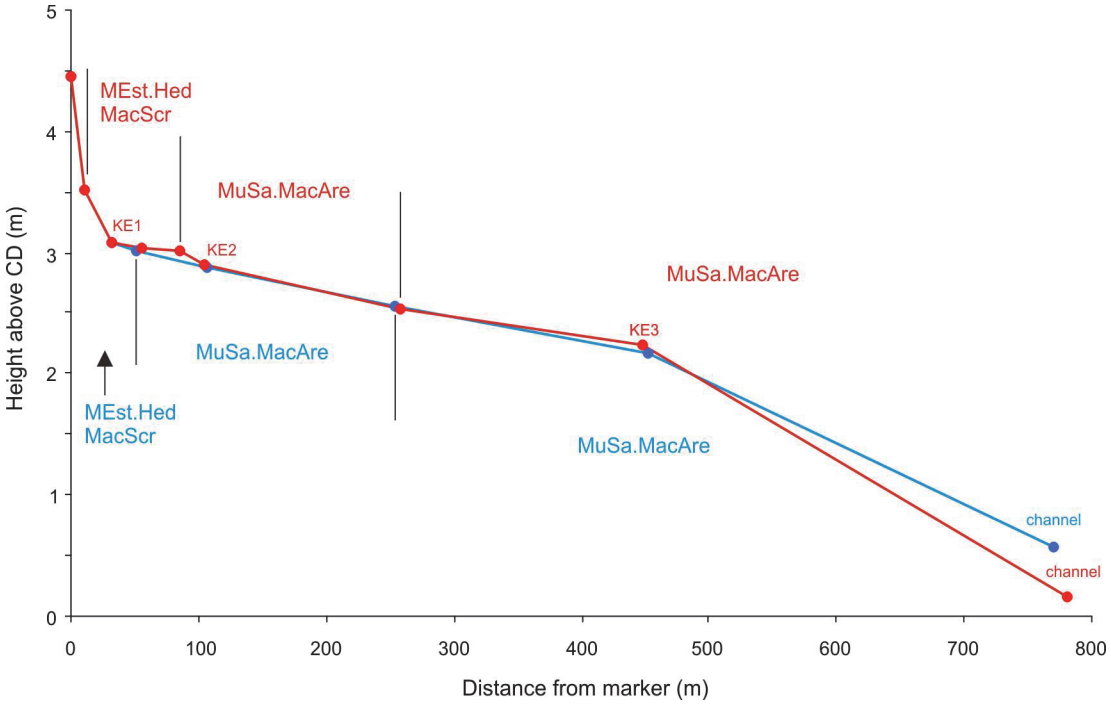


Figure 8. Comparison of profiles of transect KE in 2014 (red) and 2003 (blue), showing component zones, delineated by vertical lines, and corresponding biotopes.

No temporal change in the sequence of biotopes along the transect is apparent (Figure 8), although the perceived lower boundary of the **LS.LMu.MEst.HedMacScr** zone has extended downshore by around 30 m. Taxon richness values recorded at all three stations are very similar in both survey years (Table 2). There are no marked temporal changes in species

composition within the zones, apart from the lack of penetration of the green algal mat into the uppermost zone in 2014, where it covered 70% of the sediment in 2003. Sediment composition varied little between surveys (Table 1.3, Annex 1).

The only apparently significant temporal change in the transect profile was observed at the bottom of the transect. The height recorded at the channel edge was 40 cm lower in 2014; however, this may merely reflect the volume of water in the channel at the times of measurement.

3.2 Biotope mapping

Habitat descriptions recorded at target note sites are provided in Tables 3.1 and 3.2 (Annex 3) and the resulting biotope map given in Figure 9.

Much of the outer half of Kentra flats was dominated by **LS.LSa.FiSa.Po**, which occupied the more exposed areas. The sediment was composed principally of clean fine sand formed into ripples, which were superimposed upon megaripples locally. The fauna was characterised by polychaetes, especially *Nephtys cirrosa*, maldanids and *Scoloplos armiger*, amphipods such as species of *Bathyporeia*, and *Angulus tenuis*. *Arenicola marina* was generally present (common) but at lower densities than the more sheltered parts of the flats. While *Lanice conchilega* was often also present at low density, it became common within a narrow depressed embayment of medium sand between sand banks to seaward of Eileanan Dubh (**LS.LSa.MuSa.Lan**). On the upper shore here there was a small region of dry, unconsolidated, medium sand supporting a sparse fauna including *Eurydice pulchra* and *Scolelepis squamata* (**LS.LSa.MoSa.AmSco.Eur**).

LS.LSa.MuSa.MacAre occupied most of the inner half of Kentra flats, including much of the major embayments of Camas Clachach, at Kentra and at Gobshealach. The sediment was largely one of slightly muddy fine sand formed into dense hummocks by *Arenicola marina* and supporting pink bacterial patches locally, although rippled clean fine sand was also present in more exposed areas, including to the south of Kentra, where it graded into **LS.LSa.FiSa.Po**. The sediment had a superficial oxidised layer (<1 cm) and supported a fauna characterised by abundant *A. marina*, together with *Nephtys hombergii*, *Cerastoderma edule* and, at a minority of sites, *Macoma balthica*. This biotope was also recognised in more sheltered regions of the outer part of Kentra Bay such as in the moorings area off the pier at Ardtoe. North of Eileanan nan Gad this biotope enclosed three pockets of mussel beds (**LS.LBR.LMus.Myt.Sa**), where the sand supported moderate densities of *Mytilus edulis* (common). The beds were small with extents of 0.55, 0.45 and 0.11 ha.

The upper shore in the northern bay at Gobshealach consisted of flat fine sand, largely slightly muddy, where the *Arenicola* population was reduced (generally F-C) and was accompanied by *Hediste diversicolor* and *Cerastoderma edule* (**LS.LSa.MuSa.HedMacEte**). The head of the bay on the opposite southern shore of the flats (Camas Clachach) exhibited muddy to very muddy sand also populated by *H. diversicolor* and *Arenicola marina*, but accompanied by *Scrobicularia plana* (C) (**LS.LMu.MEst.HedMacScr**).

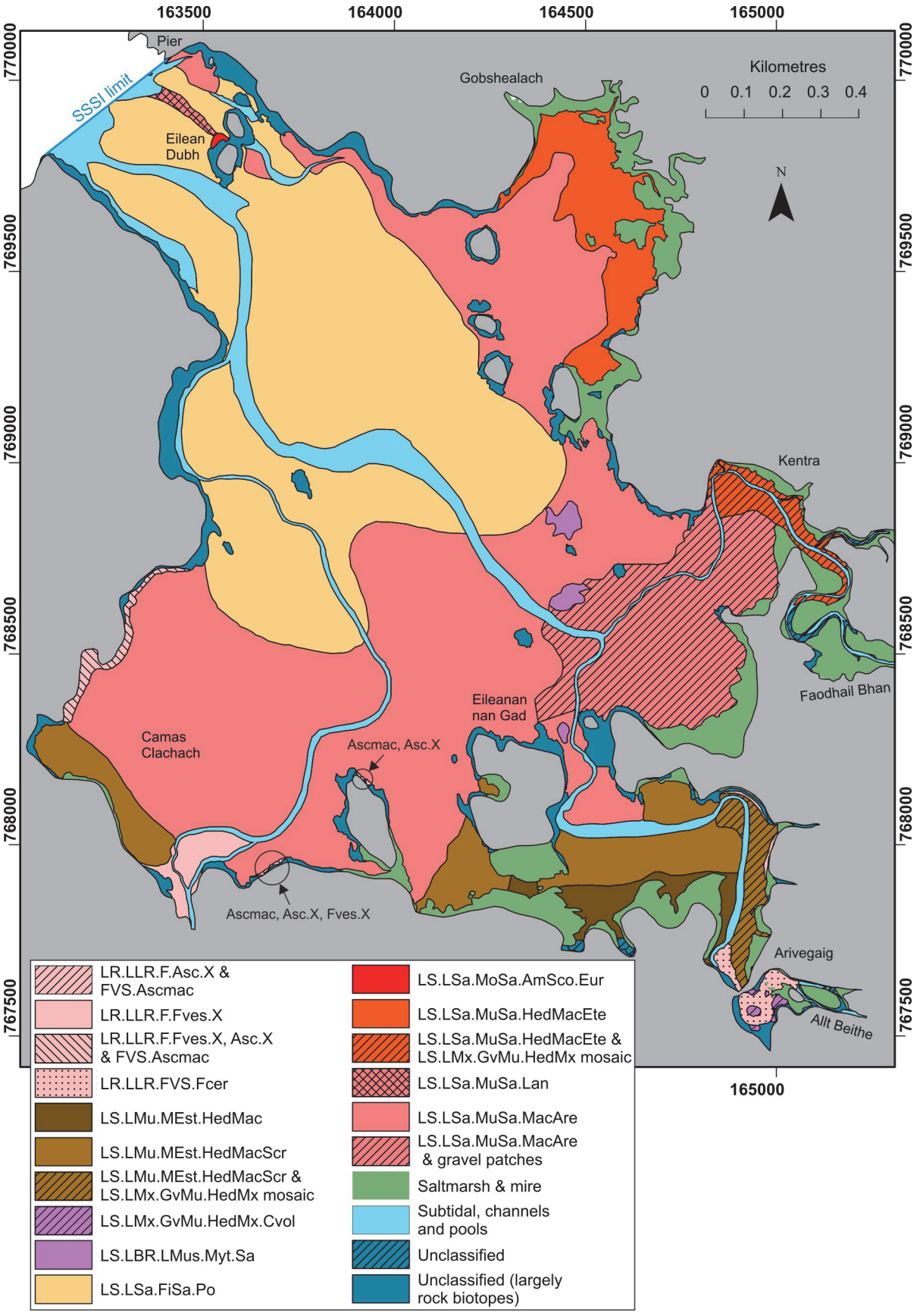


Figure 9. Distribution of sediment flat biotopes and adjacent habitat types within Kentra Bay and Moss SSSI.

The two major sources of freshwater into Kentra Bay are two burns at the head of the bay, Faodhail Bhan at Kentra and Allt Beithe at Arivegaig. At the mouth of the Faodhail Bhan an extensive area of fine sand (**LS.LSa.MuSa.MacAre**) was interrupted by raised patches of gravel on sand. Some of these patches were found to support a similar, though relatively impoverished, fauna (**LS.LMx**), whereas others supported *Hediste diversicolor* and *Eteone longa* and have been ascribed to **LS.LSa.MuSa.HedMacEte**. These dense gravel patches continued into the less saline upper reaches of the estuary, where they formed a mosaic with fine sand, slightly muddy in places. The fine sand community was dominated by *Hediste diversicolor*, *Arenicola marina* and *Corophium volutator* (**LS.LSa.MuSa.HedMacEte**), with *Arenicola* penetrating the channel to the highest part of the estuary surveyed. Gravel patches harboured a similar fauna, though often accompanied by scattered fucoid algae, especially *Fucus vesiculosus* (**LS.LMx.GvMu.HedMx**).

At the mouth of the Allt Beithe clean fine sand in the area of the channel east of Eileanan nan Gad, probably subject to enhanced current speeds, supported an impoverished community dominated by *Arenicola marina*, with *Fucus vesiculosus* present on scattered stones. This is regarded as representing a poor example of **LS.LSa.MuSa.MacAre**. Farther upstream, the sand gave way to predominantly muddy sand, densely hummocked by *A. marina*, accompanied by dense *Scrobicularia plana*, with *Hediste diversicolor*, *Nephtys hombergii* and *Macoma balthica* (**LS.LMu.MEst.HedMacScr**). Muddy sand continued onto the upper shore in this region, but at least along the southern side of the channel, *A. marina* and *S. plana* were sparse or absent (**LS.LMu.MEst.HedMac**). West of Arivegaig, particularly on the eastern side of the channel the muddy sand sediment supporting dense *S. plana* (**LS.LMu.MEst.HedMacScr**) formed a mosaic with slightly elevated patches of dense gravel and pebbles, populated by *H. diversicolor*, *Corophium volutator* and oligochaetes (**LS.LMx.GvMu.HedMx**).

In the region of the Arivegaig bridge a heterogeneous substrate of gravel, pebbles and cobbles in the channel and on muddy sand on the channel banks supported a sward of *Fucus ceranoides* (**LR.LLR.FVS.Fcer**). Patches of mud with scattered gravel, pebbles and cobbles were populated by *Hediste diversicolor* and *Corophium volutator*, with an epifauna including *Neomysis integer* and *Carcinus maenas* (**LS.LMx.GvMu.HedMx.Cvol**).

Mixed substrate reef biotopes including **LR.LLR.F.Fves.X** and **LR.LLR.F.Asc.X** were widely observed along the upper margin of sediment biotopes within Kentra Bay, although these were generally not mapped. Exceptions were made, however, where these formed mosaics with the *Ascophyllum nodosum* ecad *mackaii* biotope, **LR.LLR.FVS.Ascmac**, as these egg wrack beds are a priority marine feature (see SNH, 2014). They were recorded at three locations in Camas Clachach, generally as small patches, but an extensive area (approximately 50 x 8 m) of superabundant *A. nodosum mackaii* was observed at one site (K14.54 - see also Figure 2).

3.3 Anthropogenic impacts

During the biotope mapping of Kentra Bay, evidence of human activities with the potential to cause habitat disturbance was observed at a number of locations (Table 4, Figure 2).

A single bait digger was encountered during the survey, probably targeting *Alitta* (=*Neanthes*) *virens*, large specimens of which were present in the area. Small boat moorings for about five vessels were present in the sheltered embayment off the pier near Ardtoe. At least some of these dry at low tide. A mooring for a small polystyrene raft was located at the mouth of the burn, Faodhail Bhan. In the same vicinity three features were observed that appeared to be the remains of crude forms of oyster trestles: a farm gate (Figure 10, left, background), a gate with metal grating resting on stones (Figure 10, right), and a wooden pallet with assorted ironwork and two nets, probably for oysters (Figure 10,

left, foreground). None of the above mentioned activities or features appeared to be causing significant damage to the sediment flats, merely highly localised disturbance, although the intensity of bait digging is unknown.

Table 4. Human usage of the Kentra sediment flats observed during the 2014 survey. Site code is that used in Figure 2.

Feature/activity	Location	Site code	Latitude	Longitude	Date
Bait digging	East of Eilean Dubh	B1	56.75962	-5.86878	12/08/2014
Moorings	Ardtoe Pier	M1	56.76188	-5.87166	12/08/2014
Mooring	Mouth of Faodhail Bhan, off Kentra	M2	56.75172	-5.84463	15/08/2014
Oyster trestles	Mouth of Faodhail Bhan, off Kentra	OT1	56.75204	-5.84495	15/08/2014
Sediment craters and tyres	Arivegaig	SC1	56.74307	-5.8453	15/08/2014

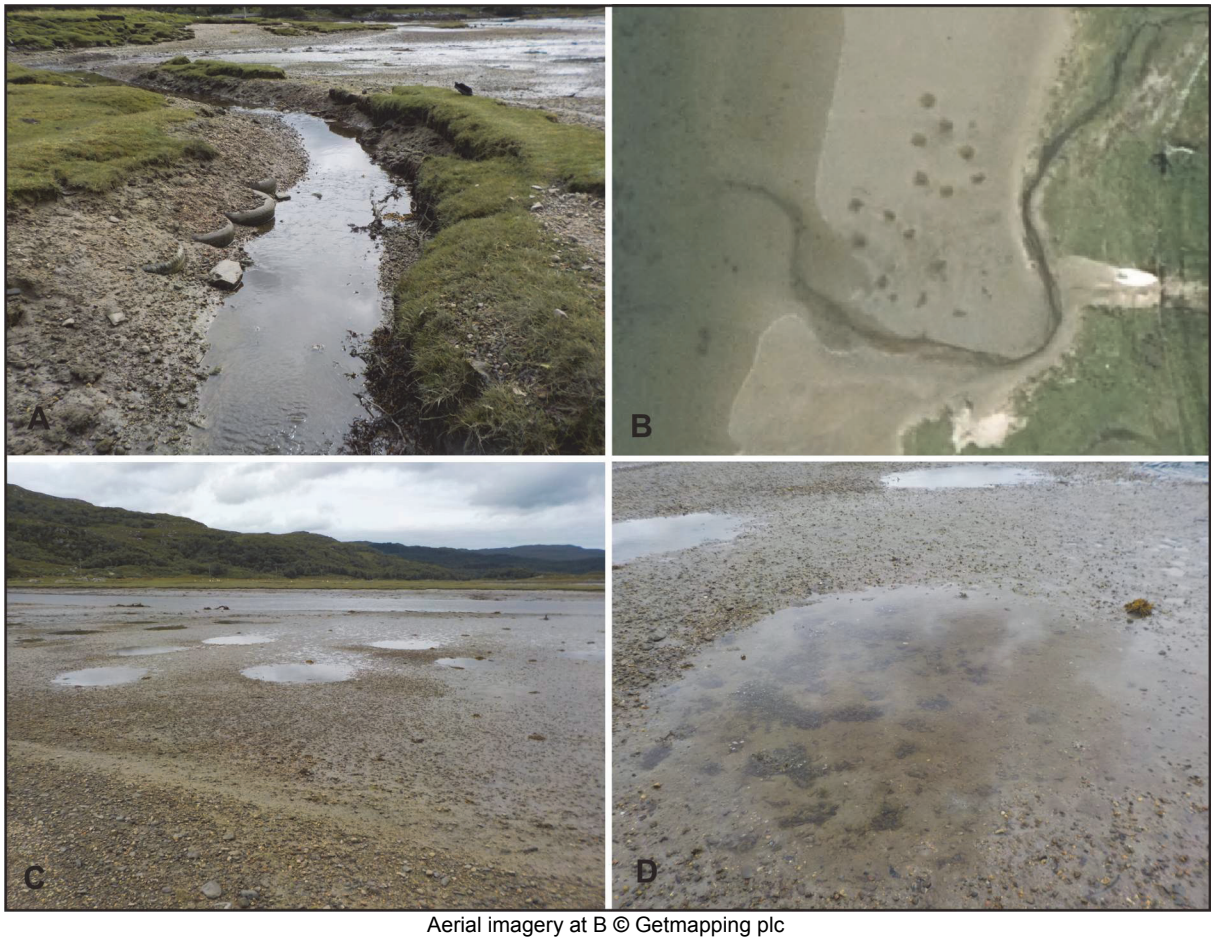
The site of tyre dumping and sediment removal at Arivegaig (see Introduction) was examined during the current survey and 13 - 16 craters were still visible (Figure 11). Most were around 2 m in diameter and water-filled to a depth of approximately 5 - 7 cm and occupied an area of muddy sand flat of 32 x 20 m. Tyres were still present in the adjacent creek in 2014, eight of them being partly visible along a 20 m stretch of the creek bank (Figure 11A).

Several of the craters appeared to act as sinks for fucoid algae (Figure 11D). Table 5 shows the fauna present within single core samples taken within one of the larger craters and in an adjacent control area. Bearing in mind the level of difference one might expect between replicate samples taken from the same habitat, this provides little indication of a marked difference in composition or diversity. Although *Corophium volutator* was lacking in the crater sample, its presence within craters was recorded in the field. In view of the results from these two core samples, additional samples taken from a further four craters and control areas have not been analysed.

Table 5. Abundance of infauna in single core samples of area 0.028 m^2 taken within and 1.5 m distant from one of the sediment craters at Arivegaig.

Species	Crater	Control
Hediste diversicolor	12	44
Pygospio elegans	1	1
Baltidrilus costata		2
Tubificoides benedii	6	16
Enchytraeidae spp.	1	
Gammarus salinus	1	1
Corophium volutator		13
Crangon crangon	2	
Chironomidae spp.	1	
Peringia ulvae		1
Cerastoderma edule	2	

Figure 10. Presumed crude oyster trestles observed off Kentra.



Aerial imagery at B © Getmapping plc

Figure 11. Tyre dumping and sediment crater site at Arivegaig. A, tyre-lined creek; B, aerial imagery of sediment craters; C, view of craters looking south-west; D, close-up of crater. Aerial imagery from 21/07/2013, other images from 15/08/2014.

4. DISCUSSION

The notified sediment flat feature for the Kentra Bay and Moss SSSI is termed 'mudflats'. The extent of this feature can be seen in Figure 9, where it includes the mud (**LS.LMu**) and muddy sand (**LS.LSa.MuSa**) biotopes. However, there is a gradation between muddy sand and clean sand biotopes and it is suggested that consideration be given to also notifying the ecologically linked 'sandflats' present in this site. Both mudflat and sandflat biotopes were incorporated into the 2003 baseline SCM survey (Lyndon *et al*., 2004) and this broader approach has been retained in the 2014 SCM work.

Existing guidance proposes that monitoring of the condition of littoral sediment features should consider ten attributes of which four require compulsory assessment (JNCC, 2004). Eight attributes have been selected for monitoring within the Kentra Bay and Moss SSSI by SNH and these are listed in Annex 2 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 2.

4.1 Extent

No activities have been identified that are likely to have caused a change in the extent of the mudflat feature in Kentra Bay. The transect profiles also indicate that there has been no reduction in extent of the habitat at the few locations examined.

4.2 Sediment character: sediment type

The Site Attribute Table sets a target limit for temporal change in sediment composition of +/- 10% for sand and silt/clay. This figure was exceeded at only two stations. An increase in sand content of 22% at station KC4 is explicable in terms of natural translocation of gravel material in a region with patches of scattered gravel (concomitant 23% loss of gravel recorded). An increase in recorded silt/clay content of 23% at station KD2 may have arisen through spatial variability in the depth of the sandier stratum underlying the surface muddy sand layer (Lyndon *et al*., 2004). While real temporal change in the composition of the

surficial sediment layer cannot be discounted, there is no evidence to implicate non-natural factors in the causation of such a localised change.

4.3 Sediment character: oxidation reduction profile

The Site Attribute Table sets a target limit for temporal change in the depth of the black layer at +/- 50% of the baseline figure for sites with a baseline value of >1 cm. This target is exceeded at two stations in 2014 (Table 6). The large change at KA1 will reflect changes in sediment compaction, moisture and oxygen permeability presumed to arise from natural temporal variation at this relatively highly hydrodynamic location. The change at station KC2 is minor. Considering the methodology of measurement, by visual estimation of colour change, and the fact that during the biotope mapping survey the depth of the black layer was seen to vary by several centimetres at the same station, the scale of the recorded difference at KC2 is not considered significant. The depth of the black layer is known to vary seasonally (Gray, 1981) and to respond to variations in factors such as temperature (Ankar and Jansson, 1973). At no station was there a reduction in the black layer depth of more than 0.4 cm. This is indicative of the absence of a temporal increase in organic enrichment.

Marked increases in the depth of the black layer occurred at four stations where the baseline depth value was <1 cm (KB2, KC1, KD2, KE2). At the sites showing the greatest change of 1.7 - 2.8 cm (respectively KE2 and KD2) the presence of a dense green algal mat was recorded in 2003 but was sparse or absent in 2014. The presence of algal mats is known to influence the depth of the black layer in intertidal sediments (Sundback and McGlathery, 2005). The temporal change in algal cover may have arisen from a number of factors including temperature, light, nutrients and wind conditions, as well as the later timing of the baseline survey at the end of August.

Table 6. Depth of the black layer recorded at the SCM transect stations in the 2003 baseline survey and in 2014. Red indicates values falling outside the SCM prescription limit for temporal change.

Station	Depth of black layer (cm)		Change (cm)	Change (%)
	2003	2014		
KA1	1.2	48.0	46.8	3900
KA2	15.0	19.0	4.0	27
KA3	1.4	1.0	-0.4	-29
KB1	0.3	0.5	0.2	67
KB2	0.4	2.0	1.6	400
KB3	2.2	2.0	-0.2	-9
KC1	0.2	1.5	1.3	650
KC2	1.2	2.0	0.8	67
KC3	0.8	1.0	0.2	25
KC4	0.6	0.5	-0.1	-17
KD1	0.8	1.0	0.2	25
KD2	0.2	3.0	2.8	1400
KD3	0.6	1.0	0.4	67
KE1	1.0	1.5	0.5	50
KE2	0.3	2.0	1.7	567
KE3	0.5	0.5	0.0	0

4.4 Biotope composition

All biotopes in the revised list of baseline survey biotopes (Table 3) were present along the relocatable transects in 2014, apart from **LS.LBR.LMus.Myt.Sa** in transect zone KC3. The faunal composition of the community at KC3 was very similar in both years, but there was a temporal reduction in the characterising species, *Mytilus edulis*. The biotope was, however, recorded at three locations during the biotope mapping survey, one of which was only 80 m from KC3. The disappearance of the biotope here appears to have resulted from a localised reduction in *Mytilus* density and there is no reason to believe that this is not within the range of natural temporal variation.

4.5 Distribution and spatial pattern of biotopes

The SAT prescription is that all biotopes recorded during the baseline survey will continue to be present along the same transects. Changes in the spatial pattern of biotopes along the relocatable transects are summarised in Table 7. For each of the three zonal records of change, the baseline survey biotope was not present at any point along the same transect in 2014. The disappearance of **LS.LSa.FiSa.Po** from the top of transect KA (KA1) is considered to be possibly due to changes in moisture content and stability of the sand resulting from natural variation in the hydrodynamic environment at this relatively exposed location (see section 3.1.1), whereas on the middle of the shore (KA2) the transition from **LS.LSa.FiSa.Po** to **LS.LSa.MuSa.Lan** results merely from the upward extension of the *Lanice conchilega* population from the adjacent zone (KA3). In fact, KA2 would have been referred to **LS.LSa.FiSa.Po** had *L. conchilega* been recorded as frequent rather than common. Similarly, as described in Section 3.1.3 above, the loss of **LS.LBR.LMus.Myt.Sa** from transect KC is likely to have resulted from natural temporal variation in the success of the *Mytilus edulis* population.

Table 7. Recorded temporal changes in biotopes along the SCM transects.

Zone	Survey	
	2003	2014
KA1	LS.LSa.FiSa.Po	LS.LSa.MoSa.AmSco.Eur
KA2	LS.LSa.FiSa.Po	LS.LSa.MuSa.Lan
KC3	LS.LBR.LMus.Myt.Sa	LS.LSa.MuSa.HedMacEte

In general there was little temporal change in the recorded distribution of biotopes along the transects. The perceived lower boundary of the uppermost zone (**LS.LMu.MEst.HedMacScr**) along transect KE extended farther downshore by around 30 m in 2014. However, the location of this boundary was not distinct and so temporal change cannot be confirmed.

4.6 Presence or abundance of specified species

The SAT lists five indicator species with prescribed values for frequency of occurrence at the 16 SCM monitoring stations. These are also given in Table 8, together with occurrence values recorded in 2014.

Table 8. Frequency of occurrence of named positive indicator species at the 16 SCM transect stations in 2014.

Species	Frequency	% occurrence	Prescribed % occurrence
Hediste diversicolor	8	50	30
Arenicola marina	13	81	50
Corophium volutator	6	38	40
Scrobicularia plana	5	31	25
Cerastoderma edule	15	94	50

All species lie well within the prescribed % occurrence target, apart from *Corophium volutator*, which falls narrowly below it. This species was absent at two stations along transect KE in 2014, where it was recorded in 2003. However, a closely related species, *Crassicorophium bonnellii*, was recorded at both stations in 2014 but was not found at any station during the baseline survey. It is unlikely that *C. bonnellii* has competitively replaced *C. volutator* along transect KE, as the two species occupy quite different niches, with *C. bonnellii* constructing tubes on stones and other firm substrates, whereas *C. volutator* lives in U-shaped burrows within the sediment. It is possible, however, that the corophiid material from these two stations in the 2003 samples was misidentified. If this were the case, and the two KE sites were excluded from consideration, then the frequency of *C. volutator* at the remaining 14 sites (43%) would meet the prescription. In any event, *C. volutator* was recorded close to one of these stations (KE1) in the same biotope polygon at the head of Camas Clachach bay, during the biotope mapping survey. There is insufficient evidence to conclude that any of the five indicator species have undergone a reduction in the frequency of their occurrence.

4.7 Species composition of representative biotopes

The SAT prescription is that there should be no decline in biotope quality due to a change in species composition or through loss of notable species. The only clear evidence of a deleterious change in species composition relates to the impoverishment of the community in the upper zone of transect KA (KA1), with a temporal reduction in the species complement from 12 to 4 (Table 2). However, this change, which resulted in ascription of a different biotope in 2014, is considered to probably result from natural variation in the hydrodynamic conditions at this relatively exposed location, as discussed previously. There was no overall change in mean taxon richness at all 16 transect stations ($\overline{x} = 16$ for both survey years) and there were no overall significant temporal changes in richness for any of the transects (2-way ANOVA, $p>0.05$).

Transect KA also experienced a compositional change in the lowest zone (KA3), with the incursion by the invasive alga, *Sargassum muticum* (Figure 12). However, the current population density is very low and any impact on the character or condition of the biotope must be considered insignificant at the present time.

Figure 12. Sargassum muticum. Photographed within 20 m of station KE3 on 12/08/2014.

4.8 Topography

Little temporal change in topography along the five transects was recorded. At the bottom of two of the transects, perceived height differences may have been due to natural temporal change in the course of the channel, or in its width due to the volume of contained water at the time of measurement. A loss of around 30 cm of sediment on the lower shore of transect KA is considered to reflect natural hydrodynamic variability at this relatively exposed location.

4.9 Overall condition assessment

As a result of the 2014 site condition monitoring of the Kentra Bay and Moss SSSI it is concluded that the site should be assigned to the condition category "Favourable Maintained".

4.10 Recommendations

Although aerial imagery of the Kentra sediment flats was available from both 2007 and 2013, the older material was largely used to aid biotope mapping as clarity was superior as a result of it being recorded close to the time of low water. Although contemporary imagery should preferably accompany biotope mapping, comparison of the imagery from both years suggests that employment of the older material probably had little influence on the resultant mapping, although some temporal change in channel routing is evident. Up-to-date, suitable imagery would, however, improve confidence in the accuracy of the resultant mapping. It would also permit some assessment of temporal change in the extent of the sediment flats.

All the major biotopes present on the mudflats (as revealed by the biotope mapping survey) were represented along the SCM transects and these transects also provided good geographical coverage of the sediment flats. It is therefore recommended that future monitoring should retain the current selection of transects.

Little temporal change in topography was recorded along the SCM transects and this might be expected in the case of relatively sheltered sediment flats. Temporal change which does occur will be generally due to natural variability in wave and current action. The importance of monitoring transect profiles lies chiefly in its potential for aiding understanding of any identified temporal change in other measures of the condition of the habitat, such as modification of species or biotope attributes. Consideration could be given to the omission of profiling from future routine monitoring of the Kentra Bay sediment flats, but with adoption where the likelihood of significant temporal change is high, based on known anthropogenic

activities or distinct changes in visual appearance. With continued improvements in the affordability and simplicity of sub-decimetre, GPS-derived height measurement, the cost/benefit ratio of incorporating transect profiling in the monitoring programme is likely to greatly decrease.

With the collection of single infaunal samples at monitoring stations, analysis of temporal change in infaunal species diversity for entire monitoring transects can be addressed by means of two-way analysis of variance, and this approach has been followed in this report. The collection of replicate samples at selected stations was found to be of value in assessing the scale of variability between replicates, thereby placing recorded temporal change at non-replicated stations into context. It is therefore considered worthwhile continuing to incorporate a degree of replication within site condition monitoring.

Apart from two stations along the most exposed transect, recorded black layer depths spanned a narrow range of 0.2 - 3.0 cm in both survey years. Given the variability in black layer depth observed at individual sites during the broadscale mapping survey (section 4.3) and the temporal change recorded at some sites possibly resulting from natural variation in the development of algal mats and other natural factors, the usefulness of quantitative targets for black layer depth within site condition monitoring of Kentra Bay sediment flats is questionable. Due to the simplicity of its measurement, it should continue to be monitored but without the formal adoption of target criteria.

None of the anthropogenic impacts observed during the 2014 survey work appear to be causing significant damage to the sediment flats and therefore are not believed to warrant remedial action. The Arivegaig sediment craters continue to constitute a visual impact but recovery of the biological condition of the habitat appears to have largely taken place. The process of natural accretion within the craters should be left to continue.

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ANNEX 1: SITE CONDITION MONITORING DATA

Table 1.1. Transect profile, positional and habitat data

Feature	Distance from marker (m)	Height above CD (m)	Latitude	Longitude	Substrate	Moisture	Depth black layer (cm)	Biotope
TRANSECT KA (12 August 2014)								
transect marker	0	5.525	56.75994	-5.86991				
rock/sand boundary	8	2.32	56.76002	-5.87009				
station KA1	27	2.105	56.76009	-5.87027	rippled medium sand	dry	48	LS.LSa.MoSa.AmSco.Eur
KA1/KA2 zone boundary	38	1.925	56.76015	-5.87040				
KA1/KA2 zone boundary (2003 position)	78	1.96	56.76035	-5.87095				
station KA2	110	1.67	56.76051	-5.87138	rippled medium sand with maerl gravel and occasional bivalve shells	moist	19	LS.LSa.MuSa.Lan
KA2/KA3 zone boundary	166	1.035	56.76080	-5.87213				
station KA3	201	0.395	56.76098	-5.87261	slightly muddy, rippled medium sand with maerl gravel	standing water	1	LS.LSa.MuSa.Lan
channel	220	0.2	56.76110	-5.87283				
TRANSECT KB (9 August 2014)								
transect marker	0	4.54	56.75831	-5.85286				
lower saltmarsh edge	10	3.58	56.75818	-5.85298				
station KB1	178	3.23	56.75690	-5.85421	muddy fine sand, occasional dead shells	standing water	0.5	LS.LSa.MuSa.MacAre
KB1/KB2 zone boundary (2003 position)	325	3.345	56.75575	-5.85539				
KB1/KB2 zone boundary	355	3.315	56.75553	-5.85560				
station KB2	387	3.24	56.75525	-5.85586	medium sand with occasional dead shells	damp, some pools	2	LS.LSa.MuSa.MacAre
KB2/KB3 zone boundary	516	2.695	56.75425	-5.85690				
station KB3	683	2.405	56.75294	-5.85820	medium sand with some rippling and rare dead shells - cockle, razor	damp	2	LS.LSa.FiSa.Po
channel	799	1.425	56.75204	-5.85912				

Table 1.1 continued

Feature	Distance from marker (m)	Height above CD (m)	Latitude	Longitude	Substrate	Moisture	Depth black layer (cm)	Biotope
TRANSECT KC (11 August 2014)								
transect marker	0	4.91	56.75194	-5.84927				
lower margin of pebble zone	18	3.07	56.75182	-5.84943				
station KC1	104	2.66	56.75118	-5.85019	slightly muddy partially rippled medium sand with occ. dead shells	standing water	1.5	LS.LSa.MuSa.MacAre
KC1/KC2 zone boundary	184	2.68	56.75058	-5.85092				
station KC2	225	2.41	56.75026	-5.85132	gravel and dead shells on medium sand	dry	2	LS.LSa.MuSa.HedMacEte
upper edge muddy sand patch	239	2.25	56.75017	-5.85145				
lower edge muddy sand patch	287	2.09	56.74981	-5.85186				
station KC3	309.5	2.295	56.74964	-5.85207	gravel on clean medium sand with dead shells and stones	dry	1	LS.LSa.MuSa.HedMacEte
KC3/KC4 zone boundary (2003 position)	325	2.17	56.74952	-5.85220				
KC3/KC4 zone boundary	330	2.16	56.74947	-5.85226				
station KC4	361	1.71	56.74924	-5.85254	slightly muddy sand, a few dead shells, some patches of gravel on surface	waterlogged; dry surface	0.5	LS.LSa.MuSa.MacAre
channel	397	1.445	56.74899	-5.85284				
TRANSECT KD (8 August 2014)								
transect marker	0	3.965	56.74289	-5.84926				
lower saltmarsh edge	6.5	3.245	56.74295	-5.84927				
station KD1	32.5	3.165	56.74318	-5.84931	gravelly muddy sand, occ. cobbles	standing water (rain?)	1	LS.LMu.MEst.HedMac
KD1/KD2 zone boundary (2003 position)	51	3.055	56.74334	-5.84933				

Table 1.1 continued

Feature	Distance from marker (m)	Height above CD (m)	Latitude	Longitude	Substrate	Moisture	Depth black layer (cm)	Biotope
KD1/KD2 zone boundary	53.5	3.015	56.74337	-5.84933				
station KD2	82	2.885	56.74361	-5.84938	muddy sand with some gravel; scattered cobbles	standing water (rain?)	3	LS.LMu.MEst.HedMacScr
KD2/KD3 zone boundary (2003 position)	105	2.815	56.74381	-5.84941				
KD2/KD3 zone boundary	120	2.615	56.74397	-5.84943				
station KD3	124	2.585	56.74400	-5.84944	slightly muddy sand	standing water	1	LS.LMu.MEst.HedMacScr
channel	161	2.055	56.74431	-5.84948				
TRANSECT KE (10August 2014)								
transect marker	0	4.45	56.74479	-5.87445				
lower saltmarsh edge	10	3.505	56.74483	-5.87435				
station KE1	32	3.08	56.74500	-5.87415	medium muddy sand	standing water (rain?)	1.5 - 2.0	LS.LMu.MEst.HedMacScr
KE1/KE2 zone boundary (2003 position)	55	3.035	56.74517	-5.87389				
KE1/KE2 zone boundary	86	3.02	56.74538	-5.87355				
station KE2	105	2.895	56.74551	-5.87335	medium sand, clean	standing water	2	LS.LSa.MuSa.MacAre
KE2/KE3 zone boundary	259	2.525	56.74658	-5.87174				
station KE3	447	2.235	56.74787	-5.86976	medium sand	standing water	0.5	LS.LSa.MuSa.MacAre
channel	780	0.16	56.75014	-5.86619				

Table 1.2. Particle size analysis of sediments at stations along five intertidal transects (KA - KE) in 2014, showing percentage of total sediment sample collected by sieves at 0.5 phi interval mesh sizes.

Sieve (phi)	Station									
	KA1	KA2	KA3	KB1	KB2	KB3	KC1	KC2	KC3	KC4
-3.50	0.00	0.00	3.16	0.00	0.00	0.00	0.94	4.15	4.35	1.15
-3.00	0.00	0.21	1.16	0.00	0.00	0.00	1.05	14.75	0.68	2.06
-2.50	0.00	0.14	2.40	0.00	0.00	0.00	1.04	4.45	2.73	1.12
-2.00	0.00	0.94	2.67	0.00	0.06	0.07	0.95	1.77	4.99	0.58
-1.50	0.10	2.24	6.23	0.04	0.05	0.00	2.22	2.65	5.23	0.57
-1.00	0.19	2.73	8.63	0.01	0.08	0.00	3.54	3.44	5.06	0.47
-0.50	0.28	3.40	8.12	0.10	0.12	0.08	6.38	3.89	6.24	0.63
0.00	0.59	2.71	4.11	0.32	0.35	0.30	7.24	3.49	4.89	1.01
0.50	1.73	3.77	3.79	1.07	3.45	1.70	7.25	3.84	5.02	2.34
1.00	6.49	7.50	5.88	3.61	14.57	5.98	8.72	5.53	6.87	5.28
1.50	18.85	22.04	9.54	6.85	28.52	17.54	11.79	7.21	7.59	8.00
2.00	49.06	34.51	22.54	16.90	28.61	30.98	23.07	13.70	13.79	18.82
2.50	17.06	14.65	13.72	18.48	13.14	29.37	15.94	12.25	14.51	21.99
3.00	3.37	3.22	5.06	30.62	4.99	10.65	7.14	10.00	12.53	22.07
3.50	0.65	0.50	0.88	14.53	2.83	1.84	1.14	3.34	3.19	7.02
4.00	0.15	0.14	0.27	3.94	1.52	0.45	0.28	1.35	0.92	2.83
>4	1.48	1.30	1.84	3.53	1.72	1.04	1.31	4.19	1.41	4.05

Sieve (phi)	Station					
	KD1	KD2	KD3	KE1	KE2	KE3
-3.50	0.00	0.00	0.00	3.06	0.00	0.00
-3.00	1.80	0.99	2.12	0.00	0.00	0.00
-2.50	0.00	0.79	0.19	1.23	0.00	0.00
-2.00	0.88	0.52	0.27	0.18	0.33	0.04
-1.50	1.49	1.70	0.36	1.12	0.13	0.05
-1.00	1.87	1.66	0.57	0.81	0.10	0.06
-0.50	1.56	2.13	0.50	0.83	0.34	0.17
0.00	1.55	2.94	1.53	0.91	0.54	0.12
0.50	2.37	4.85	5.02	1.31	2.30	0.28
1.00	3.89	6.32	12.03	2.58	6.88	0.31
1.50	4.97	8.20	13.40	3.55	15.23	1.34
2.00	11.45	9.97	17.59	9.68	21.31	4.19
2.50	9.74	8.82	12.10	13.13	22.92	12.77
3.00	8.16	4.36	13.61	20.35	17.59	33.22
3.50	2.51	1.70	10.11	6.71	6.04	25.43
4.00	1.40	1.35	5.34	2.15	2.53	14.37
>4	46.37	43.71	5.27	32.41	3.75	7.65

Table 1.3. Particle size characteristics of sediments at stations along five intertidal transects (KA - KE) in 2014. $MD_{ø}$ = median grain diameter in phi units, MD_{μ} = median grain diameter in microns, $QD_{ø}$ = phi quartile deviation. Also shown are temporal changes in the percentage values of silt/clay, sand and gravel between the 2003 baseline survey and 2014.

Station	2014						Temporal change (%)		
	$MD_{ø}$	MD_{μ}	$QD_{ø}$	% silt/clay	% sand	% gravel	silt/clay	sand	gravel
KA1	1.75	297	0.25	1.48	98.52	0.00	-0.04	0.22	-0.20
KA2	1.55	342	0.48	1.30	97.41	1.29	-0.29	4.91	-4.61
KA3	1.20	435	1.45	1.84	88.77	9.39	-0.24	-1.43	1.69
KB1	2.55	171	0.53	3.53	96.47	0.00	1.03	3.47	-4.50
KB2	1.55	342	0.45	1.72	98.22	0.06	0.32	0.42	-0.74
KB3	1.90	268	0.40	1.04	98.89	0.07	-0.27	0.19	0.07
KC1	1.15	451	1.28	1.31	94.71	3.99	0.13	7.31	-7.41
KC2	1.13	457	2.15	4.19	70.68	25.12	2.69	-3.42	0.72
KC3	1.25	420	1.55	1.41	85.84	12.75	-0.34	-5.46	5.75
KC4	2.19	219	0.60	4.05	91.04	4.91	1.74	21.74	-23.49
KD1	3.00	125	ND	46.37	50.95	2.68	6.74	-6.65	-0.02
KD2	2.60	165	ND	43.71	53.99	2.29	22.58	-23.21	0.59
KD3	1.90	268	0.88	5.27	92.15	2.58	-1.05	1.65	-0.62
KE1	2.80	144	ND	32.41	63.12	4.47	-1.17	0.22	0.97
KE2	2.05	241	0.58	3.75	95.91	0.33	1.51	0.41	-1.97
KE3	2.95	129	0.43	7.65	92.31	0.04	0.02	1.41	-1.36

Table 1.4. Abundance of infauna at stations along five intertidal transects (KA - KE). Abundance given is the number in samples of 8 pooled cores of total area 0.0667 m^2. Four replicate samples were taken at one station along each transect, and single samples elsewhere. P = present.

Taxon	Sample																													
	KA						KB						KC							KD						KE					
	1.1	2.1	2.2	2.3	2.4	3.1	1.1	1.2	1.3	1.4	2.1	3.1	1.1	2.1	2.2	2.3	2.4	3.1	4.1	1.1	1.2	1.3	1.4	2.1	3.1	1.1	1.2	1.3	1.4	2.1	3.1
Nemertea spp		2		5	4	2						1					5														
Lineus sp																								1							
Harmothoe sp juv																									1		1				
Phyllodocidae sp indet																														1	
Eteone longa														5	1	2	3					1		1		2				1	1
Phyllodoce mucosa		1	1		1	2					1								1												
Kefersteinia cirrata																	1				1			2	1	2	1			1	1
Syllis sp E			5	5	1																				1						
Streptosyllis websteri		1	1	1	1	1																									
Parexogone hebes				1		4																									
Exogone (Exogone) verugera				1																											
Nereididae sp juv						2			1																						
Hediste diversicolor		1												8	6	4	8	2		22	23	20	13	5	6	31	10	43	20	4	
Nephtys cirrosa		7	5	2	1	1																									
Nephtys hombergii						1	1		2	5	1	2						2	5												6
Protodorvillea kefersteini				1	1																										
Schistomeringos neglecta				1																											

Table 1.4 continued

Taxon	Sample																													
	KA						KB						KC							KD						KE					
	1.1	2.1	2.2	2.3	2.4	3.1	1.1	1.2	1.3	1.4	2.1	3.1	1.1	2.1	2.2	2.3	2.4	3.1	4.1	1.1	1.2	1.3	1.4	2.1	3.1	1.1	1.2	1.3	1.4	2.1	3.1
Leitoscoloplos mammosus																															1
Scoloplos (Scoloplos) armiger		1		1	2	12																									
Aricidea (Aricidea) minuta		1				4																									
Spionidae sp juv/indet				1	3	1													2												
Aonides oxycephala				1																											
Malacoceros tetracerus														16		1	18	2							2					4	
Polydora cornuta																												1			
Pseudopolydora pulchra		2	2			5																									1
Pygospio elegans		6	10	30	10	1	5	25	7	8	4		2	85	10	20	71	154	6					1	20		2		4	33	29
Scolelepis (Scolelepis) foliosa					1																										
Scolelepis (Scolelepis) squamata	1					1																									
Spio martinensis																															1
Chaetozone christiei		5			1	11																									
Cirriformia tentaculata			2		1																										
Flabelligera affinis																													1		

Table 1.4 continued

Taxon	Sample																													
	KA						KB						KC							KD						KE					
	1.1	2.1	2.2	2.3	2.4	3.1	1.1	1.2	1.3	1.4	2.1	3.1	1.1	2.1	2.2	2.3	2.4	3.1	4.1	1.1	1.2	1.3	1.4	2.1	3.1	1.1	1.2	1.3	1.4	2.1	3.1
Capitella capitata						4		1			3			1	1		1	6							4					1	
Mediomastus fragilis		3	1	3	1																									
Notomastus latericeus		2	4	3	4																									
Arenicola marina								1				1	2	4		5	3	1										2			
Leiochone leiopygos	1	5	6	6	6	2																									
Euclymene oerstedi						2																									
Travisia forbesii		3	6	21	3							12																			
Polyophthalmus pictus						1																									
Amphitrite cirrata																				1											
Polycirrus medusa				1																											
Fabricia stellaris							4	15	3	3	27		1				11													3	1
Spirobranchus lamarcki						1																									
Paranais litoralis								3								1															
Clitellio arenarius														22	19	17	30	39													
Baltidrilus costatus														39	7	8	22	1						1		1	5	2	1	7	
Tubificoides benedii							4	8	15	10	44			1		2	1	1	2	2	8	5	1	31	49	28	29	38	78	113	2
Tubificoides pseudogaster agg.						1							1	19	2	2	6	14	1		1				8				1	2	
Enchytraeidae spp				2										55	9	20	49	118													
Grania spp		1	1	2	1																										
Semibalanus balanoides														1																	

Table 1.4 continued

Taxon	Sample																													
	KA						KB						KC							KD						KE					
	1.1	2.1	2.2	2.3	2.4	3.1	1.1	1.2	1.3	1.4	2.1	3.1	1.1	2.1	2.2	2.3	2.4	3.1	4.1	1.1	1.2	1.3	1.4	2.1	3.1	1.1	1.2	1.3	1.4	2.1	3.1
Austrominius modestus																	1														
Neomysis integer							2	2	2		1		3	3		2			15												
Praunus sp													1																		
Apherusa bispinosa																									1						
Tryphosella sarsi																										2					
Bathyporeia guilliamsoniana		2			1																										
Bathyporeia pilosa												3																			
Melitidae sp indet		1																													
Melita palmata																											1				
Microprotopus maculatus						3																									
Crassicorophium bonellii																		1							1	8		1		1	
Crassicorophium crassicorne		3	5	10	4									1																	
Corophium volutator											1			4		2	2	6		2			1	3	11						
Eurydice pulchra	1			2																											
Eualus pusiolus?																							1								
Crangon crangon			1				1			2	1	2	1	1				1						4	2					1	1
Pagurus bernhardus						1																									
Carcinus maenas			1		1						1											1	1								
Chironomidae spp			1	2	2			1																							

Table 1.4 continued

Taxon	Sample																													
	KA						KB						KC							KD						KE					
	1.1	2.1	2.2	2.3	2.4	3.1	1.1	1.2	1.3	1.4	2.1	3.1	1.1	2.1	2.2	2.3	2.4	3.1	4.1	1.1	1.2	1.3	1.4	2.1	3.1	1.1	1.2	1.3	1.4	2.1	3.1
Lepidochitona (Lepidochitona) cinerea		1	1			2																								
Littorina spp juv											2				1								1	2						
Peringia ulvae							29	20	12	55	359		1	1			1			40	53	38	96	22	2	188	178	233	224	149	2
Retusa obtusa		5			1																									
Lucinoma borealis		7	4	2	3	4																								
Kurtiella bidentata		1	1	5	1																									
Cerastoderma edule (juvs)	4	20	9	34	13	5	34	23	40	44	31		37	15	10	17	26	10	2			1		1	5	1			1	8	11
Cerastoderma edule (adults)		1					7	1	6	6	1	1		2	1	1		1						1						
Tellina tenuis		4	5	2	3																									
Macoma balthica							2	2	1	1	2									2			1	3			2	2	1	5	2
Scrobicularia plana																				1				3	6	1	6	3	1	1	
Dosinia spp juv				1																										
Polititapes rhomboides		6	1	1	4	16																								
Thracia phaseolina				1																										
Phoronis spp		2	1			1																								
Antedon bifida																												1		
Unidentified sp.				1																										
Arionidae spp (terrestrial slugs)																								1	1					
Araneae spp (terrestrial spiders)																				P										

Table 1.5. Abundance of biota at stations along 5 transects (KA - KE). SACFOR abundances are given derived from visual observation of biota when digging over a total area of sediment of c. 1 m^2 or by estimating the abundance of Arenicola *casts and* Lanice *tubes.*

Taxa	**Site**															
	KA1	**KA2**	**KA3**	**KB1**	**KB2**	**KB3**	**KC1**	**KC2**	**KC3**	**KC4**	**KD1**	**KD2**	**KD3**	**KE1**	**KE2**	**KE3**
Phyllodoce sp.		F														
Glycera sp.		F	F													
Alitta virens			C													
Hediste diversicolor											C	F		F		
Nereidae sp.																F
Nephtys cirrosa		F														
Nephtys hombergii				F	F		F	F		F			F		F	F
Nephtys sp.			F													
Arenicola marina			C	A	A	A	A	C	C	A		C	A	A	A	A
Maldanidae spp.		P	P													F
Lanice conchilega		C	C													
Tubificidae spp.		O							O	P						
Semibalanus balanoides				R					P					P		
Elminius modestus				R					P					P		
Mysidacea sp.				P	P											
Crangon crangon			F				F									
Carcinus maenas		C		C		C			C	C			C	C		
Littorina littorea									C							
Cerastoderma edule				C		F	F	F	F							
Scrobicularia plana												C	F	C	F	
Mya sp.													F			
Angulus tenuis		F														
Mytilus edulis									O							
Venerupis corrugata			F													
Ensis ensis			C													
Fucus vesiculosus		R		R				R	R		P	P			R	
Fucus spiralis														R		

Table 1.5 continued

Taxa	Site															
	KA1	**KA2**	**KA3**	**KB1**	**KB2**	**KB3**	**KC1**	**KC2**	**KC3**	**KC4**	**KD1**	**KD2**	**KD3**	**KE1**	**KE2**	**KE3**
Pelvetia canaliculata														R		
Chorda filum			R													
Sargassum muticum			R													
Algal mat				F	R										C	F

Table 1.6. Abundance of biota at stations along 5 transects (KA - KE). SACFOR abundances are given derived from all sampling methods employed, including core sampling, visual observation of biota when digging over a total area of sediment of c. 1 m^2 and by estimation of the abundance of Arenicola *casts and* Lanice *tubes. At sites where replicate core samples were taken, only the first replicate has been employed here, in order to standardise the methodology and facilitate comparisons.*

Taxon	**Site**															
	KA1	**KA2**	**KA3**	**KB1**	**KB2**	**KB3**	**KC1**	**KC2**	**KC3**	**KC4**	**KD1**	**KD2**	**KD3**	**KE1**	**KE2**	**KE3**
Nemertea spp		C	C			C										
Lineus sp												C				
Harmothoe sp juv													C			
Phyllodocidae sp indet															C	
Eteone longa								C				C		C	C	C
Phyllodoce mucosa		C	C		C					C						
Kefersteinia cirrata												C	C	C	C	C
Syllis sp E													C			
Streptosyllis websteri		C	C													
Parexogone hebes			F													
Exogone (Exogone) verugera																
Nereididae sp juv			C													
Nereidae sp																F
Alitta virens			C													
Hediste diversicolor		C						A	C		A	C	C	A	C	
Nephtys cirrosa		A	C													
Nephtys hombergii			C	C	C	C	F	F	C	C			F		F	C
Glycera sp		F	F													
Protodorvillea kefersteini																
Schistomeringos neglecta																
Leitoscoloplos mammosus																C
Scoloplos (Scoloplos) armiger		C	A													
Aricidea (Aricidea) minuta		C	C													
Spionidae sp juv/indet			C							C						
Aonides oxycephala																
Malacoceros tetracerus								A	C				C		C	
Polydora cornuta																
Pseudopolydora pulchra		C	C													C
Pygospio elegans		F	F	F	F		F	A	A	F		F	C		C	C
Scolelepis (Scolelepis) foliosa																
Scolelepis (Scolelepis) squamata	C		C													
Spio martinensis																C

Table 1.6 continued

Taxon	Site															
	KA1	KA2	KA3	KB1	KB2	KB3	KC1	KC2	KC3	KC4	KD1	KD2	KD3	KE1	KE2	KE3
Chaetozone christiei		C	A													
Cirriformia tentaculata																
Flabelligera affinis																
Capitella capitata			C		C			C	C				C		C	
Mediomastus fragilis		C														
Notomastus latericeus		C														
Arenicola marina			C	A	A	A	A	C	C	A		C	A	A	A	A
Leiochone leiopygos	C	C	C													
Euclymene oerstedi			C													
Maldanidae sp																F
Travisia forbesii		C				A										
Polyophthalmus pictus			C													
Amphitrite cirrata											C					
Polycirrus medusa																
Lanice conchilega		C	C													
Fabricia stellaris				F	C		F								F	F
Spirobranchus lamarcki			C													
Paranais litoralis																
Tubificidae spp		O														
Clitellio arenarius								C	C							
Baltidrilus costatus								C	F			F		F	C	
Tubificoides benedii				F	C			F	F	F	F	C	C	C	A	F
Tubificoides pseudogaster agg.			F				F	C	C	F			C		F	
Enchytraeidae spp								C	A							
Grania spp		F														
Semibalanus balanoides				R				F	P					P		
Austrominius modestus				R					P					P		
Neomysis integer				C	C		C	C		A						
Praunus sp							C									
Apherusa bispinosa													F			
Tryphosella sarsi														F		
Bathyporeia guilliamsoniana		F														
Bathyporeia pilosa						F										
Melitidae sp indet		F														
Melita palmata																
Microprotopus maculatus			F													
Crassicorophium bonellii									F				F	C	F	
Crassicorophium crassicorne		F						F								
Corophium volutator					F			F	F		F	F	C			

Table 1.6 continued

Taxon	Site															
	KA1	KA2	KA3	KB1	KB2	KB3	KC1	KC2	KC3	KC4	KD1	KD2	KD3	KE1	KE2	KE3
Eurydice pulchra	F															
Eualus pusiolus?																
Crangon crangon			F	C	C	C	C	C	C			C	C		C	C
Pagurus bernhardus			A													
Carcinus maenas		C		C	A	C			C	C			C	C		
Chironomidae spp																
Lepidochitona (Lepidochitona) cinerea		C	C													
Littorina littorea									C							
Littorina spp juv					F							F				
Peringia ulvae				C	A		F	F			C	C	F	A	A	F
Retusa obtusa		F														
Lucinoma borealis		A	C													
Kurtiella bidentata		C														
Cerastoderma edule (juvs)	C	A	C	A	A		A	A	A	C		C	C	C	A	A
Cerastoderma edule (adults)		C		A	C	C		C	C			C				
Mytilus edulis									O							
Tellina tenuis		C														
Macoma balthica				C	C						C	C			C	C
Scrobicularia plana											C	C	C	C	C	
Dosinia spp juv																
Mya sp													F			
Polititapes rhomboides		A	S													
Venerupis corrugata			F													
Ensis ensis			C													
Thracia phaseolina																
Phoronis spp		A	A													
Antedon bifida																
Unidentified sp.																
Arionidae spp (terrestrial slugs)												C	C			
Araneae spp (terrestrial spiders)											F					
Fucus vesiculosus		R		R				R	R		P	P			R	
Fucus spiralis														R		
Pelvetia canaliculata														R		
Chorda filum			R													
Sargassum muticum			R													
Green filamentous algal mat				F	R										C	F

Figure 1.1. Cumulative weight of sediment retained on sieves at 0.5 phi intervals for stations along transect KA.

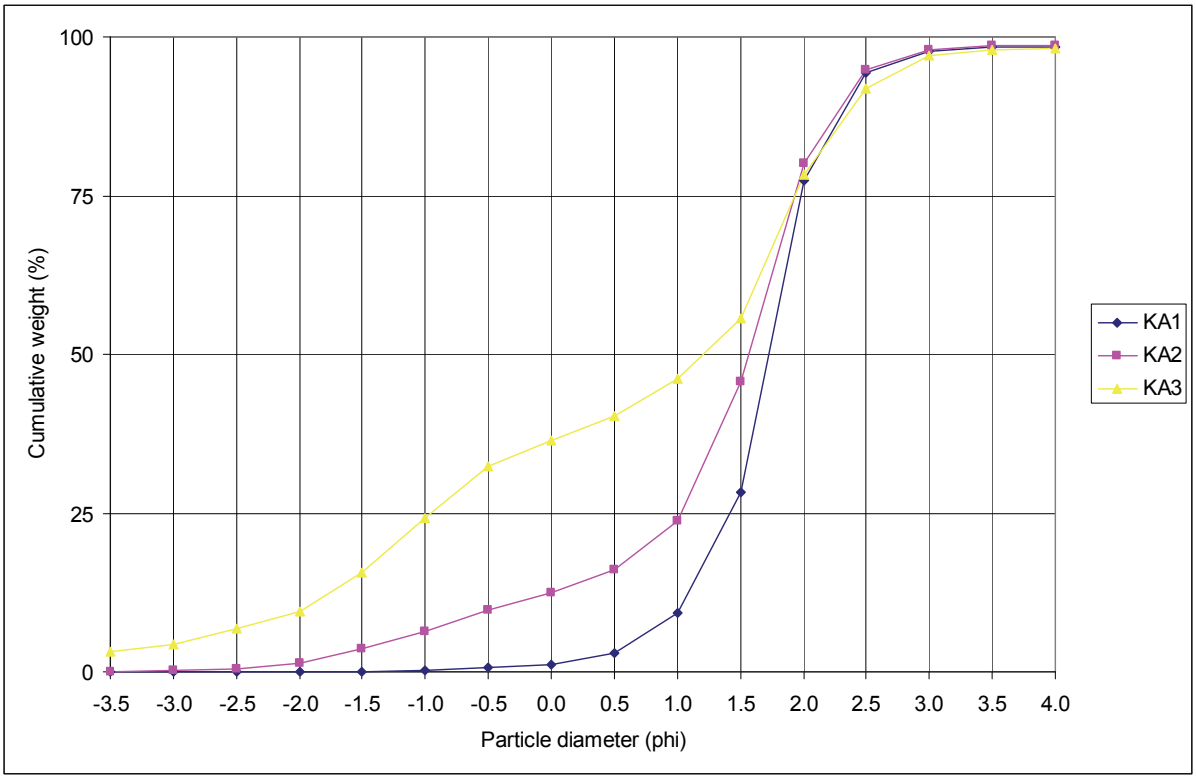


Figure 1.2. Cumulative weight of sediment retained on sieves at 0.5 phi intervals for stations along transect KB.

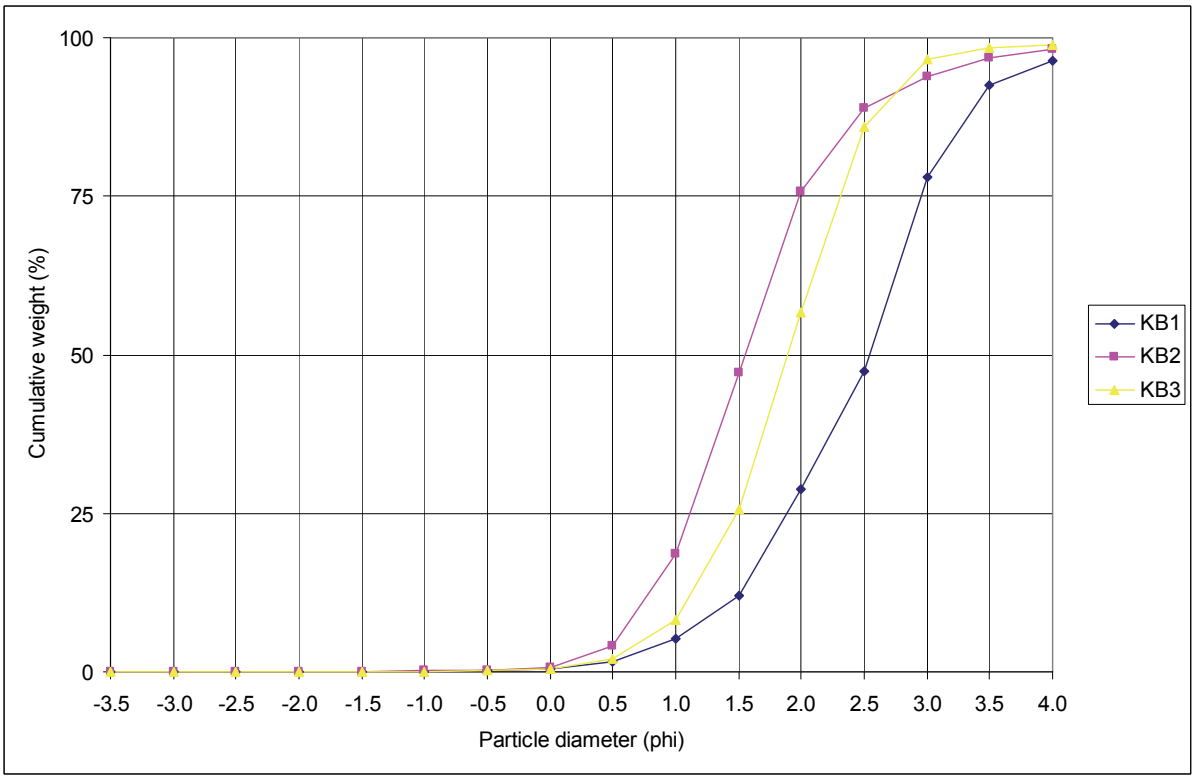


Figure 1.3. Cumulative weight of sediment retained on sieves at 0.5 phi intervals for stations along transect KC.

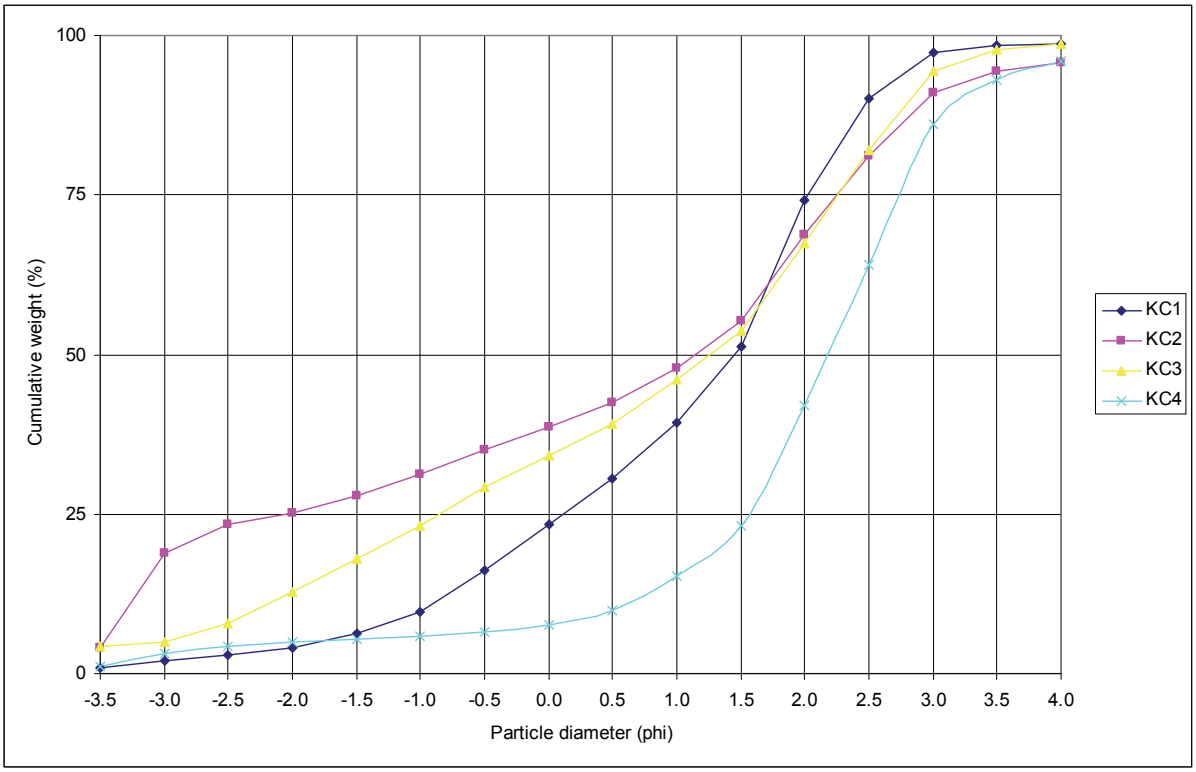


Figure 1.4. Cumulative weight of sediment retained on sieves at 0.5 phi intervals for stations along transect KD.

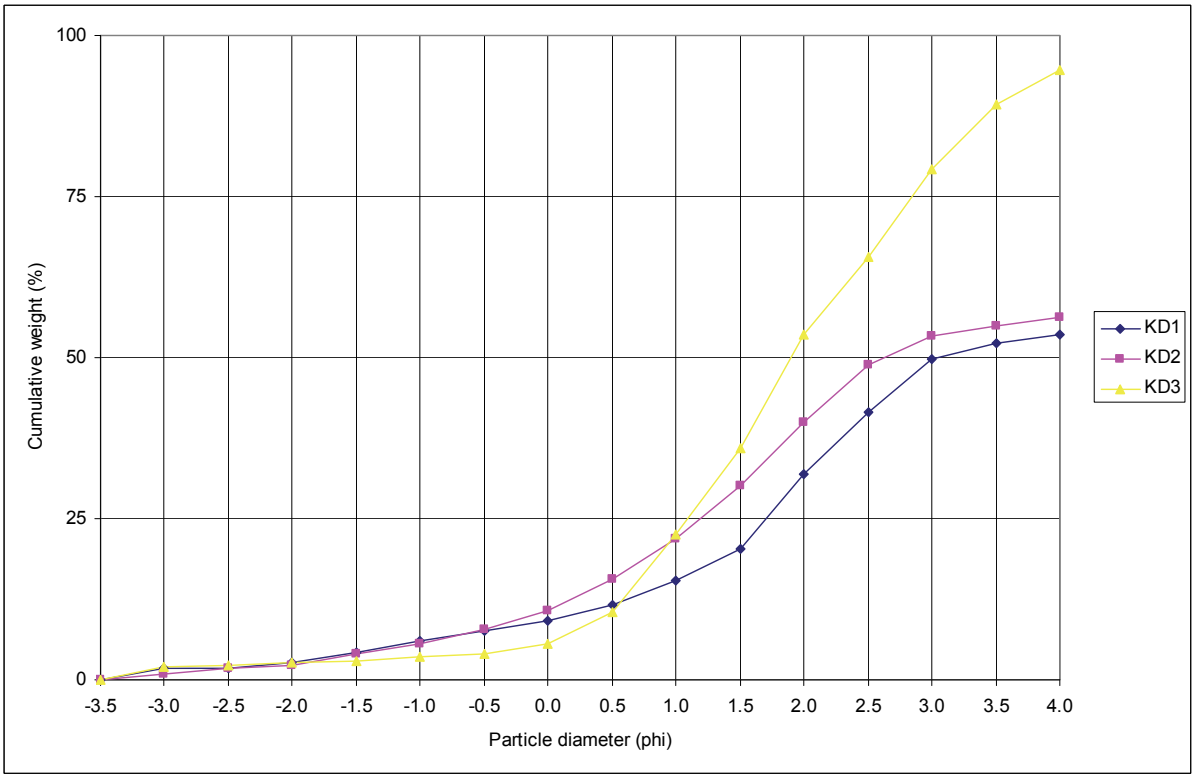
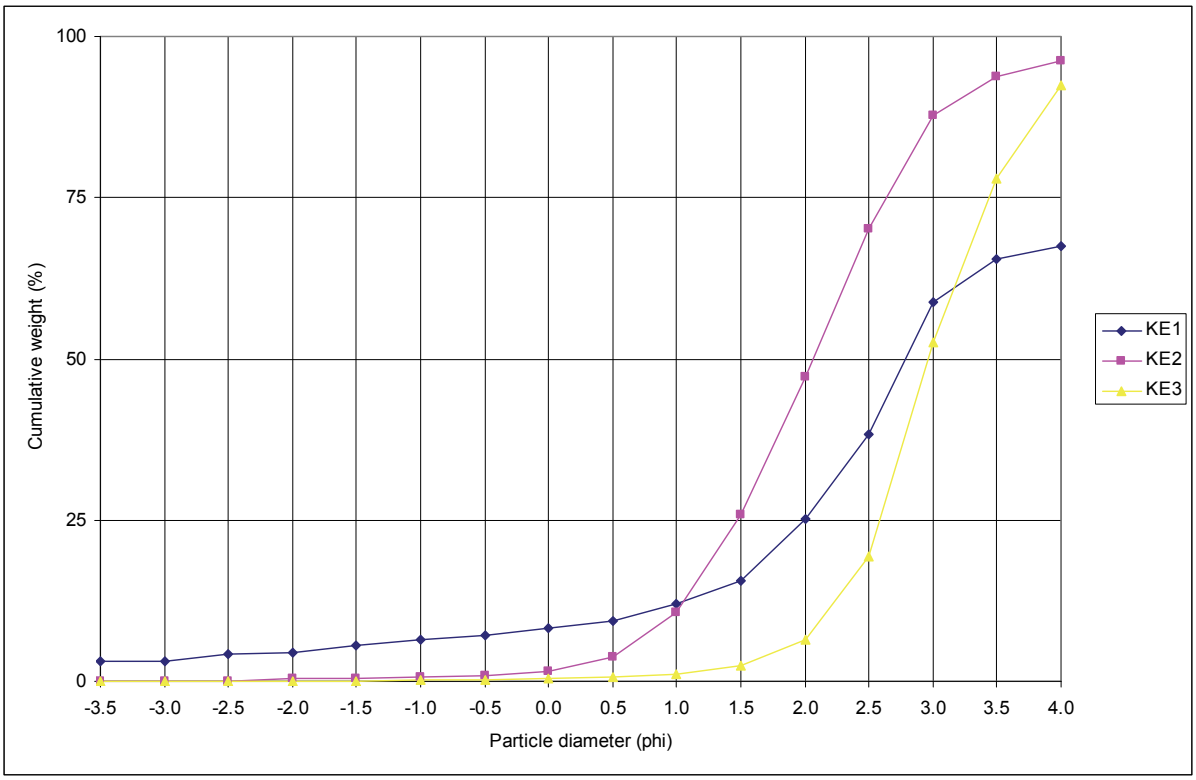


Figure 1.5. Cumulative weight of sediment retained on sieves at 0.5 phi intervals for stations along transect KE.



ANNEX 2: SITE ATTRIBUTE TABLE FOR THE MUDFLAT FEATURE OF KENTRA BAY AND MOSS SSSI, WITH THE RESULTS OF THE 2014 SITE CONDITION MONITORING SURVEY. * DENOTES NON MANDATORY ATTRIBUTE.

Attribute	Target	Method	Result
Extent	No change in extent allowing for natural succession or known cyclical change.	Extent should be assessed periodically against a baseline map showing the distribution of littoral sediment, or through the review of any known activities that may have caused an alteration in extent. Possible sources of baseline data are archive remote sensing, aerial photographs and intertidal resource mapping (see Davies *et al*., 2001).	No activities identified likely to have caused change in the extent of the mudflat feature. Transect profiles also indicate no reduction in extent of the habitat at the five locations examined.
Sediment character: sediment type	No change in composition of sediment type across the feature, allowing for natural succession/known cyclical change. Percentage of silt/clay and sand 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)	Distribution of sediment types should be assessed across the whole feature and compared to baseline conditions. Core samples to be taken at 16 stations along relocatable transects and analysed for particle size every 6 years.	An increase in sand content of 22% at station KD4 consistent with natural translocation of gravel material in a region with patches of scattered gravel. An increase in recorded silt/clay content of 23% at station KD2 may have arisen through spatial variability in the depth of the sandier stratum underlying the surface muddy sand layer. No evidence to implicate unusual or non-natural factors in the causation of these changes.
*Sediment character: oxidation-reduction profile (Redox layer)	Average depth to the top of the black layer should not decrease in relation to baseline. The depth of the black layer will not deviate by +/- 50% from the baseline for sediments with a baseline black layer depth of >1 cm	A visual estimate of the depth of the anaerobic layer will be taken at 16 stations along 5 relocatable transects every 6 years.	No reduction in black layer depth at any station of more than 50% where baseline value >1 cm. Depth increased by >50% at 2 sites with baseline value >1 cm. Change consistent with natural variation.
*Sediment character: Organic carbon content	Organic carbon content should not increase in relation to an established baseline.	Organic carbon content assessed in specified area. For details of assessment techniques see the Common Standards Monitoring Guidance and Davies *et al*., 2001.	Attribute not assessed.

Attribute	Target	Method	Result
Biotope composition	Maintain the variety of biotopes identified for the site, allowing for natural succession/ known cyclical change. The following biotopes (or equivalents) will be found within the SSSI: **LS.LSa.FiSa.Po**, **LS.LSa.MuSa.Lan**, **LS.LSa.MuSa.MacAre**, **LS.LSa.MuSa.HedMacEte**, **LS.LBR.LMus.Myt.Sa**, **LS.LMu.MEst.HedMac**, **LS.LMu.MEst.HedMacScr**	Assessment of the presence of biotopes by visual survey, infaunal core sampling and digover of 1 m^2 area at fixed stations along 5 relocatable transects.	All biotopes found within the SSSI. **LS.LBR.LMus.Myt.Sa** not recorded along transects due to reduction in density of *Mytilus edulis*. Reduction considered due to natural temporal variation.
Distribution and spatial pattern of biotopes	Maintain the distribution of biotopes, allowing for natural succession/ known cyclical change. The following biotopes will be found at the indicated relocated transects: *Transect KA*: **LS.LSa.FiSa.Po**, **LS.LSa.MuSa.Lan** *Transect KB*: **LS.LSa.MuSa.MacAre**, **LS.LSa.FiSa.Po** *Transect KC*: **LS.LSa.MuSa.MacAre**, **LS.LSa.MuSa.HedMacEte**, **LS.LBR.LMus.Myt.Sa** *Transect KD*: **LS.LMu.MEst.HedMac**, **LS.LMu.MEst.HedMacScr** *Transect KE*: **LS.LMu.MEst.HedMacScr**, **LS.LSa.MuSa.MacAre**	Assessment of the distribution of biotope(s) identified for the site along 5 relocatable transects every 6 years by means of visual survey, infaunal core sampling and digover of 1 m^2 area at fixed stations.	**LS.LSa.FiSa.Po** absent from transect KA probably due to changes in sediment conditions resulting from natural variation in the hydrodynamic environment and extension of the *Lanice conchilega* population from lower down the shore. Absence of **LS.LBR.LMus.Myt.Sa** from transect KC likely to have resulted from natural temporal variation in success of the *Mytilus edulis* population. No other clear, marked change in biotope distribution along transects identified.

Attribute	Target	Method	Result
* Species population measures - Presence or abundance of specified species Population structure of a species	Maintain presence or abundance of named positive indicator species. *Cerastoderma edule* will be present at 50% or more of the sample stations. *Arenicola marina* will be present at 50% or more of the sample stations. *Hediste diversicolor* will be present at 30% or more of the sample stations. *Corophium volutator* will be present at 40% or more of the sample stations. *Scrobicularia plana* will be present at 25% or more of the sample stations	Population structure should be assessed in terms of viability of the named species identified for the feature. Assessment of the presence or abundance of positive/negative indicator species identified for the feature by means of visual survey, infaunal core sampling and digover of 1 m^2 area at fixed stations along 5 relocatable transects every 6 years.	Only *Corophium volutator* failed to meet target with frequency of occurrence of 38%. Failure due to replacement of *C. volutator* by similar species, *Crassicorophium bonnellii*, at 2 stations. Apparent change possibly due to identification error of baseline samples or possibly due to natural temporal variation.
*Species composition of representative or notable biotopes	No decline in biotope quality due to change in species composition or loss of notable species allowing for natural succession/ known cyclical change.	Assessment of biotope quality through assessing species composition, where the biotope is representative of the site or contains a number of species of conservation importance. Assess change in species composition at fixed stations along 5 relocatable transects every 6 years with the aid of multivariate techniques and diversity measures.	Marked reduction in diversity at one station (KA1) considered to result from natural variation in hydrodynamic conditions. Appearance of sparse *Sargassum muticum* at KA3 considered to have insignificant impact on habitat condition.
* Extent of sub-feature or representative/ notable biotopes	No change in extent of the littoral sediment biotope(s) identified for the site allowing for natural succession/known cyclical change.	Assessment of the extent of biotope(s) identified for the site because of their nature conservation importance. No such biotopes identified for this site.	Attribute not assessed.
*Topography	No change in topography of the littoral sediment, allowing for natural responses to hydrodynamic regime.	Tidal elevation and shore slope to be assessed periodically by mean of measurement of the profile along 5 relocatable transects every 6 years.	No significant temporal changes in transect profiles recorded. Minor changes along 2 transects due to natural changes in course or width of channel. Loss of c. 30 cm of sediment along transect KA considered to reflect natural hydrodynamic variability at this relatively exposed location.

ANNEX 3: BIOTOPE MAPPING DATA - TARGET NOTES

Table 3.1. Temporal, locational and sediment data collected at target note sites.

Site	Date	Latitude WGS84	Longitude WGS84	Easting (BNG)	Northing (BNG)	WPT no.	Time (BST)	Substrate	Moisture	Surface features	Black layer (cm)
K1.83	12/08/2014	56.76024	5.87352	163343	769882	77	13:40:58	clean fine sand	waterlogged	rippled	<30
K1.84	12/08/2014	56.75960	5.87499	163249	769816	79	13:59:28				
K1.84B	12/08/2014	56.76165	5.87146	163478	770032	80	14:10:22	slightly muddy sand	waterlogged, pools	slightly rippled	0.2
K1.85	12/08/2014	56.76116	5.87193	163446	769979	81	14:26:46	clean fine sand	damp	rippled	3
K1.86	12/08/2014	56.76105	5.87243	163415	769969	82	14:40:04				
K1.86B	12/08/2014	56.76030	5.87025	163543	769878	83	15:04:20	fine sand	waterlogged	rippled	<30
K4.82	12/08/2014	56.75970	5.86756	163704	769802	76	13:15:40	clean fine sand	damp with large pools	rippled	<30
K5.81	12/08/2014	56.75943	5.86820	163663	769774	75	12:58:14	fine sand	waterlogged	rippled	0.2, locally 2.5
K5.87	12/08/2014	56.75977	5.86916	163607	769815	84		clean fine sand	dry	rippled	
K7.99	13/08/2014	56.75601	5.86610	163770	769386	94	14:29:27	clean fine sand, in waves	damp, varying to pooled	rippled	30
K8.04	09/08/2014	56.75679	5.86270	163982	769461	27	10:24:03	fine sand	standing water	rippled	1
K8.06	09/08/2014	56.75811	5.86546	163822	769618	29	11:03:32	fine sand	waterlogged, pools	rippled	0.2
K8.07	09/08/2014	56.75912	5.86595	163799	769732	30	11:17:31	fine sand with broken shell			
K8.08	09/08/2014	56.75852	5.86733	163711	769670	31	11:29:15	fine sand with broken shell and dead maerl fragments	dry	faintly rippled	>30
K8.09	09/08/2014	56.75838	5.86842	163643	769658	32	11:47:23	fine sand	waterlogged	rippled	20
K8.10	09/08/2014	56.75698	5.86513	163835	769491	33	12:21:28	fine sand	waterlogged	rippled	>30

Table 3.1 continued

Site	Date	Latitude WGS84	Longitude WGS84	Easting (BNG)	Northing (BNG)	WPT no.	Time (BST)	Substrate	Moisture	Surface features	Black layer (cm)
K8.12	09/08/2014	56.75477	5.86153	164041	769233	35	13:14:36	fine sand	waterlogged	rippled	1
K8.70	11/08/2014	56.75315	5.86093	164068	769050	68	13:50:49	fine sand	damp	rippled	0.5
K8.71	11/08/2014	56.75240	5.85646	164336	768952	69		fine sand	waterlogged, pools	rippled	1.5
K8.80	12/08/2014	56.75879	5.86825	163656	769703	74	12:33:14	clean fine sand with some dead maerl	damp	rippled	<30
K8.94	13/08/2014	56.75602	5.86078	164095	769369	89	13:08:38	clean fine sand	standing water	rippled	1.5
K8.98	13/08/2014	56.75473	5.86383	163901	769236	93	14:15:19	clean fine sand	damp; water table at 8 cm	rippled	3
K9.05	09/08/2014	56.75961	5.86440	163896	769781	28	10:49:03	slightly muddy fine sand	standing water	lugworm hummocks	0.2
K10.01	09/08/2014	56.75966	5.85422	164519	769751	24	09:14:16	fine sand	standing, pooled water	flat	0.5
K10.15	09/08/2014	56.75564	5.85377	164521	769303	37	14:52:48	slightly muddy sand with scattered gravel and shells	moist - water table at 5 cm	flat	0.2
K10.90	13/08/2014	56.76072	5.85533	164457	769873	85	12:10:00	slightly muddy fine sand	waterlogged	flat	2
K10.91	13/08/2014	56.76014	5.85590	164419	769810	86	12:20:55				
K10.92	13/08/2014	56.75975	5.85358	164558	769759	87	12:26:53	slightly muddy fine sand - similar to previous site (K10.91)	waterlogged	small lugworm hummocks	2

Table 3.1 continued

Site	Date	Latitude WGS84	Longitude WGS84	Easting (BNG)	Northing (BNG)	WPT no.	Time (BST)	Substrate	Moisture	Surface features	Black layer (cm)
K10.93	13/08/2014	56.75780	5.85226	164627	769538	88	12:47:36	patchwork of dense *Arenicola* on slightly muddy sand and raised gravelly sand scars with dense gravel on surface. Station in raised gravel area	damp		2
K11.02	09/08/2014	56.75851	5.85675	164357	769632	25	09:35:48	fine, very slightly muddy sand	standing water	lugworm hummocks	0.3
K11.03	09/08/2014	56.75761	5.86041	164128	769545	26	10:12:10	fine, very slightly muddy sand	standing water	lugworm hummocks	0.5
K11.13	09/08/2014	56.75117	5.85504	164415	768810		13:52:00 to 13:58:16	very slightly muddy fine sand	waterlogged		
K11.14	09/08/2014	56.75154	5.85341	164517	768845	36	14:20:43	fine sand with very slight mud content	standing water	lugworm hummocks	0.5
K11.60	11/08/2014	56.75141	5.85104	164661	768823	58	10:35:59	very slightly muddy fine sand	waterlogged	small ripples	0.6
K11.100	13/08/2014	56.75734	5.85635	164374	769501	95	15:07:30	very slightly muddy fine sand	waterlogged, standing water	small lugworm hummocks	0.2
K12.11	09/08/2014	56.75404	5.86559	163789	769165	34	12:53:02	clean fine sand	dry	rippled	25
K12.24	10/08/2014	56.75243	5.86854	163598	768997	47	12:29:44	fine sand	waterlogged	rippled	4
K12.25	10/08/2014	56.75227	5.86486	163822	768966	48	12:53:26	fine sand	waterlogged	rippled, black marbling on surface	0.1
K12.26	10/08/2014	56.75068	5.86256	163953	768781	49	13:12:06	fine sand	waterlogged, pools	faintly rippled	0.6

Table 3.1 continued

Site	Date	Latitude WGS84	Longitude WGS84	Easting (BNG)	Northing (BNG)	WPT no.	Time (BST)	Substrate	Moisture	Surface features	Black layer (cm)
K12.27	10/08/2014	56.74951	5.86005	164099	768643	50	13:24:08	fine sand			
K12.95	13/08/2014	56.75451	5.86728	163688	769224	90	13:39:24	clean fine sand, slightly waved	damp with water at 10 cm. Large pools	rippled	none seen
K12.96	13/08/2014	56.75461	5.86620	163755	769231	91	13:48:36	clean fine sand, waved	damp but with pools	rippled	none seen
K12.97	13/08/2014	56.75470	5.64680	177160	768505	92	14:07:30	clean fine sand			
K13.16	10/08/2014	56.74910	5.87266	163326	768640	39	10:24:33	very muddy sand with gravel	waterlogged	flat	0.5
K13.17	10/08/2014	56.74858	5.87282	163313	768583	40	10:52:02	very muddy sand	waterlogged	lugworm hummocks	0.2
K13.18	10/08/2014	56.74704	5.87448	163201	768418	41	11:08:38	muddy sand	waterlogged	lugworm hummocks	
K14.20	10/08/2014	56.74461	5.87070	163417	768134	43	11:37:39	muddy sand with gravel	waterlogged		0.1
K14.21	10/08/2014	56.74567	5.86774	163605	768242	44	11:47:40		waterlogged, pools		0.1
K14.22	10/08/2014	56.74730	5.86740	163636	768422	45	11:59:02	slightly muddy sand	waterlogged, pools	lugworm hummocks	
K14.23	10/08/2014	56.74820	5.86559	163752	768516	46	12:05:51	firm fine sand	waterlogged	rippled	1
K14.50	10/08/2014	56.74611	5.86011	164074	768265	51	13:39:48	slightly muddy fine sand	waterlogged, pools	lugworm hummocks	0.1
K14.51	10/08/2014	56.74412	5.85994	164072	768043	52	13:56:23	slightly muddy fine sand			
K14.52	10/08/2014	56.74511	5.86225	163937	768161	53	14:08:29	muddy sand with stones			
K14.53	10/08/2014	56.74350	5.86437	163797	767989	54	14:20:42	muddy sand	waterlogged, pools	lugworm hummocks	0.5
K14.54	10/08/2014	56.74314	5.86594	163699	767954	55	14:35:17	muddy sand with gravel			

Table 3.1 continued

Site	Date	Latitude WGS84	Longitude WGS84	Easting (BNG)	Northing (BNG)	WPT no.	Time (BST)	Substrate	Moisture	Surface features	Black layer (cm)
K14.68	11/08/2014	56.74812	5.85702	164275	768477	66	13:13:15	fine sand	waterlogged	rippled	0.5
K15.19	10/08/2014	56.74351	5.87217	163320	768017	42	11:20:44	very muddy sand/mud	waterlogged		0.1
K15.56	10/08/2014	56.74549	5.87599	163099	768251	57	15:02:41	muddy sand	waterlogged, pools		
K16.55	10/08/2014	56.74317	5.86952	163480	767970	56	14:46:54	sand with dense gravel and pebbles	in channel		
K17.120	14/08/2014	56.74255	5.85305	164483	767844	106	14:35:23	slightly muddy sand, scattered gravel	waterlogged		unclear
K17.128	14/08/2014	56.74332	5.85799	164186	767947	114	16:07:37	slightly muddy sand			1
K17.129	14/08/2014	56.74280	5.85522	164352	767879	115	16:20:09	muddy sand	standing water	flat	5 (grey)
K17.130	14/08/2014	56.74281	5.85481	164377	767879	116	16:23:23	muddy sand			
K17.130B	14/08/2014	56.74292	5.85607	164301	767896	117	16:35:58	muddy sand	standing water	lugworm hummocks	
K18.127	14/08/2014	56.74513	5.85720	164245	768146	113	15:48:02	muddy sand with scattered gravel	standing water	flat	0.3 - absent
K19.69	11/08/2014	56.74947	5.85485	164416	768620	67	13:29:56 to 13:34:4	gravelly sand			
K20.61	11/08/2014	56.75137	5.84859	164811	768810	59	11:00:50	very slightly muddy fine sand	waterlogged	small lugworm hummocks	0.5
K21.62	11/08/2014	56.75222	5.84726	164897	768900	60	11:21:43	fine sand with dense surface cover of gravel and pebbles	damp		0.3
K21.63	11/08/2014	56.75222	5.84745	164886	768901	61	11:42:34	fine sand, very slightly muddy	waterlogged		0.3

Table 3.1 continued

Site	Date	Latitude WGS84	Longitude WGS84	Easting (BNG)	Northing (BNG)	WPT no.	Time (BST)	Substrate	Moisture	Surface features	Black layer (cm)
K21.65	11/08/2014	56.75032	5.84761	164864	768690	63	12:28:24	fine sand	waterlogged	faint ripples	0.1
K21.67	11/08/2014	56.74829	5.85076	164659	768475	65	12:56:19	fine sand with much shell material	waterlogged	slightly rippled	0.5
K21.72	11/08/2014	56.75288	5.84815	164847	768976	70	14:53:32	sand with dense surface scatter of gravel and pebbles			
K22.73	11/08/2014	56.75207	5.84484	165044	768875	71	15:01:02	slightly muddy sand with gravel	waterlogged	flat	0.2
K22.74	11/08/2014	56.75092	5.84348	165120	768742	72	15:24:25	slightly muddy sand with scattered gravel	waterlogged	flat	0.3
K22.75	11/08/2014	56.75003	5.84284	165154	768641	73	15:38:13	slightly muddy sand with gravel on surface	waterlogged	flat	0.8
K23.64	11/08/2014	56.75074	5.84602	164964	768731	62	12:04:30	fine sand	waterlogged, pools	rippled	0.7
K23.66	11/08/2014	56.74852	5.84773	164845	768490	64	12:38:04	fine sand	waterlogged	slightly rippled	
K23.66A	11/08/2014	56.74852	5.84773	164845	768490	64	12:38:04	gravel on sand	dry		
K24.115	14/08/2014	56.74295	5.84648	164887	767866	101	13:18:25	soft muddy sand	waterlogged		0.2
K24.116	14/08/2014	56.74496	5.84677	164882	768091	102	13:37:09	very slightly muddy fine sand with gravel cover			
K24.117	14/08/2014	56.74404	5.84750	164831	767991	103	13:50:52	muddy sand	waterlogged	lugworm hummocks	1
K24.118	14/08/2014	56.74514	5.84967	164706	768121	104	14:05:42	slightly muddy sand	waterlogged	lugworm hummocks	
K24.119	14/08/2014	56.74372	5.85111	164609	767968	105		slightly muddy sand	waterlogged	lugworm hummocks	0.2

Table 3.1 continued

Site	Date	Latitude WGS84	Longitude WGS84	Easting (BNG)	Northing (BNG)	WPT no.	Time (BST)	Substrate	Moisture	Surface features	Black layer (cm)
K24.121	14/08/2014	56.74363	5.85301	164492	767964	107	14:49:03	soft muddy sand	waterlogged		
K24.122	14/08/2014	56.74461	5.85322	164485	768074	108	14:58:36	clean fine sand	waterlogged	rippled	5
K24.123	14/08/2014	56.74482	5.85290	164506	768096	109	15:06:07	gravel on sand scar			
K24.124	14/08/2014	56.74603	5.85344	164481	768233	110	15:13:50	fine sand as before (e.g. K24.122) but with scattered pebbles and gravel and boulders	waterlogged	rippled	
K24.125	14/08/2014	56.74659	5.85417	164440	768298	111	15:26:08	sand with dense cover of gravel and pebbles and scattered cobbles and boulders	damp		1
K24.126	14/08/2014	56.74632	5.85396	164451	768267	112	15:33:28	as previous site (K24.125)			
K25.200	15/08/2014	56.74379	5.84512	164975	767955	137	16:05:06	very slightly muddy fine sand with dense cover of gravel and pebbles	waterlogged	flat	
K25.201	15/08/2014	56.74390	5.84570	164940	767969	138	16:13:34	very slightly muddy sand with surface cover of gravel and pebbles	damp	flat	1
K25.202	15/08/2014	56.74392	5.84549	164953	767971	139	16:30:12	slightly muddy fine sand with sparse gravel on surface	standing water		1
K25.203	15/08/2014	56.74257	5.84592	164919	767822	140	16:42:06	slightly muddy fine sand with sparse gravel on surface	standing water		0.4

Table 3.1 continued

Site	Date	Latitude WGS84	Longitude WGS84	Easting (BNG)	Northing (BNG)	WPT no.	Time (BST)	Substrate	Moisture	Surface features	Black layer (cm)
K25.204	15/08/2014	56.74132	5.84663	164867	767685	141	16:55:16	slightly muddy sand with dense gravel and pebbles	waterlogged, pools and in channel		
K25.205	15/08/2014	56.74146	5.84594	164911	767699	142	17:01:42	muddy sand	waterlogged		
K26.110	14/08/2014	56.74106	5.84461	164989	767650	96	12:20:17	gravel and pebbles with scattered cobbles	in channel with small emerged patches		
K26.111	14/08/2014	56.74089	5.84367	165046	767627	97	12:30:18	pebbles and cobbles	channel		
K26.112	14/08/2014	56.74058	5.84409	165018	767594	98	12:43:38	mud with scattered gravel, pebbles and cobbles	waterlogged		3
K26.113	14/08/2014	56.74073	5.84477	164977	767613	99	12:51:07	mud	waterlogged		3
K26.114	14/08/2014	56.74025	5.84538	164937	767562	100	12:59:11	mud with scattered gravel, cobbles and boulders	waterlogged		unclear
K26.131	14/08/2014	56.74066	5.84596	164904	767610	118	16:59:50				

Table 3.2. Habitat notes, biological data and imagery acquired at target note sites. SACFOR abundances obtained from surface features, dig-over and, at some sites, sieving of sediment. Biotope column gives possible biotopes assigned in the field. Photo file names with prefix of 'SNH_KENTRA_2014_DSCN' and suffix of '.jpg'. Video file names with suffix of ".mp4".

Site	Habitat notes	Biota notes	Biota - SACFOR	Sample	Biotope	Photos	Video	Team
K1.83	site typical of most of southern area of polygon 1		*Nephtys cirrosa* C, *Arenicola marina* C, *Angulus tenuis* F	Y		0339-42		CM, KT
K1.84	similar to previous site (K1.83). No *Lanice*, many sprat (in K69) in pools	Dense sprat in pools	*Sprattus sprattus* P	Y		0343-47		CM, KT
K1.84B	site typical of darker lower area visible on aerial to bottom of slipway (marked on map)		*Nephtys hombergii* F, *Scoloplos armiger* C, *Arenicola marina* A	Y		0349-53		CM, KT
K1.85	drier zone between K1.84B zone and deeper channel running along line of transect KA (sketched)		*Nephtys cirrosa* C, *Scoloplos armiger* C, *Arenicola marina* C, Maldanidae spp. A, *Bathyporeia guilliamsoniana* F	Y		0355-62		CM, KT
K1.86		scattered *Sargassum muticum* (R), mostly 30-60 cm in length (largest c 110 cm) on shell and stones	*Sargassum muticum* R	N		0364-70		CM, KT
K1.86B	probably similar to polygon 3 transect site though in localised depression running out from between islands		*Arenicola marina* C	N		0372-75		CM, KT
K4.82	same biotope as K8.80, typical of polygon 4		*Arenicola marina* F, *Cerastoderma edule* R	N		0334-37		CM, KT

Table 3.2 continued

Site	Habitat notes	Biota notes	Biota - SACFOR	Sample	Biotope	Photos	Video	Team
K5.81	representative of polygon 5 which is dark rippled fine sand (black layer 2 mm in places) with reticulated channel running through it. Same biotope also seems to line channel banks locally		*Alitta virens* C, *Nephtys hombergii* C, *Arenicola marina* C	Y		0328-31		CM, KT
K5.87	thin strip of dry sand adjacent to island. Similar to top site in polygon 3		*Arenicola marina* F	N		0377-80		CM, KT
K7.99	Most of polygon 7 will be the channel. Large sieve sample taken		*Nephtys cirrosa* C, *Arenicola marina* C, *Bathyporeia guilliamsoniana* F	Y		0422-25		CM, KT, ER
K8.04			Polychaeta spp. indet. P, *Nephtys* sp. F, *Arenicola marina* A, Gammaridae sp. O, *Cerastoderma edule* F	N	MacAre/Po	0140-41		CM, KT
K8.06			*Arenicola marina* A	N	MacAre/Po	0147-49		CM, KT
K8.07	transition from waterlogged MacAre? inshore to drier sand - small localised dry area similar to K08.08			N				CM, KT
K8.08	dry patchy band running parallel to the channel (lighter shading on aerial photo)	nothing seen		N		0151-54		CM, KT
K8.09	narrow strip running along channel - visible as darker on aerial photo		*Nephtys cirrosa* C, *Arenicola marina* C, *Lanice conchilega* O	Y		0156-58		CM, KT
K8.10	representative of extensive area		*Eteone longa* F, *Nephtys cirrosa* F, *Scoloplos armiger* F, *Arenicola marina* A, Maldanidae spp. P, *Lanice conchilega* R	Y		0160-62		CM, KT

Table 3.2 continued

Site	Habitat notes	Biota notes	Biota - SACFOR	Sample	Biotope	Photos	Video	Team
K8.12			*Nephtys cirrosa* F, *Arenicola marina* A, Maldanidae spp. P, *Lanice conchilega* F, *Crangon crangon* F, *Mytilus edulis* R	Y		0168-70		CM, KT
K8.70	extensive area alongside channel. Inshore is wet band (possibly depressed) running along polygon. Next site (K8.71) is in wet band. Wet band just visible on aerial as slightly darker. Possibly same biotope		*Nephtys cirrosa* C, *Arenicola marina* A, *Cerastoderma edule* C	Y	Po?	0296-99		CM, KT
K8.71	representative of extensive area		*Nephtys cirrosa* C, *Scoloplos armiger* C, *Travisia forbesi* C, *Arenicola marina* A, Maldanidae spp. P, *Corophium crassicorne* C, *Cerastoderma edule* F	Y		0301-05		CM, KT
K8.80	extensive area between channels. Tyre present		*Nephtys cirrosa* F, *Arenicola marina* F, *Bathyporeia pilosa* F, *Cerastoderma edule* F	Y		0322-25		CM, KT
K8.94	definite change from polygon 11 with cleaner distinctly rippled sand - no lugworm hummocks. Representative of very large area. Large sieve sample taken		*Goniada maculata* F, Syllidae sp. F, *Nephtys cirrosa* F, *Scoloplos armiger* C, *Pygospio elegans* C, Spionidae spp. C, *Travisia forbesi* C, *Capitella capitata* C, *Arenicola marina* A, Maldanidae spp. C, *Bathyporeia pilosa* F, Gammaridae sp. F, *Corophium crassicorne* C, *Crangon crangon* A, *Carcinus maenas* P, *Cerastoderma edule* F	Y		0399-0402		CM, KT, ER
K8.98	extensive area. Large sieve sample taken		*Scoloplos armiger* C, Spionidae spp. C, *Travisia forbesi* C, *Arenicola marina* C, Maldanidae spp. P, *Bathyporeia pilosa* F, *Bathyporeia guilliamsoniana* F, *Angulus tenuis* C	Y	Po?	0416-20		CM, KT, ER
K9.05	channel		*Nephtys* sp. F, *Arenicola marina* A, *Lanice conchilega* R, *Crangon crangon* F, *Carcinus maenas* P, Pink bacterial film F, Diatom film F	N		0143-45		CM, KT
K10.01	representative of polygon		*Hediste diversicolor* F, *Arenicola marina* C, *Cerastoderma edule* C	N		0131-32		CM, KT

Table 3.2 continued

Site	Habitat notes	Biota notes	Biota - SACFOR	Sample	Biotope	Photos	Video	Team
K10.15			*Hediste diversicolor* C, *Arenicola marina* C, *Corophium volutator* C, *Cerastoderma edule* F	Y		0176-78		CM, KT
K10.90	site representative of polygon in region with flat sand and sparse *Arenicola*. Large sieve sample taken		*Hediste diversicolor* A, *Arenicola marina* F, *Peringia ulvae* A, *Cerastoderma edule* F	Y		0382-86		CM, KT, ER
K10.91	transition to dense *Arenicola* - a little inshore of the polygon boundary		*Arenicola marina* A	N				CM, KT, ER
K10.92	localised patch of dense *Arenicola*. Polygon has frequent patches of such dense *Arenicola*. Large sieve sample taken		*Hediste diversicolor* C, *Nephtys hombergii* F, *Pygospio elegans* F, *Arenicola marina* A, *Tubificoides benedii* F, *Carcinus maenas* P, *Cerastoderma edule* C	Y		0389-92		CM, KT, ER
K10.93	adjacent dense *Arenicola* patches similar to previous site (K10.92). Patchwork starts in subpolygon 10B. Large sieve sample taken		*Hediste diversicolor* C, Tubificidae spp. C, *Baltidrilus costata* F, Enchytraeidae spp. C, *Corophium volutator* F, Diptera larva F	Y		0394-97		CM, KT, ER
K11.02			*Nephtys hombergii* F, *Arenicola marina* A, *Cerastoderma edule* F, *Percursaria percursa* P	Y	MacAre	0134-35		CM, KT
K11.03			*Nephtys* sp. F, *Arenicola marina* A, Diatom film O	N	MacAre	0137-38		CM, KT
K11.13	walked around fairly sparse mussel bed to determine extent from GPS logger		*Arenicola marina* A, *Mytilus edulis* C	N				CM, KT
K11.14		mysids in pool	*Arenicola marina* A, Mysidacea sp. P, *Cerastoderma edule* F, Diatom film F, *Fucus vesiculosus* R	N		0172-74		CM, KT
K11.60			*Nephtys hombergii* C, *Arenicola marina* A, *Cerastoderma edule* C, *Fucus vesiculosus* R	Y	MacAre	0249-52		CM, KT

Table 3.2 continued

Site	Habitat notes	Biota notes	Biota - SACFOR	Sample	Biotope	Photos	Video	Team
K11.100	extensive area of biotope. Large sieve sample taken		*Nephtys hombergii* F, *Spio filicornis*? C, *Pygospio elegans* C, Spionidae spp. C, *Arenicola marina* A, *Tubificoides benedii* F, *Neomysis integer* C, *Crangon crangon* C, *Cerastoderma edule* C, Pink bacterial film R, Diatom film C	Y		0427-31		CM, KT, ER
K12.11	light area visible on aerial		*Nephtys cirrosa* C, *Scolelepis squamata*? F	Y		0164-66		CM, KT
K12.24	similar to previous target (K14.23), as was walk between. Last photo looking NE showing dry sand patches on other side of channel		*Nephtys cirrosa* F, *Scoloplos armiger* C, *Arenicola marina* C	Y		0209-13		CM, KT
K12.25	visible as localised dark patch on aerial		*Nephtys cirrosa* F, *Scoloplos armiger* F, *Arenicola marina* A, *Lanice conchilega* O, *Fabulina fabula* F	Y		0215-17		CM, KT
K12.26	same biotope since just beyond last target (K12.25)		*Nephtys hombergii* F, *Arenicola marina* A, *Cerastoderma edule* F	Y		0219-22		CM, KT
K12.27	same biotope as previous target (K12.26)			N				CM, KT
K12.95	extensive area of clean fine sand on lower shore, formed into waves, extending to channel, with large pools. Large sieve sample taken		Nemertea sp. C, *Nephtys cirrosa* C, *Scoloplos armiger*? C, *Spio martinensis*? C, *Arenicola marina* F, *Bathyporeia guilliamsoniana* F	Y		0404-08	K12.95	CM, KT, ER
K12.96	transition to raised area of sand waves, although biotope possibly similar to previous site (K12.95)			N		0411-14		CM, KT, ER
K12.97	transition to flatter, wetter rippled sand - see next site (K8.98)			N				CM, KT, ER

Table 3.2 continued

Site	Habitat notes	Biota notes	Biota - SACFOR	Sample	Biotope	Photos	Video	Team
K13.16	site at lower margin of biotope. WPT 38 marks lower margin farther along. Patches of AscX and VesX with AscX tending to occupy upper shore. *Mackaii* scattered patches throughout, perhaps 5% overall	*mackaii* locally 80%	*Ascophyllum nodosum* O, *Ascophyllum nodosum mackaii* F(S locally), *Fucus vesiculosus* A	N	VesX and AscX	0183-86		CM, KT
K13.17			*Nephtys hombergii* F, *Arenicola marina* A, *Carcinus maenas* P	Y	MacAre?	0188-90		CM, KT
K13.18	transition to AscX and VesX inshore		*Arenicola marina* A	N	MacAre			CM, KT
K14.20			*Nephtys hombergii* F, *Arenicola marina* A, *Tubificoides benedii* F, *Macoma balthica* F	Y	MacAre	0196-98		CM, KT
K14.21			*Nephtys* sp. F, *Arenicola marina* A, *Cerastoderma edule* F, Green filamentous algal mat C	N	MacAre	0200-03		CM, KT
K14.22	same as K14.21		*Arenicola marina* A	N	MacAre			CM, KT
K14.23	site characteristic of zone. Polygon boundary marks change from muddy sand, hummocked, to firm rippled fine sand		*Arenicola marina* A, *Lanice conchilega* O, *Cerastoderma edule* F	N		0205-07		CM, KT
K14.50	polygon boundary 12/14 corresponds with change		*Nephtys hombergii* C, *Arenicola marina* A, Maldanidae spp. P, *Fucus vesiculosus* R, Algal mat C	Y	MacAre?	0226-28		CM, KT
K14.51	same as previous biotope (K14.50) but denser F ves patches		*Arenicola marina* A, *Fucus vesiculosus* O	N	MacAre?			CM, KT
K14.52	small patches of *mackaii*		*Ascophyllum nodosum* P, *Ascophyllum nodosum mackaii* P	N	AscX, mackaii			CM, KT
K14.53			*Nephtys hombergii* F, *Heteromastus filiformis* F, *Arenicola marina* A, *Fucus vesiculosus* R	Y		0230-33		CM, KT

Table 3.2 continued

Site	Habitat notes	Biota notes	Biota - SACFOR	Sample	Biotope	Photos	Video	Team
K14.54		dense patch of *mackaii* c. 50 x 8 m in extent	*Ascophyllum nodosum mackaii* S	N	mackaii	0235-37		CM, KT
K14.68			*Nephtys hombergii* F, *Scoloplos armiger* C, *Arenicola marina* A, *Carcinus maenas* C, *Cerastoderma edule* F	Y	MacAre/Po	0285-88		CM, KT
K15.19			*Hediste diversicolor* C, *Carcinus maenas* P, *Scrobicularia plana* C, *Fucus vesiculosus* O	Y		0192-94		CM, KT
K15.56		dead *Scrobicularia* shells on surface	*Hediste diversicolor* C, *Nephtys hombergii* F, *Arenicola marina* A, *Corophium volutator* F, *Carcinus maenas* C, *Fucus vesiculosus* R	Y				CM, KT
K16.55			*Ascophyllum nodosum mackaii* R, *Fucus vesiculosus* A, *Fucus ceranoides* C	N	VesX?	0239-42		CM, KT
K17.120	characteristic of small upper shore subpolygon		*Hediste diversicolor* A, *Neomysis integer* A, *Carcinus maenas* C, *Macoma balthica* F, *Fucus vesiculosus* R	Y		0487-90		CM, KT, ER
K17.128	black streaks on aerial are gravel. Scars with reduced fauna. Rich fauna at site		*Nephtys hombergii* C, *Arenicola marina* A, Tubificidae spp. C, *Corophium volutator* C, *Cerastoderma edule* F, *Scrobicularia plana* C, *Fucus vesiculosus* O	Y		0521-26		CM, KT, ER
K17.129			*Hediste diversicolor* F, *Nephtys hombergii* P, Tubificidae spp. F, *Bathyporeia pilosa* F, *Corophium volutator* A	Y		0528-31		CM, KT, ER
K17.130	eastern biotope boundary of K12.129		*Arenicola marina* A, *Scrobicularia plana* P	N				CM, KT, ER
K17.130B	eastern boundary of *Scrobicularia* into channel in poly 17		*Arenicola marina* A, *Scrobicularia plana* C	N				CM, KT, ER
K18.127	polygon 18 mostly muddy sand with gravel in varying density		*Hediste diversicolor* C, *Arenicola marina* A, *Carcinus maenas* C, *Macoma balthica* C, *Scrobicularia plana* C, *Ascophyllum* O, *Fucus vesiculosus* O	Y		0515-19		CM, KT, ER

Table 3.2 continued

Site	Habitat notes	Biota notes	Biota - SACFOR	Sample	Biotope	Photos	Video	Team
K19.69	Patchy mussel bed. Also mussel patches to west. Mapped by GPS logger		*Mytilus edulis* C	N		0290-94		CM, KT
K20.61			*Arenicola marina* A, *Cerastoderma edule* C, *Fucus vesiculosus* R	N		0254-56		CM, KT
K21.62	Habitat corresponds to black streaks on aerial - slightly raised streaks of gravel and pebbles forming patchwork with sand areas (see K21.63)		*Hediste diversicolor* C, *Nephtys hombergii* P, *Arenicola marina* C, *Corophium volutator* O, *Ascophyllum* R, *Fucus vesiculosus* C	Y	VesX??	0258-60		CM, KT
K21.63	last photo shows sediment patch and Fves transition		*Nephtys hombergii* F, *Capitella capitata* juv? F, *Arenicola marina* A, Tubificidae spp. O, *Neomysis integer* C, *Corophium volutator* O	Y		0262-65		CM, KT
K21.65	site representative of polygon		*Arenicola marina* A, *Cerastoderma edule* F	N	MacAre?	0272-74		CM, KT
K21.67	a few raised gravel patches		*Nephtys* sp. C, *Arenicola marina* A, *Fucus vesiculosus* O	N	MacAre??	0280-83		CM, KT
K21.72	similar to K21.62		*Fucus vesiculosus* F	N				CM, KT
K22.73	sandy areas interspersed with patches of dense gravel-covered sand with no *Arenicola* evident		Nemertea sp. C, *Hediste diversicolor* C, *Arenicola marina* A, Gammaridae sp. F, *Corophium volutator* C	Y		0307-10		CM, KT
K22.74	similar to previous site (K22.73)		*Hediste diversicolor* C, *Arenicola marina* A, *Corophium volutator* C, *Carcinus maenas* C, *Fucus vesiculosus* C	Y		0312-15		CM, KT
K22.75			*Hediste diversicolor* C, *Arenicola marina* C, *Corophium volutator* C, *Carcinus maenas* C, *Fucus spiralis* P, *Fucus ceranoides* O	N		0317-20		CM, KT
K23.64			*Arenicola marina* A, Gammaridae sp. O, *Crangon crangon* F, *Cerastoderma edule* F	N	MacAre?	0267-70		CM, KT
K23.66	see K23.66A for accompanying patches of raised gravel on (dry) sand as before (see K21.62 & 63).		*Nephtys hombergii* F, *Arenicola marina* A, Tubificidae spp. C, *Carcinus maenas* C	Y	MacAre??	0275-78		CM, KT

Table 3.2 continued

Site	Habitat notes	Biota notes	Biota - SACFOR	Sample	Biotope	Photos	Video	Team
K23.66A	patches of raised gravel on (dry) sand as before (see K21.62 & 63). Raised areas with no fauna evident except *Corophium*		*Corophium volutator* P	Y		0275-78		CM, KT
K24.115	biotope probably covers most of inlet around site		*Hediste diversicolor* S, *Pygospio elegans* F, *Arenicola marina* F, Tubificoides benedii F, *Macoma balthica* F, *Scrobicularia plana* O, *Ascophyllum* R, *Fucus vesiculosus* R	Y		0458-61		CM, KT, ER
K24.116	site characteristic of sketched subpolygon		*Hediste diversicolor* C, *Arenicola marina* C, Tubificidae spp. C, *Corophium volutator* F, *Littorina littorea* F, *Ascophyllum* R, *Fucus vesiculosus* R	Y		0463-66		CM, KT, ER
K24.117			*Hediste diversicolor* A, *Arenicola marina* A, Tubificidae spp. F, *Corophium volutator* F, *Scrobicularia plana* C	Y		0468-73		CM, KT, ER
K24.118	as previous site (K24.117)		*Arenicola marina* A, *Scrobicularia plana* C	N		0474-79		CM, KT, ER
K24.119			*Nephtys hombergii* A, *Pygospio elegans* F, *Arenicola marina* A, Tubificidae spp. C, *Carcinus maenas* P, *Macoma balthica* F, *Scrobicularia plana* C	Y		0481-85		CM, KT, ER
K24.121	HedMac.Scr as previous sites. Streaking on aerial probably *Ascophyllum*		*Arenicola marina* C, *Scrobicularia plana* C, *Ascophyllum nodosum* F	N	HedMac. Scr	0492-97		CM, KT, ER
K24.122	possibly Po?		*Arenicola marina* A, *Bathyporeia pilosa* F	Y	Po?	0499-0502		CM, KT, ER
K24.123	gravel scar (minor feature)		*Arenicola marina* C, *Fucus vesiculosus* O	N		0504-07		CM, KT, ER
K24.124	as K24.122 (and K24.123?)		*Arenicola marina* C, *Fucus vesiculosus* O	N		0509-13		CM, KT, ER
K24.125	site within distinct black scar on aerial. Sparse mussel bed, C in places, elsewhere F		*Hediste diversicolor* F, *Arenicola marina* R, Tubificidae spp. A, Gammaridae sp. F, *Cerastoderma edule* F, *Mytilus edulis* C	Y				CM, KT, ER

Table 3.2 continued

Site	Habitat notes	Biota notes	Biota - SACFOR	Sample	Biotope	Photos	Video	Team
K24.126	southern edge of mussel bed			N				CM, KT, ER
K25.200	7 m wide band at top of shore below salt marsh along most of bay		*Fucus vesiculosus* A, *Fucus ceranoides* P	N		0591-93		CM, KT
K25.201	area with patchwork of slightly lower muddy sand, waterlogged with dense *Arenicola*, and slightly raised damp sand with gravel cover (within which this site is located). Both habitats cover c.50% of the beach each.		*Hediste diversicolor* F, Tubificidae spp. F, *Corophium volutator* C, *Crangon crangon* C, *Carcinus maenas* C, *Ascophyllum* R, *Fucus vesiculosus* R, *Fucus ceranoides* R	Y		0595-98	K25.201	CM, KT
K25.202			*Hediste diversicolor* F, *Arenicola marina* A, Tubificidae spp. C, *Corophium volutator* C, *Cerastoderma edule* juv. C, *Macoma balthica* F, *Scrobicularia plana* C	Y	HedMac. Scr	0601-05		CM, KT
K25.203			*Arenicola marina* A, *Corophium volutator* C, *Scrobicularia plana* C, *Ascophyllum nodosum* R, *Fucus vesiculosus* R, *Fucus ceranoides* R	N	HedMac. Scr	0607-11		CM, KT
K25.204	to north of F cer patch, a mosaic of HedMac.Scr and gravel as in north of bay (see K25.205)		*Fucus ceranoides* A	N	F cer	0613-19	K25.204	CM, KT
K25.205	patch of HedMac.Scr with adjacent gravel patches		*Scrobicularia plana* C	N	HedMac. Scr	0622-27		CM, KT
K26.110	most of polygon, except perhaps for the deep bits (minority)		Mysidacea sp. P, *Fucus ceranoides* A	N	F cer	0433-37		CM, KT, ER
K26.111			*Fucus ceranoides* C	N	F cer	0439-43		CM, KT, ER
K26.112	mud in sheltered pockets - see also K26.113 which is similar		*Carcinus maenas* P, *Fucus ceranoides* O	N		0445-49		CM, KT, ER

Table 3.2 continued

Site	Habitat notes	Biota notes	Biota - SACFOR	Sample	Biotope	Photos	Video	Team
K26.113	small patch of mud 10 x 10 m		*Hediste diversicolor* A, *Neomysis integer* C, *Corophium volutator* C, *Carcinus maenas* P, *Fucus ceranoides* R	Y				CM, KT, ER
K26.114	large patch 27 x 27 m		*Fucus ceranoides* O	N		0451-55	K26.114	CM, KT, ER
K26.131	view from bridge of polygon 26			N		0532-36	K26.131	CM, KT, ER

ANNEX 4: PHOTO AND VIDEO LOGS

Table 4.1 Log of photographs associated with quadrats in Kentra Bay

Image identifier	Site code	Date and time (UT)	Latitude (original)	Longitude (original)	Latitude (dec deg)	Longitude (dec deg)	Description	Bearing (degrees T)
SNH_KENTRA_2014_IMGP0100.JPG	KA1	2014-08-12 11:41:12	56.76009	-5.87027	56.76009	-5.87027	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0101.JPG	KA1	2014-08-12 11:41:21	56.76009	-5.87027	56.76009	-5.87027	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0102.JPG	KA1	2014-08-12 11:41:29	56.76009	-5.87027	56.76009	-5.87027	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0103.JPG	KA1	2014-08-12 11:41:38	56.76009	-5.87027	56.76009	-5.87027	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0104.JPG	KA1	2014-08-12 11:41:52	56.76009	-5.87027	56.76009	-5.87027	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0105.JPG	KA1	2014-08-12 11:42:15	56.76009	-5.87027	56.76009	-5.87027	Habitat overview of sediment shore	unknown
SNH_KENTRA_2014_IMGP0106.JPG	KA1	2014-08-12 11:42:26	56.76009	-5.87027	56.76009	-5.87027	Habitat overview of sediment shore	unknown
SNH_KENTRA_2014_IMGP0114.JPG	KA2	2014-08-12 12:33:12	56.76051	-5.87138	56.76051	-5.87138	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0115.JPG	KA2	2014-08-12 12:33:23	56.76051	-5.87138	56.76051	-5.87138	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0116.JPG	KA2	2014-08-12 12:33:33	56.76051	-5.87138	56.76051	-5.87138	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0117.JPG	KA2	2014-08-12 12:33:47	56.76051	-5.87138	56.76051	-5.87138	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0118.JPG	KA2	2014-08-12 12:33:56	56.76051	-5.87138	56.76051	-5.87138	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0119.JPG	KA2	2014-08-12 12:34:08	56.76051	-5.87138	56.76051	-5.87138	Habitat overview of sediment shore	unknown

Image identifier	Site code	Date and time (UT)	Latitude (original)	Longitude (original)	Latitude (dec deg)	Longitude (dec deg)	Description	Bearing (degrees T)
SNH_KENTRA_2014_IMGP0120.JPG	KA2	2014-08-12 12:34:19	56.76051	-5.87138	56.76051	-5.87138	Habitat overview of sediment shore	unknown
SNH_KENTRA_2014_IMGP0121.JPG	KA3	2014-08-12 12:40:15	56.76098	-5.87261	56.76098	-5.87261	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0122.JPG	KA3	2014-08-12 12:40:38	56.76098	-5.87261	56.76098	-5.87261	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0123.JPG	KA3	2014-08-12 12:40:50	56.76098	-5.87261	56.76098	-5.87261	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0124.JPG	KA3	2014-08-12 12:41:00	56.76098	-5.87261	56.76098	-5.87261	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0125.JPG	KA3	2014-08-12 12:41:13	56.76098	-5.87261	56.76098	-5.87261	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0126.JPG	KA3	2014-08-12 12:41:24	56.76098	-5.87261	56.76098	-5.87261	Habitat overview of sediment shore	unknown
SNH_KENTRA_2014_IMGP0127.JPG	KA3	2014-08-12 12:41:44	56.76098	-5.87261	56.76098	-5.87261	Habitat overview of sediment shore	unknown
SNH_KENTRA_2014_IMGP0017.JPG	KB1	2014-08-09 10:58:22	56.75690	-5.85421	56.75690	-5.85421	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0018.JPG	KB1	2014-08-09 10:58:41	56.75690	-5.85421	56.75690	-5.85421	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0019.JPG	KB1	2014-08-09 10:59:17	56.75690	-5.85421	56.75690	-5.85421	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0020.JPG	KB1	2014-08-09 11:00:15	56.75690	-5.85421	56.75690	-5.85421	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0021.JPG	KB1	2014-08-09 11:02:34	56.75690	-5.85421	56.75690	-5.85421	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0022.JPG	KB1	2014-08-09 11:04:07	56.75690	-5.85421	56.75690	-5.85421	Habitat overview of sediment shore	unknown
SNH_KENTRA_2014_IMGP0023.JPG	KB1	2014-08-09 11:04:21	56.75690	-5.85421	56.75690	-5.85421	Habitat overview of sediment shore	unknown

Image identifier	Site code	Date and time (UT)	Latitude (original)	Longitude (original)	Latitude (dec deg)	Longitude (dec deg)	Description	Bearing (degrees T)
SNH_KENTRA_2014_IMGP0024.JPG	KB2	2014-08-09 11:08:24	56.75525	-5.85586	56.75525	-5.85586	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0025.JPG	KB2	2014-08-09 11:08:38	56.75525	-5.85586	56.75525	-5.85586	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0026.JPG	KB2	2014-08-09 11:08:53	56.75525	-5.85586	56.75525	-5.85586	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0027.JPG	KB2	2014-08-09 11:09:16	56.75525	-5.85586	56.75525	-5.85586	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0028.JPG	KB2	2014-08-09 11:09:40	56.75525	-5.85586	56.75525	-5.85586	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0029.JPG	KB2	2014-08-09 11:10:12	56.75525	-5.85586	56.75525	-5.85586	Habitat overview of sediment shore	unknown
SNH_KENTRA_2014_IMGP0030.JPG	KB2	2014-08-09 11:10:22	56.75525	-5.85586	56.75525	-5.85586	Habitat overview of sediment shore	unknown
SNH_KENTRA_2014_IMGP0031.JPG	KB3	2014-08-09 11:15:31	56.75294	-5.85820	56.75294	-5.85820	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0032.JPG	KB3	2014-08-09 11:15:46	56.75294	-5.85820	56.75294	-5.85820	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0033.JPG	KB3	2014-08-09 11:16:00	56.75294	-5.85820	56.75294	-5.85820	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0034.JPG	KB3	2014-08-09 11:16:13	56.75294	-5.85820	56.75294	-5.85820	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0035.JPG	KB3	2014-08-09 11:16:26	56.75294	-5.85820	56.75294	-5.85820	0.25 m^2 quadrat on sediment shore	unknown
SNH_KENTRA_2014_IMGP0036.JPG	KB3	2014-08-09 11:16:38	56.75294	-5.85820	56.75294	-5.85820	Habitat overview of sediment shore. Looking NW from KB3 towards mouth of Kentra Bay and Eigg beyond. Abundant Arenicola casts evident	315

Image identifier	Site code	Date and time (UT)	Latitude (original)	Longitude (original)	Latitude (dec deg)	Longitude (dec deg)	Description	Bearing (degrees T)
SNH_KENTRA_2014_IMGP0037.JPG	KB3	2014-08-09 11:16:52	56.75294	-5.85820	56.75294	-5.85820	Habitat overview of sediment shore. View south of west from KB3 looking across channel of Fhaodhail Bhan. Abundant Arenicola casts evident.	250
SNH_KENTRA_2014_IMGP0079.JPG	KC1	2014-08-11 11:18:55	56.75118	-5.85019	56.75118	-5.85019	0.25 m2 quadrat on sediment shore. Abundant Arenicola in wet muddy medium sand.	unknown
SNH_KENTRA_2014_IMGP0080.JPG	KC1	2014-08-11 11:19:04	56.75118	-5.85019	56.75118	-5.85019	0.25 m2 quadrat on sediment shore. Abundant Arenicola in wet muddy medium sand.	unknown
SNH_KENTRA_2014_IMGP0081.JPG	KC1	2014-08-11 11:19:17	56.75118	-5.85019	56.75118	-5.85019	0.25 m2 quadrat on sediment shore. Abundant arenicola in wet muddy medium sand.	unknown
SNH_KENTRA_2014_IMGP0082.JPG	KC1	2014-08-11 11:19:28	56.75118	-5.85019	56.75118	-5.85019	0.25 m2 quadrat on sediment shore. Abundant Arenicola in wet muddy medium sand.	unknown
SNH_KENTRA_2014_IMGP0083.JPG	KC1	2014-08-11 11:19:44	56.75118	-5.85019	56.75118	-5.85019	0.25 m2 quadrat on sediment shore. Abundant Arenicola in wet muddy medium sand.	unknown
SNH_KENTRA_2014_IMGP0084.JPG	KC1	2014-08-11 11:20:00	56.75118	-5.85019	56.75118	-5.85019	Habitat overview of shore at KC1 looking east.	90
SNH_KENTRA_2014_IMGP0085.JPG	KC1	2014-08-11 11:20:07	56.75118	-5.85019	56.75118	-5.85019	Habitat overview of shore at KC1 looking west.	270

Image identifier	Site code	Date and time (UT)	Latitude (original)	Longitude (original)	Latitude (dec deg)	Longitude (dec deg)	Description	Bearing (degrees T)
SNH_KENTRA_2014_IMGP0072.JPG	KC2	2014-08-11 11:15:52	56.75026	-5.85132	56.75026	-5.85132	0.25 m2 quadrat on sediment shore. Sparse Arenicola in gravelly sand with Littorina and F.ves..	unknown
SNH_KENTRA_2014_IMGP0073.JPG	KC2	2014-08-11 11:16:00	56.75026	-5.85132	56.75026	-5.85132	0.25 m2 quadrat on sediment shore. Sparse Arenicola in gravelly sand with Littorina and F.ves..	unknown
SNH_KENTRA_2014_IMGP0074.JPG	KC2	2014-08-11 11:16:16	56.75026	-5.85132	56.75026	-5.85132	0.25 m2 quadrat on sediment shore. Sparse Arenicola in gravelly sand with Littorina and F.ves..	unknown
SNH_KENTRA_2014_IMGP0075.JPG	KC2	2014-08-11 11:16:24	56.75026	-5.85132	56.75026	-5.85132	0.25 m2 quadrat on sediment shore. Sparse Arenicola in gravelly sand with Littorina and F.ves..	unknown
SNH_KENTRA_2014_IMGP0076.JPG	KC2	2014-08-11 11:16:33	56.75026	-5.85132	56.75026	-5.85132	0.25 m2 quadrat on sediment shore. Sparse Arenicola in gravelly sand with Littorina and F.ves..	unknown
SNH_KENTRA_2014_IMGP0077.JPG	KC2	2014-08-11 11:16:48	56.75026	-5.85132	56.75026	-5.85132	Habitat overview of shore at KC2 looking east to Arevegaig.	90
SNH_KENTRA_2014_IMGP0078.JPG	KC2	2014-08-11 11:16:59	56.75026	-5.85132	56.75026	-5.85132	Habitat overview of shore at KC2 looking south-west .	225
SNH_KENTRA_2014_IMGP0065.JPG	KC3	2014-08-11 11:13:18	56.74964	-5.85207	56.74964	-5.85207	0.25 m2 quadrat on sediment shore. Littorina littorea on gravel/stones with barnacles on stones.	unknown

Image identifier	Site code	Date and time (UT)	Latitude (original)	Longitude (original)	Latitude (dec deg)	Longitude (dec deg)	Description	Bearing (degrees T)
SNH_KENTRA_2014_IMGP0066.JPG	KC3	2014-08-11 11:13:28	56.74964	-5.85207	56.74964	-5.85207	0.25 m2 quadrat on sediment shore. Littorina littorea on gravel/stones with barnacles on stones.	unknown
SNH_KENTRA_2014_IMGP0067.JPG	KC3	2014-08-11 11:13:37	56.74964	-5.85207	56.74964	-5.85207	0.25 m2 quadrat on sediment shore. Littorina littorea on gravel/stones.	unknown
SNH_KENTRA_2014_IMGP0068.JPG	KC3	2014-08-11 11:13:48	56.74964	-5.85207	56.74964	-5.85207	0.25 m2 quadrat on sediment shore. Occasional Mytilus on gravel/stones with Littorina littorea.	unknown
SNH_KENTRA_2014_IMGP0069.JPG	KC3	2014-08-11 11:13:59	56.74964	-5.85207	56.74964	-5.85207	0.25 m2 quadrat on sediment shore. Occasional Mytilus on gravel/stones with Littorina littorea.	unknown
SNH_KENTRA_2014_IMGP0070.JPG	KC3	2014-08-11 11:14:17	56.74964	-5.85207	56.74964	-5.85207	Habitat overview of shore at KC3 looking east across river channel to Arevegaig.	90
SNH_KENTRA_2014_IMGP0071.JPG	KC3	2014-08-11 11:14:29	56.74964	-5.85207	56.74964	-5.85207	Habitat overview of shore at KC3 looking west to mouth of Kentra Bay.	270
SNH_KENTRA_2014_IMGP0058.JPG	KC4	2014-08-11 11:11:09	56.74924	-5.85254	56.74924	-5.85254	0.25 m2 quadrat on sediment shore. Arenicola in clean medium sand, occ dead shells.	unknown
SNH_KENTRA_2014_IMGP0059.JPG	KC4	2014-08-11 11:11:28	56.74924	-5.85254	56.74924	-5.85254	0.25 m2 quadrat on sediment shore. Arenicola in clean medium sand, drift algae.	unknown
SNH_KENTRA_2014_IMGP0060.JPG	KC4	2014-08-11 11:11:40	56.74924	-5.85254	56.74924	-5.85254	0.25 m2 quadrat on sediment shore. Arenicola in clean medium sand.	unknown

Image identifier	Site code	Date and time (UT)	Latitude (original)	Longitude (original)	Latitude (dec deg)	Longitude (dec deg)	Description	Bearing (degrees T)
SNH_KENTRA_2014_IMGP0061.JPG	KC4	2014-08-11 11:11:52	56.74924	-5.85254	56.74924	-5.85254	0.25 m2 quadrat on sediment shore. Arenicola in clean medium sand, drift algae.	unknown
SNH_KENTRA_2014_IMGP0062.JPG	KC4	2014-08-11 11:12:02	56.74924	-5.85254	56.74924	-5.85254	0.25 m2 quadrat on sediment shore. Arenicola in clean medium sand, drift algae and occ dead shells.	unknown
SNH_KENTRA_2014_IMGP0063.JPG	KC4	2014-08-11 11:12:18	56.74924	-5.85254	56.74924	-5.85254	Habitat overview of shore at KC4 looking west to mouth of Kentra Bay.	270
SNH_KENTRA_2014_IMGP0064.JPG	KC4	2014-08-11 11:12:28	56.74924	-5.85254	56.74924	-5.85254	Habitat overview of shore at KC4 looking south-west across river channel.	225
SNH_KENTRA_2014_IMGP0005.JPG	KD1	2014-08-08 10:25:22	56.74318	-5.84931	56.74318	-5.84931	0.25 m2 quadrat on sediment shore. Gravel on muddy med - coarse sand. Some pits. 1 possible Arenicola cast top right.	unknown
SNH_KENTRA_2014_IMGP0006.JPG	KD1	2014-08-08 10:25:50	56.74318	-5.84931	56.74318	-5.84931	0.25 m2 quadrat on sediment shore. Gravel on muddy med - coarse sand. Occ Fucus spiralis on small stones.	unknown
SNH_KENTRA_2014_IMGP0007.JPG	KD1	2014-08-08 10:26:08	56.74318	-5.84931	56.74318	-5.84931	0.25 m2 quadrat on sediment shore. Gravel on muddy med - coarse sand. Occ Fucus spiralis on small stones.	unknown
SNH_KENTRA_2014_IMGP0008.JPG	KD1	2014-08-08 10:26:24	56.74318	-5.84931	56.74318	-5.84931	0.25 m2 quadrat on sediment shore. Gravel on muddy med - coarse sand. Occ Fucus spiralis on small stones.	unknown

Image identifier	Site code	Date and time (UT)	Latitude (original)	Longitude (original)	Latitude (dec deg)	Longitude (dec deg)	Description	Bearing (degrees T)
SNH_KENTRA_2014_IMGP0009.JPG	KD2	2014-08-08 10:27:52	56.74361	-5.84938	56.74361	-5.84938	0.25 m2 quadrat on sediment shore. Scattered gravel and dead bivalve shells on med muddy sand.	unknown
SNH_KENTRA_2014_IMGP0010.JPG	KD2	2014-08-08 10:28:07	56.74361	-5.84938	56.74361	-5.84938	0.25 m2 quadrat on sediment shore. Scattered gravel and dead bivalve shells on med muddy sand.	unknown
SNH_KENTRA_2014_IMGP0011.JPG	KD2	2014-08-08 10:28:20	56.74361	-5.84938	56.74361	-5.84938	0.25 m2 quadrat on sediment shore. Muddy medium sand with occasional Fucus vesiculosus on stones.	unknown
SNH_KENTRA_2014_IMGP0012.JPG	KD2	2014-08-08 10:28:41	56.74361	-5.84938	56.74361	-5.84938	0.25 m2 quadrat on sediment shore. Arenicola burrow and cast (indistinct through rain) in med muddy sand with scattered gravel and dead shells.	unknown
SNH_KENTRA_2014_IMGP0013.JPG	KD3	2014-08-08 10:29:51	56.74400	-5.84944	56.74400	-5.84944	0.25 m2 quadrat on sediment shore. Arenicola burrows and casts in medium muddy sand with occ. dead shells.	unknown
SNH_KENTRA_2014_IMGP0014.JPG	KD3	2014-08-08 10:30:08	56.74400	-5.84944	56.74400	-5.84944	0.25 m2 quadrat on sediment shore. Arenicola burrows and casts in medium muddy sand with occ. dead shells.	unknown

Image identifier	Site code	Date and time (UT)	Latitude (original)	Longitude (original)	Latitude (dec deg)	Longitude (dec deg)	Description	Bearing (degrees T)
SNH_KENTRA_2014_IMGP0015.JPG	KD3	2014-08-08 10:30:18	56.74400	-5.84944	56.74400	-5.84944	0.25 m2 quadrat on sediment shore. Arenicola burrows and casts in medium muddy sand with occ. dead shells and drift algae.	unknown
SNH_KENTRA_2014_IMGP0016.JPG	KD3	2014-08-08 10:30:34	56.74400	-5.84944	56.74400	-5.84944	0.25 m2 quadrat on sediment shore. Arenicola burrows and casts in medium muddy sand with occ. dead shells and drift algae.	unknown
SNH_KENTRA_2014_IMGP0051.JPG	KE1	2014-08-10 10:38:17	56.74500	-5.87415	56.74500	-5.87415	0.25 m2 quadrat on sediment shore. Arenicola in wet muddy sand.	unknown
SNH_KENTRA_2014_IMGP0052.JPG	KE1	2014-08-10 10:38:31	56.74500	-5.87415	56.74500	-5.87415	0.25 m2 quadrat on sediment shore. Arenicola in wet muddy sand.	unknown
SNH_KENTRA_2014_IMGP0053.JPG	KE1	2014-08-10 10:38:47	56.74500	-5.87415	56.74500	-5.87415	0.25 m2 quadrat on sediment shore. Arenicola in wet muddy sand, with Fucus.spiralis on small stones.	unknown
SNH_KENTRA_2014_IMGP0054.JPG	KE1	2014-08-10 10:39:02	56.74500	-5.87415	56.74500	-5.87415	0.25 m2 quadrat on sediment shore. Arenicola in wet muddy sand.	unknown
SNH_KENTRA_2014_IMGP0055.JPG	KE1	2014-08-10 10:39:14	56.74500	-5.87415	56.74500	-5.87415	0.25 m2 quadrat on sediment shore. Arenicola in wet muddy sand.	unknown
SNH_KENTRA_2014_IMGP0056.JPG	KE1	2014-08-10 10:39:39	56.74500	-5.87415	56.74500	-5.87415	Habitat overview of shore at KE1 looking north.	360
SNH_KENTRA_2014_IMGP0057.JPG	KE1	2014-08-10 10:39:45					Habitat overview of shore at KE1 looking east.	90

Image identifier	Site code	Date and time (UT)	Latitude (original)	Longitude (original)	Latitude (dec deg)	Longitude (dec deg)	Description	Bearing (degrees T)
SNH_KENTRA_2014_IMGP0044.JPG	KE2	2014-08-10 10:35:08	56.74551	-5.87335	56.74551	-5.87335	0.25 m2 quadrat on sediment shore. Arenicola with filamentous green algae.	unknown
SNH_KENTRA_2014_IMGP0045.JPG	KE2	2014-08-10 10:35:28	56.74551	-5.87335	56.74551	-5.87335	0.25 m2 quadrat on sediment shore. Arenicola with Fucus vesiculosus on small stone.	unknown
SNH_KENTRA_2014_IMGP0046.JPG	KE2	2014-08-10 10:35:42	56.74551	-5.87335	56.74551	-5.87335	0.25 m2 quadrat on sediment shore. Arenicola with filamentous green algae.	unknown
SNH_KENTRA_2014_IMGP0047.JPG	KE2	2014-08-10 10:35:57	56.74551	-5.87335	56.74551	-5.87335	0.25 m2 quadrat on sediment shore. Arenicola with Fucus vesiculosus on small stone.	unknown
SNH_KENTRA_2014_IMGP0048.JPG	KE2	2014-08-10 10:36:07	56.74551	-5.87335	56.74551	-5.87335	0.25 m2 quadrat on sediment shore. Arenicola with filamentous green algae.	unknown
SNH_KENTRA_2014_IMGP0049.JPG	KE2	2014-08-10 10:36:17	56.74551	-5.87335	56.74551	-5.87335	Habitat overview of shore at KE2 looking east.	90
SNH_KENTRA_2014_IMGP0050.JPG	KE2	2014-08-10 10:36:27	56.74551	-5.87335	56.74551	-5.87335	Habitat overview of shore at KE2 looking north-east.	45
SNH_KENTRA_2014_IMGP0038.JPG	KE3	2014-08-10 10:24:19	56.74787	-5.86976	56.74787	-5.86976	0.25 m2 quadrat on sediment shore. Abundant Arenicola in clean medium sand, hummocks due to casts and borrows.	unknown
SNH_KENTRA_2014_IMGP0039.JPG	KE3	2014-08-10 10:24:35	56.74787	-5.86976	56.74787	-5.86976	0.25 m2 quadrat on sediment shore. Abundant Arenicola in clean medium sand, hummocks due to casts and borrows.	unknown

Image identifier	Site code	Date and time (UT)	Latitude (original)	Longitude (original)	Latitude (dec deg)	Longitude (dec deg)	Description	Bearing (degrees T)
SNH_KENTRA_2014_IMGP0040.JPG	KE3	2014-08-10 10:24:59	56.74787	-5.86976	56.74787	-5.86976	0.25 m2 quadrat on sediment shore. Abundant Arenicola in clean medium sand, hummocks due to casts and burrows, drift algae.	unknown
SNH_KENTRA_2014_IMGP0041.JPG	KE3	2014-08-10 10:25:19	56.74787	-5.86976	56.74787	-5.86976	0.25 m2 quadrat on sediment shore. Abundant Arenicola in clean medium sand, hummocks due to casts and burrows.	unknown
SNH_KENTRA_2014_IMGP0042.JPG	KE3	2014-08-10 10:25:51	56.74787	-5.86976	56.74787	-5.86976	0.25 m2 quadrat on sediment shore. Abundant Arenicola in clean medium sand, hummocks due to casts and burrows.	unknown
SNH_KENTRA_2014_IMGP0043.JPG	KE3	2014-08-10 10:26:07	56.74787	-5.86976	56.74787	-5.86976	Habitat overview of shore at KE3 looking north.	360

Table 4.2 Log of video data collected in Kentra Bay

MP4 file	Method	Video time code (start)	Video time code (end)	Substrate	Biotope	Surveyors
KC_channel.mp4	Hand-held	00:00:00	00:00:37	sediment flats		Alastair Lyndon, Jenna Brash, Eiona Rodgers
Station_KC4.mp4	Hand-held	00:00:00	00:00:39	slightly muddy medium sand, a few dead shells, some patches of gravel on	LS.LSa.MuSa.MacAre	Alastair Lyndon, Jenna Brash, Eiona Rodgers

MP4 file	Method	Video time code (start)	Video time code (end)	Substrate	Biotope	Surveyors
				surface		
KC3_KC4_2014_boundary.mp4	Hand-held	00:00:00	00:00:36			Alastair Lyndon, Jenna Brash, Eiona Rodgers
KC3_KC4_2003_boundary.mp4	Hand-held	00:00:00	00:00:24			Alastair Lyndon, Jenna Brash, Eiona Rodgers
Station_KC3.mp4	Hand-held	00:00:00	00:00:34	gravel on clean medium sand with dead shells and stones	LS.LSa.MuSa.HedMacEte	Alastair Lyndon, Jenna Brash, Eiona Rodgers
KC3_upper muddy_sand_boundary.mp4	Hand-held	00:00:00	00:00:50			Alastair Lyndon, Jenna Brash, Eiona Rodgers
KC2_lower_muddy_sand_boundary.mp4	Hand-held	00:00:00	00:00:34			Alastair Lyndon, Jenna Brash, Eiona Rodgers
Station_KC2.mp4	Hand-held	00:00:00	00:00:35	gravel and dead shells on medium sand	LS.LSa.MuSa.HedMacEte	Alastair Lyndon, Jenna Brash, Eiona Rodgers
KC1_KC2_boundary.mp4	Hand-held	00:00:00	00:00:41			Alastair Lyndon, Jenna Brash, Eiona Rodgers
Station_KC1.mp4	Hand-held	00:00:00	00:00:52	slightly muddy partially rippled medium sand with occ. dead shells	LS.LSa.MuSa.MacAre	Alastair Lyndon, Jenna Brash, Eiona Rodgers
KC1_upper_boundary.mp4	Hand-held	00:00:00	00:00:30			Alastair Lyndon, Jenna Brash, Eiona Rodgers
KC_transect_marker.mp4	Hand-held	00:00:00	00:00:48			Alastair Lyndon, Jenna Brash, Eiona Rodgers

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