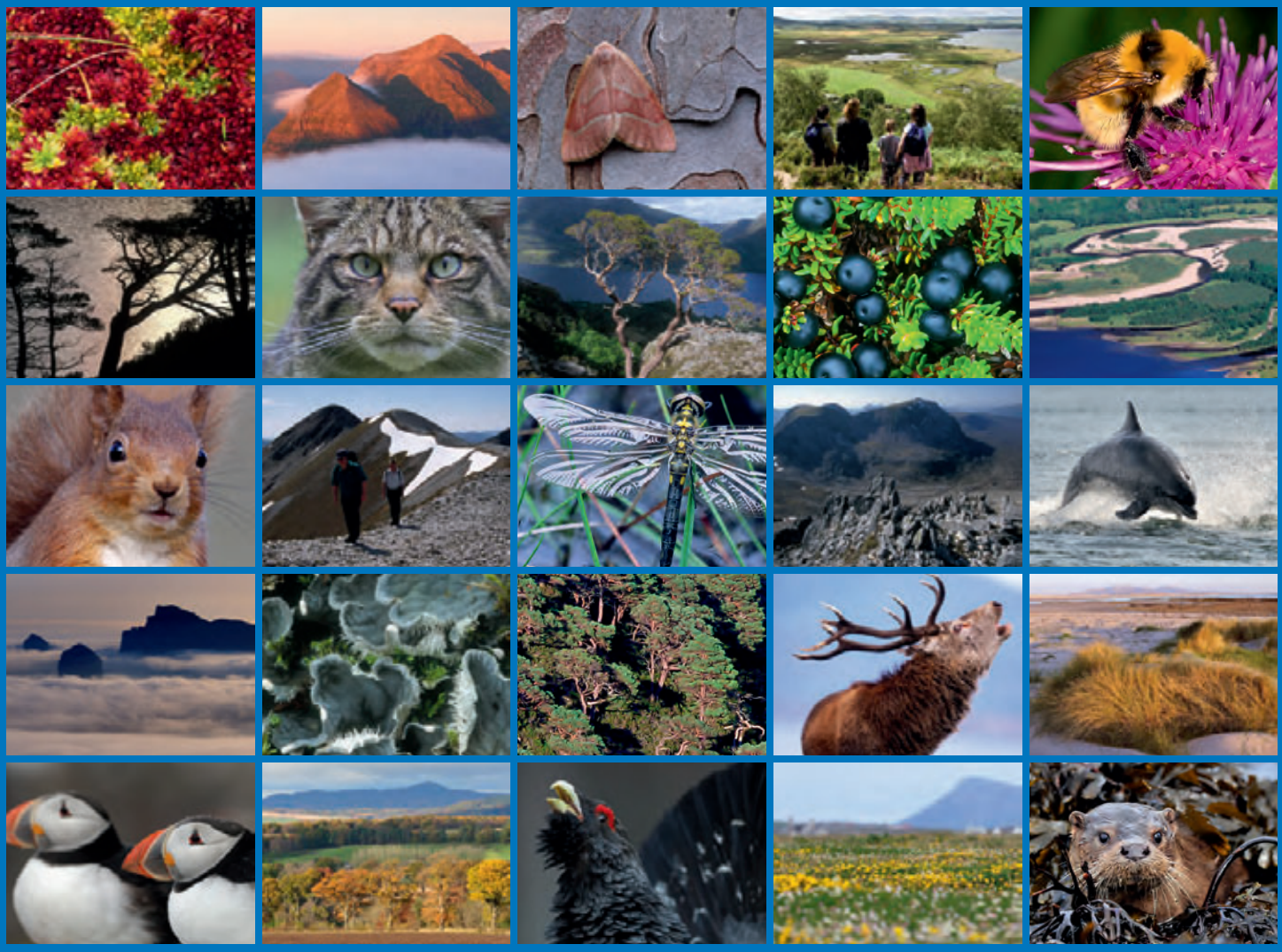
Scottish Natural Heritage
Commissioned Report No. 502

The distribution of selected MPA search features within Lochs Linnhe, Etive and Eil: A broadscale validation survey (Part B)



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COMMISSIONED REPORT

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The distribution of selected MPA search features within Lochs Linnhe, Etive, Leven and Eil: a broadscale validation survey (Part B)

For further information on this report please contact:

Laura Clark
Scottish Natural Heritage
Great Glen House
INVERNESS
IV3 8NW
Telephone: 01463-725237
E-mail: Laura.clark@snh.gov.uk

This report should be quoted as:

Moore, C. G., Harries, D. B. & Trigg, C. (2012). The distribution of selected MPA search features within Lochs Linnhe, Etive, Leven and Eil: a broadscale validation survey (Part B). *Scottish Natural Heritage Commissioned Report No.502.*

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COMMISSIONED REPORT

Summary

The distribution of selected MPA search features within Lochs Linnhe, Etive, Leven and Eil: a broadscale validation survey (Part B)

Commissioned Report No. 502
Contractor: Heriot-Watt University
Year of publication: 2012

Background

Provisions to designate new Marine Protected Areas (MPAs) within Scottish waters were introduced through the Marine (Scotland) Act 2010 and the UK Marine and Coastal Access Act 2009. To help target nature conservation action SNH and JNCC have generated a focused list of habitats and species of importance in Scottish waters - the Priority Marine Features (PMFs). A subset of the PMFs (MPA search features) will drive the identification of Nature Conservation MPAs.

The Loch Linnhe system was identified as an area with numerous historical records of PMFs and MPA search features. The present work is a contribution to a broader programme of assessment of the distribution of PMFs in this area (Nickell *et al.,* 2012*)*. The objective of the Heriot-Watt University component was to validate historical records and to assess the distribution and condition of beds of flame shells (*Limaria hians*), horse mussels (*Modiolus modiolus*), intertidal blue mussels (*Mytilus edulis*) and sea loch egg wrack (*Ascophyllum nodosum* ecad *mackaii*) in Lochs Linnhe, Etive, Leven and Eil. Additional aims included assessment of the current condition of recorded instances of northern sea fan and intertidal tide-swept algal communities.

Main findings

- The presence of a flame shell bed (**SS.SMx.IMx.Lim**) was confirmed in Port Appin Narrows, Loch Linnhe. However, there is strong evidence that the extent of the bed has declined considerably over the last ten years and now represents one of the smaller Scottish beds. Flame shell beds reported historically from off Shuna Island and Rubha an Ridire were not refound in 2011.

- Historical records of six tide-swept horse mussel beds (**SS.SBR.SMus.ModT**) were confirmed in 2011, occurring in Port Appin Narrows, lower Loch Leven and on either side of Annat Narrows at the entrance to Loch Eil. The largest beds were those of Annat Narrows, with a total extent estimated to be of the order of 10 ha. A reported small bed in Port Appin Narrows was not found in 2011.

- The northern sea fan biotope (**CR.HCR.XFa.SwiLgAs**), exhibiting a rich sponge and hydroid fauna, was recorded on steep bedrock off Bernera Island, Lynn of Morvern. This represents only the second record of this biotope within this search area exhibiting the characterising species, *Swiftia pallida.*

- Reported occurrences of intertidal blue mussel beds (**LS.LBR.LMus.Myt.Mx**) in Dunstaffnage Bay (Loch Etive) and on Lochy Flats (Fort William) were validated in 2011. However, the beds were found to be very small in size and the Dunstaffnage bed also exhibited low mussel density and community diversity.

- The present study confirmed the presence of sea loch egg wrack bed patches in Bishop's Bay and at Carness in Loch Leven. The beds exhibited high wrack densities but with total extents of 0.21 ha and 0.16 ha respectively, they can be considered small beds. However, there appears to have been a considerable increase in the size of the Carness bed over the last eleven years.

- Historical records of the presence of tide-swept *Ascophyllum nodosum* biotope (**LR.HLR.FT.AscT**) in the entrance narrows to Loch Eil and Loch Etive were validated for 2011 by the present study, as was the presence of tide-swept *Laminaria digitata* (**IR.MIR.KT.LdigT**) in Loch Eil. In addition, the presence of a tide-swept *Fucus serratus* biotope (**LR.HLR.FT.FserT**) was recognised in Loch Eil in 2011. They are poor examples of their types, in particular displaying poorly developed filter feeding faunas, presumably resulting from lowered salinity conditions.

- Additional PMF records included the presence of *Arctica islandica* at two sites and *Leptometra celtica* at two sites. However, no aggregations of these species were observed. Sublittoral tide-swept algal biotopes (**IR.MIR.KT** and **IR.MIR.KR.LhypTX**) were widely recorded in the narrows at Port Appin and Annat, and in lower Loch Leven.

- The introduced Pacific red alga *Heterosiphonia japonica* was recorded at low density on the Port Appin flame shell bed and on one of the Loch Leven horse mussel beds, where it appeared to be exercising an insignificant ecological impact.

For further information on this project contact:
Laura Clark, **Scottish Natural Heritage, Great Glen House, Inverness IV3 8NW**
Tel: 01463-725237

For further information on the SNH Research & Technical Support Programme contact:
DSU (Policy & Advice Directorate), Scottish Natural Heritage, Great Glen House, Inverness, IV3 8NW**.**
Tel: 01463 725000 or pads@snh.gov.uk

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ACKNOWLEDGEMENTS

We would like to thank the following personnel for contributions to the field work: Rob Cook (HWU), Dr Graham Saunders (Graham Saunders Marine Ecology), Dr Tom Wilding (SAMS) and Morven Carruthers (SNH). Identification of the infaunal component of *Modiolus* clump samples was carried out by Sue Hamilton (22 Bryce Crescent, Currie, Midlothian) with specialist input from Dr Peter Garwood (Identichaet) and Dr Roger Bamber (ARTOO Marine Biology Consultants).

This work was funded by Marine Scotland as part of the Scottish MPA project.

1 INTRODUCTION

Provisions to designate new marine protected areas (MPAs) within Scottish waters were introduced through the Marine (Scotland) Act 2010 and the UK Marine and Coastal Access Act 2009. Scottish Natural Heritage (SNH) has identified the Loch Linnhe system, comprising Loch Linnhe, Loch Don, Loch Etive, Loch a' Choire, Loch Leven and Loch Eil, as a potential MPA search location (Figure 1).

To help target nature conservation action as outlined in the marine nature conservation strategy (Marine Scotland, 2010), SNH and JNCC have generated a focused list of habitats and species of importance in Scottish waters - the Priority Marine Features (PMFs). It is a subset of these biological features (referred to as MPA search features) that will drive the identification of Nature Conservation MPAs (see Moore and James, 2011 for draft list).

Previous marine biological surveys in the area have been reviewed and historical records of PMFs and MPA search features collated by Moore (2011), who identified 55 PMFs (Table 1). A summary of the surveys and a compendium of historical records is provided in Appendix 10. The main aim of the current survey is to validate these historical PMF records and to provide an improved understanding of their distribution and condition.

The 2011 survey work was carried out by a consortium comprising SNH, the Scottish Association for Marine Science (SAMS) and Heriot-Watt University. By means of drop-down video and grab surveying employing the vessels SV *Sir John Murray* and RV *Seol Mara*, a coarse-grained characterisation of search feature distribution throughout the search area was carried out by SAMS (Nickell *et al*., 2012).

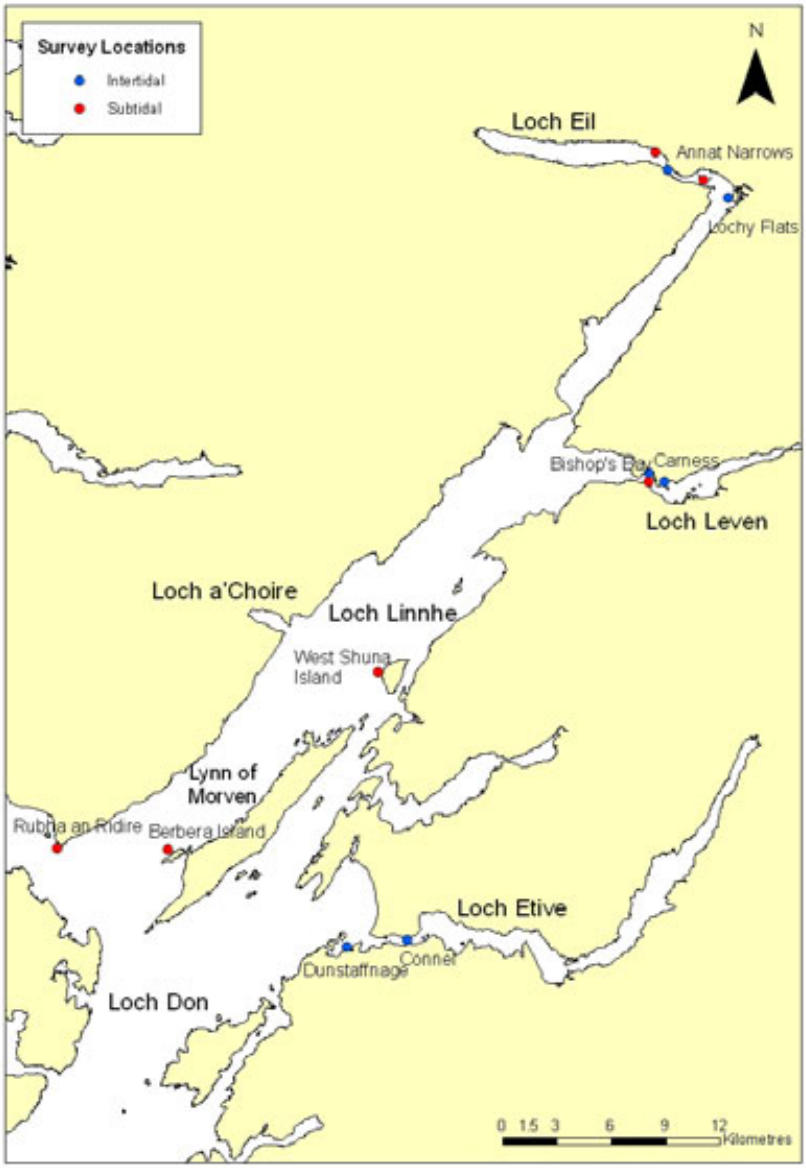
The contribution by Heriot-Watt University and the subject of this report was chiefly to examine discrete beds of specific Priority Marine Features. The objective was to validate historical records and to assess the distribution and condition of beds of flame shells (*Limaria hians*), horse mussels (*Modiolus modiolus*), intertidal blue mussels (*Mytilus edulis*) and sea loch egg wrack (*Ascophyllum nodosum* ecad *mackaii*). Additional aims included assessment of the current condition of recorded instances of northern sea fan and intertidal tide-swept algal communities.

Table 1 PMFs recorded for the survey area, with search feature status (● if present) and code used to abbreviate each habiat and species within this report

Habitat	Code	Search feature
LS.LBR.LMus.Myt	ME	●
LS.LBR.LMus.Myt.Mx	ME	●
IR.LIR.IFaVS.MytRS	ME	●
SS.SMu.CFiMu.SpnMeg	BM	●
SS.SMu.CFiMu.SpnMeg.Fun	BM	●
SS.SMu.CFiMu.MegMax	BM	●
SS.SMx.IMx.Lim	FS	●
SS.SBR.SMus.ModCvar	HM	●
SS.SBR.SMus.ModHAs	HM	●
SS.SBR.SMus.ModT	HM	●
Modiolus bed	HM	●
SS.SMu.CFiMu.BlyrAchi	DM	●
LS.LMu	IM	
LS.LMu.MEst.HedMac	IM	
LS.LMu.MEst.HedMacScr	IM	
LS.LMu.UEst.Hed	IM	
SS.SMp.KSwSS.LsacCho	KS	●
SS.SMp.KSwSS.LsacMxVS	KS	●
SS.SMp.KSwSS.LsacR.Mu	KS	●
SS.SMp.KSwSS.LsacR.Sa	KS	●
IR.LIR.IFaVS	LS	●
IR.LIR.KVS.LsacPhyVS	LS	●
IR.LIR.Lag	LS	
IR.LIR.Lag.FcerEnt	LS	
IR.LIR.Lag.FChoG	LS	
SS.SMu.SMuLS	LS	
CR.HCR.XFa.SwiLgAs	NS	●
LS.LMp.LSgr.Znol	SG	●
SS.SMp.SSgr.Rup	SG	●
LR.LLR.FVS.Ascmac	SL	●
LR.HLR.FT.AscT	TS	●
IR.MIR.KT.LdigT	TS	●
IR.MIR.KT.XKT	TS	●
IR.MIR.KT.XKTX	TS	●
IR.MIR.KR.LhypTX.Ft	TS	●

Species	Code	Search feature
Funiculina quadrangularis	FQ	●
Pachycerianthus multiplicatus	PM	●
Alcyonium hibernicum	AH	
Swiftia pallida	SP	●
Arctica islandica	AI	●
Glossus humanus	GH	●
Leptometra celtica	LC	●
Palinurus elephas	PE	●
Anguilla anguilla	AA	
Cetorhinus maximus	CM	●
Dipturus batis	DB	●
Pollachius virens juv?	PV	
Gadus morhua	GM	
Molva molva	MM	
Pomatoschistus minutus	PO	
Salmo trutta	ST	
Cepphus grylle	CG	●
Halichoerus grypus	HG	
Phoca vitulina	PH	
Lutra lutra	LL	

Figure 1 MPA search area showing locations surveyed in the current study



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2 METHODS

2.1 Drop-down video

Drop-down video was deployed from RV *Serpula* at 38 sites (Figures 2 – 6), principally as a component of the localised surveys of flame shell and horse mussel (Section 2.2). Several additional sites were worked in upper Loch Linnhe and Loch Eil as a contribution to the major video survey of the search area being undertaken by SV *Sir John Murray* and RV *Seol Mara*. Such sites were either too shallow for *Sir John Murray*, or too distant from the main *Seol Mara* survey area. In this report all *Serpula* video sites are given the prefix 'S' and *Seol Mara* sites the prefix 'M'.

The video system used consisted of a Panasonic NV-GS150 three chip digital video camera within a Seapro housing held within a frame, illuminated by twin 100 watt lamps. A 100 m umbilical cable carried the video signal to a Sony Video Walkman for real-time observation and for recording on miniDV tape. At each station the camera was deployed from a drifting vessel for several minutes, noting the times, depths and precise positions at the start and end of the drift using differential GPS (dGPS). These data, as well as brief notes on substrates and biota, were entered onto a *pro forma* (Appendix 1). In addition dGPS positional data and time, updated every second, were streamed to a video overlay system for display on the captured video, with positional, time and depth data also logged by computer every two seconds. This was to facilitate subsequent splitting of the run into different biotope sectors, where necessary.

The video material from each station was processed in the laboratory, with notes being taken on the substrate and the biota present, where possible employing the SACFOR scale of abundance. Biotopes were allocated based on the classification scheme of Connor *et al.* (2004). Stations were also categorized according to the PMFs/MPA search features present.

Where possible, depths were related to chart datum by determination of the tidal rise at the appropriate secondary port using TotalTide software (Hydrographic Office, Taunton). The secondary ports of Port Appin and Corpach were used for the Port Appin and upper Loch Linnhe areas respectively. In Loch Leven tides are delayed by approximately 45 minutes from the time at Oban (Admiralty, 2011). Tidal height data are unavailable for Loch Leven and the restricted entrance to Loch Leven is believed to cause some reduction in the tidal range inside the loch (Lawrence, 1990). Approximate rise values were derived for the loch based on the port of Oban +45 minutes. Oban was chosen rather than the nearest secondary port of Corran Narrows, as the latter has a greater tidal range. Tidal times are published for the head of Loch Eil but not heights (Admiralty, 2011). Consequently, tidal rise in the loch was approximated by use of the standard Admiralty graphical method (Admiralty, 2011) employing time data for Loch Eil Head and height data for Corpach.

All depths given in this report are depths below chart datum. All positions utilise the WGS84 datum.

2.2 Localised surveys

Detailed surveys were carried out at a number of sites to assess the distribution, extent and condition of certain MPA search features, namely flame shell, horse mussel, blue mussel and sea loch egg wrack beds. Sites of historical records for northern sea fan and tide-swept algal communities were also assessed for current condition. The methods used at each site are summarised in Table 2.

Table 2 Summary of methods employed for localised surveys of MPA search features

Location	Date	PMF target	MNCR phase 2 site	Samples	Video sites	Dive sites	Boundary mapping	Littoral density survey
Port Appin Narrows, Loch Linnhe	19-21 Aug 2011 25 Aug 2011	Flame shell bed, horse mussel bed	FS01, HM03	4 *Modiolus* clumps	15	41		
West Shuna Island, Loch Linnhe	19 Aug 2011	Flame shell bed				7		
Rubha an Ridire Lynn of Morvern	21 Aug 2011	Flame shell bed				2		
Lower Loch Leven	22 Aug 2011	Horse mussel beds	HM01	4 *Modiolus* clumps	14	9		
Annat Narrows, Lochs Eil and Linnhe	23-24 Aug 2011	Horse mussel beds	HM02	4 *Modiolus* clumps	14	7		
Bernera Island, Lynn of Morvern	21 Aug 2011	Northern sea fan and sponge communities	NS01			1		
Dunstaffnage, Loch Etive	29 Aug 2011	Blue mussel bed	ME01				√	√
Lochy Flats, Loch Linnhe	30 Aug 2011	Blue mussel bed	ME02				√	√
Bishop's Bay, Loch Leven	31 Aug 2011	Sea loch egg wrack bed	SL01				√	√
Carness, Loch Leven	01 Sep 2011	Sea loch egg wrack bed	SL02				√	√
Annat Narrows W, Loch Eil	03 Aug 2011	Tide-swept algal communities	TS01				√	
Connel, Loch Etive	18 Jun 2011 14 Sep 2011	Tide-swept algal communities	TS02				√	

2.2.1 Port Appin Narrows, Loch Linnhe (flame shell, horse musssel beds)

2.2.1.1 Video survey

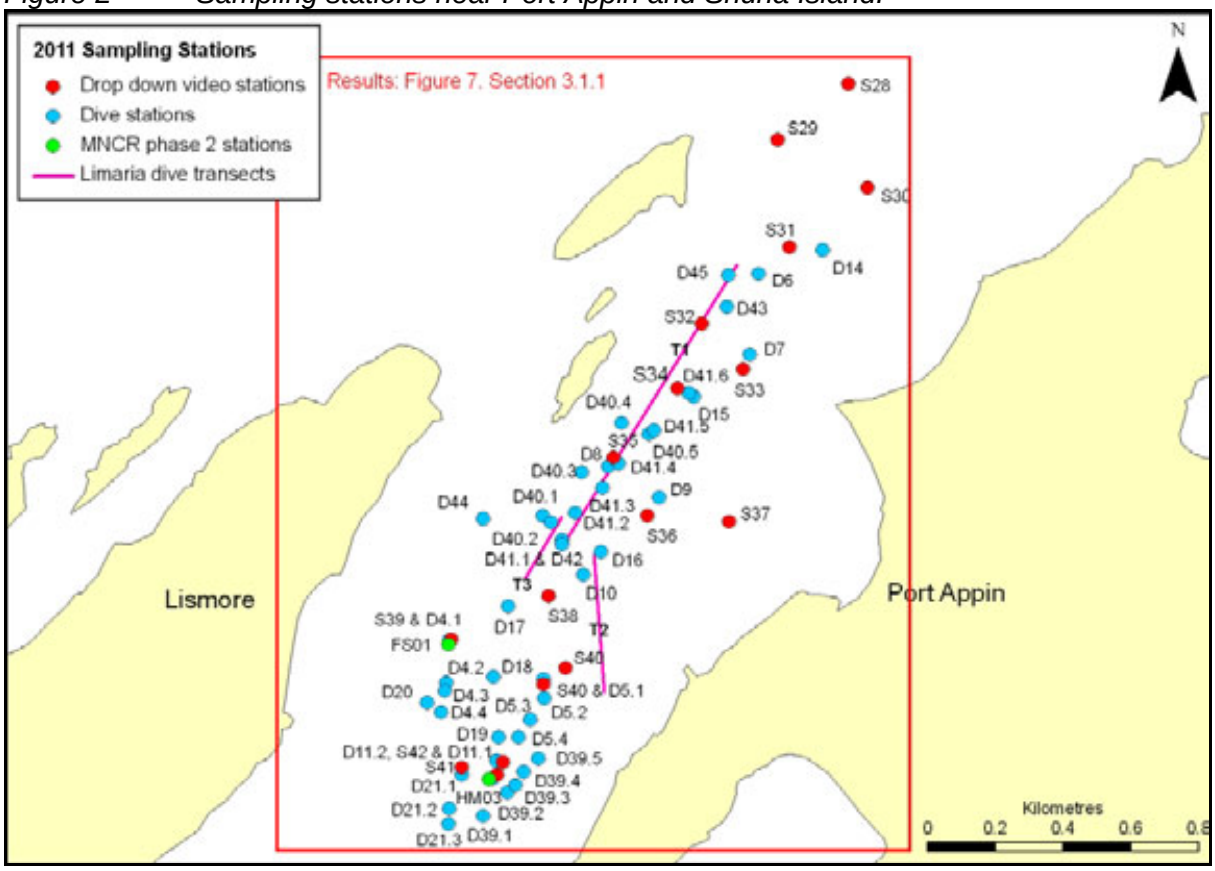
Fifteen drop-down video runs were carried out from RV *Serpula* to assess the distribution of both the *Limaria* and *Modiolus* beds. Site locations are shown in Figure 2 and locational details provided in Table 2.1 (Appendix 2).

2.2.1.2 Dive survey

Dives were carried out at a further 41 sites to provide more detailed information on *Limaria* and *Modiolus* distribution (Figure 2; Appendix 3: Table3.1). At each station, the position was fixed by the surface team obtaining a dGPS fix on the diver surface marker buoy, following a signal from the diver. The diver used a *pro forma* (Appendix 1) to record the following data at each station within an area of approximately 5 x 5 m:

- depth
- percentage coverage by *Limaria* nest material
- mean *Limaria* nest thickness
- visible presence of *Limaria* individuals
- SACFOR estimate of *Modiolus* abundance
- sediment type
- comments

Figure 2 Sampling stations near Port Appin and Shuna Island.



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Generally the diver swam or drifted in one direction. The number of sites examined per dive varied from 1 to 5 and distances covered from c. 50 m to 500 m, with stations worked on all patches of *Limaria* or *Modiolus* observed, in addition to intervening bare patches.

2.2.1.3 MNCR phase 2 survey

To characterise and assess the condition of *Limaria* and *Modiolus* beds revealed by the previous surveys, a diver phase 2 survey was carried out in a representative area of the *Limaria* bed and the *Modiolus* bed (Figure 2). Location data are provided in Appendix 4. The site was marked with a shot line for the duration of the survey and the dGPS position of the line recorded. A 25 m tape transect line was marked out on the seabed by running out a measuring tape from the base of the shot line. The bearing of the tape from the shot was noted and the depth at both ends of the tape recorded. A band 2 m either side of the tape was surveyed by two divers, who noted the presence, and where possible, estimated the abundance of conspicuous biota, collecting material which needed to be identified in the laboratory. To supplement the real-time visual records and collections, the transect band was videoed using a hand-held digital video camera (Sony HD Model XR550) and still photographs taken of the habitat and associated community using two digital still cameras (Canon 400D with 14 mm wide-angle lens and Nikon D300 with 90 mm macro lens).

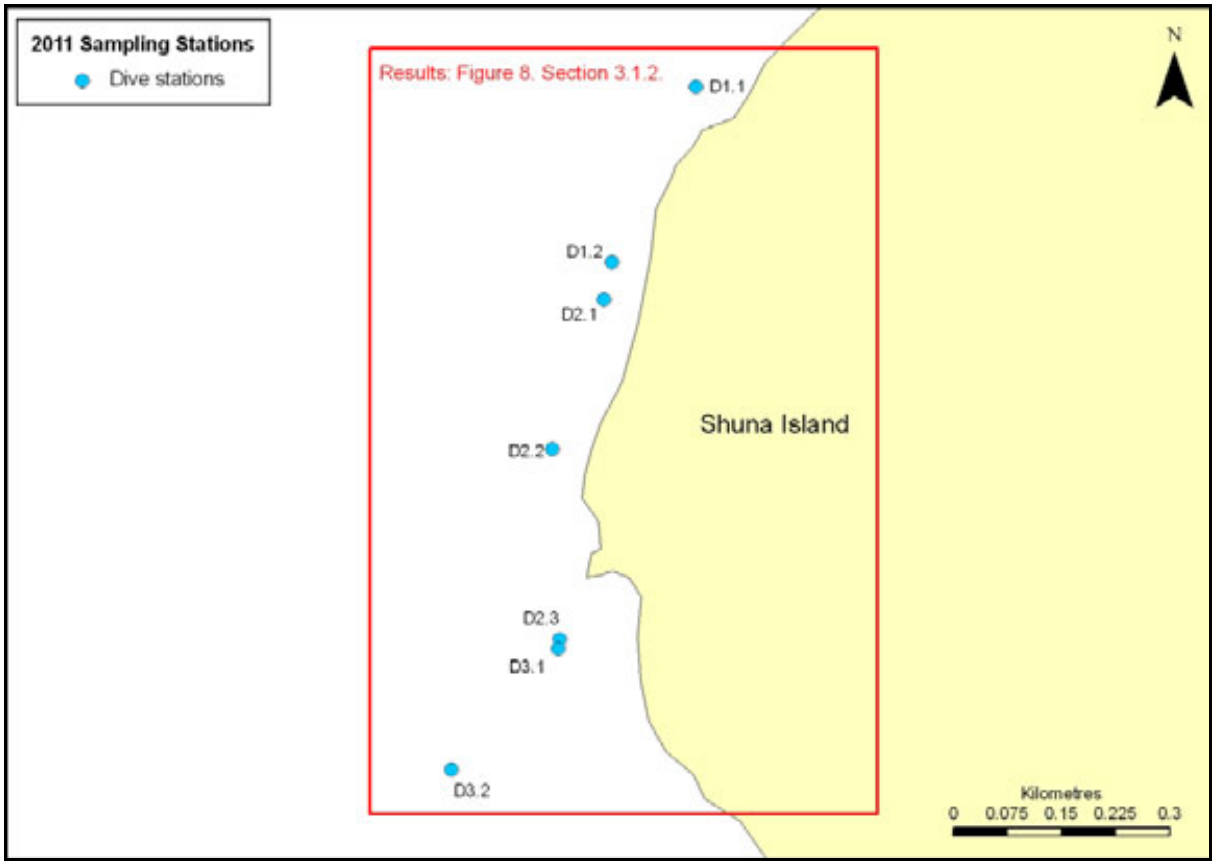
Semiquantitative data on the epifauna and infauna of the *Modiolus* bed was acquired by collecting four replicate clumps of *Modiolus* from within the transect band. A diver carefully removed each clump, whose size just enabled it to be placed into a 5 litre bucket. The bucket was sealed with a lid before transport to the surface. In the laboratory the volume of the clump was determined by displacement and the associated fauna and flora retained on a 0.5 mm mesh sieve counted and identified.

The diver species records and those derived from the study of the collected biota, video footage and still photographs were collated to produce a species list for the transect band with, where possible, SACFOR abundance estimates. Based on the physical and biological data collected, a biotope was subsequently allocated using Connor *et al.* (2004).

2.2.2 West Shuna Island, Loch Linnhe (flame shell bed)

Connor (1990) recorded the presence of a *Limaria* bed midway along the western coastline of Shuna Island at depths of 6.0 - 10.2 m. In 2011 a 1.07 km stretch of this coastline, passing through Connor's site and representing the most current-exposed region of the coast, was surveyed by diver (Figure 3). The diver zigzagged along the coast between a depth range of c. 5 - 12 m searching for *Limaria*, with subsequent divers commencing the search close to the exit point of the previous diver. At intervals (position fixed by the vessel following diver signalling using the surface marker buoy) the diver recorded data on *Limaria*, *Modiolus* and the habitat using the *pro forma* described above in Section 2.2.1.2. Divers were also tasked to assess the width and depth limits of any *Limaria* band encountered, although none was found. Figure 3 shows the locations of diver records with positions also provided in Table 3.1 (Appendix 3).

Figure 3 Sampling stations near west of Shuna island



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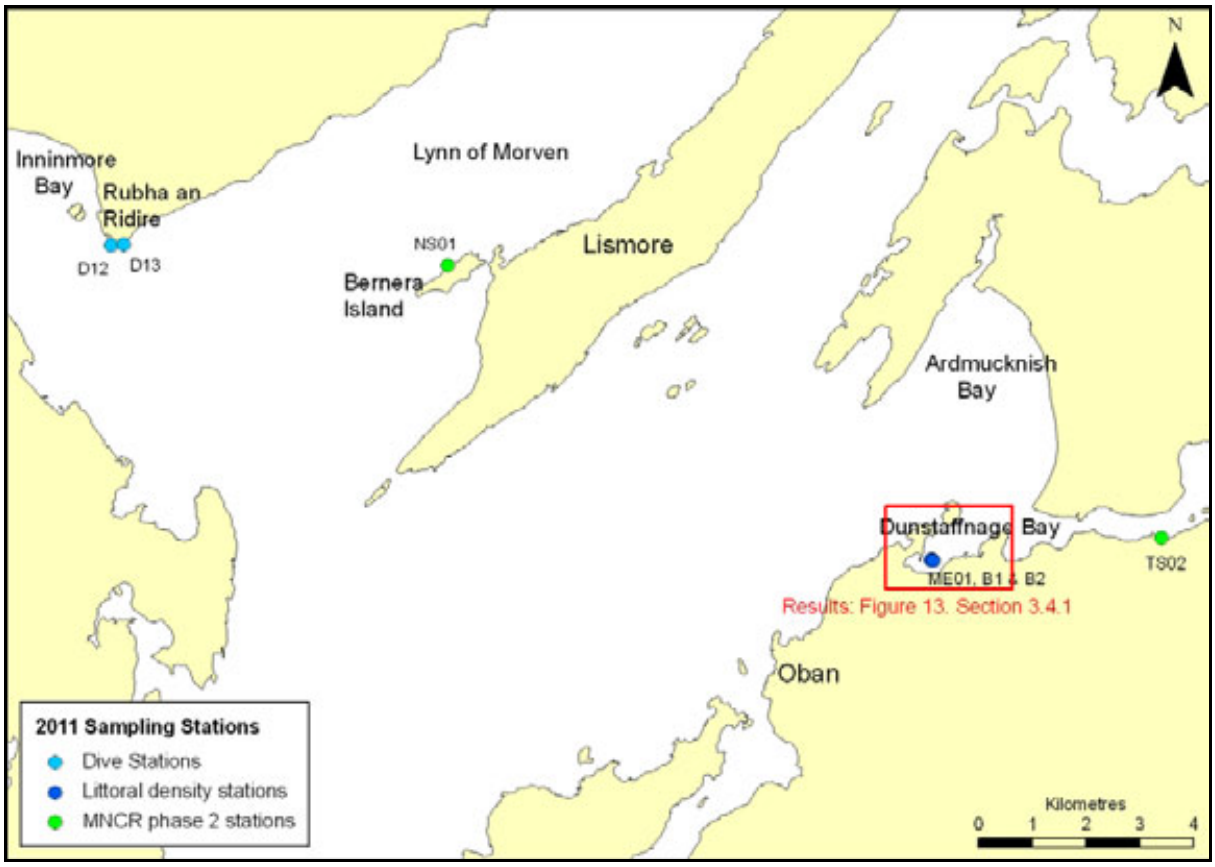
2.2.3 Rubha an Ridire, Lynn of Morvern (flame shell bed)

An area off Rubha an Ridire at the eastern entrance to the Sound of Mull where there are historical records of the presence of a *Limaria* bed at 15 - 18 m (Connor, 1990) and scattered Limaria at 20 - 25 m (unpublished Seasearch records, 2008) was surveyed by the *Sir John Murray* using an ROV. In view of the potential difficulty in identification of the *Limaria* nest habitat from ROV footage, divers also carried out a search for *Limaria* and for any other PMFs at the two recorded sites (Figure 4; Appendix 3: Table 3.1).

Figure 4 Sampling stations near Inninmore Bay, Bernera Island and Dunstaffnage.



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2.2.4 Lower Loch Leven (horse mussel beds)

2.2.4.1 Video survey

Fourteen drop-down video runs were carried out from RV *Serpula* at two recorded locations of horse mussel beds (Davies, 1991), at the eastern entrance to Ballachulish Narrows and southeast of Rubha Charnuis, following the procedures outlined in Section 2.1. Site locations are shown in Figure 5 and locational details provided in Table 2.1 (Appendix 2).

2.2.4.2 Dive survey

Positional information for all dive sites is supplied in Figure 5 and Table 3.1 (Appendix 3).

Single dives were carried out at the above two video survey locations to supplement SACFOR estimates of *Modiolus* abundance obtained from the video surveys (sites D24 and D25).

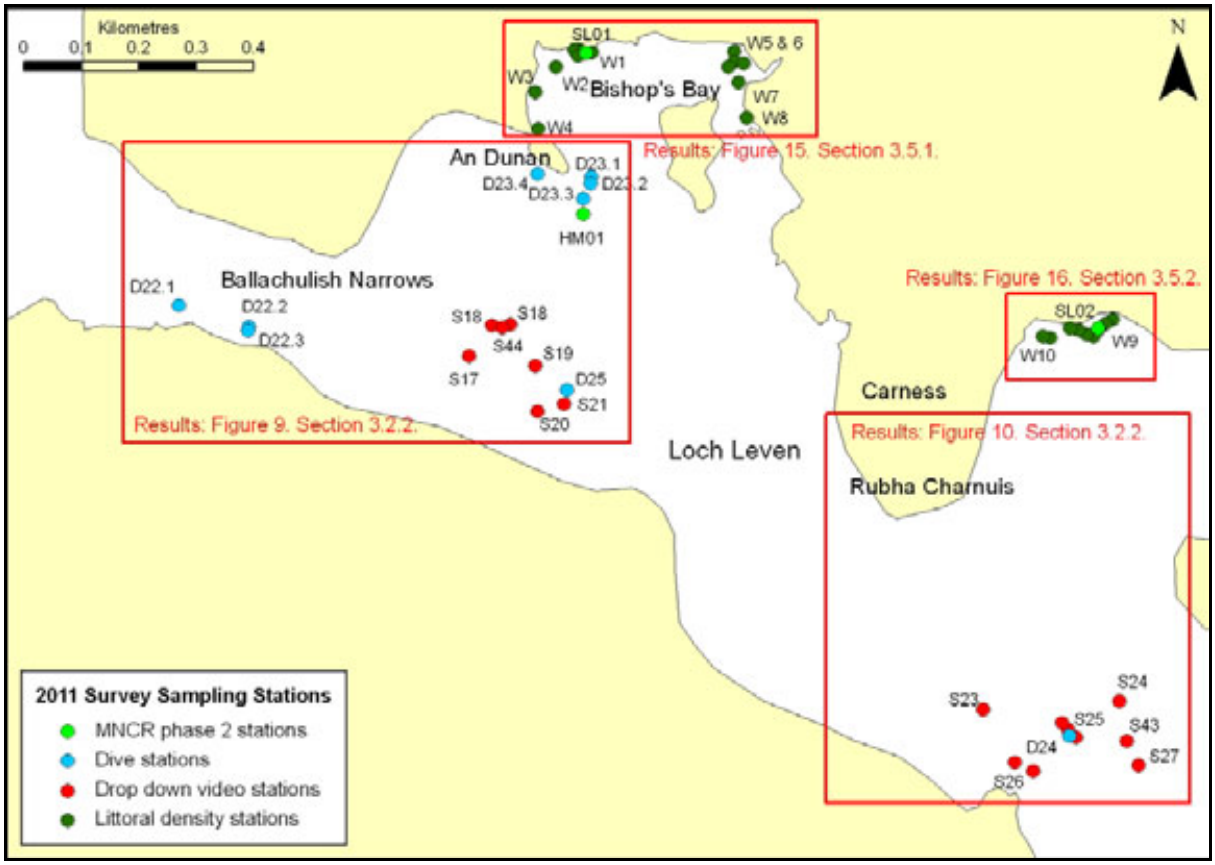
A dive search was performed to the south of the island An Dunan in a previously recorded *Modiolus* bed location (Davies, 1991). The diver attempted to determine the boundary of the bed, recording habitat, *Modiolus* and *Limaria* data using the *pro forma* described above (Section 2.2.1.2), at four sites (D23.1-4, Figure 5), with positions fixed by the covering vessel, following diver signalling of the surface marker buoy.

A dive was also carried out at the site of a record of the presence of clumps of *Modiolus* in the sublittoral fringe on the south side of Ballachulish Narrows (Smith, 1981) (Figure 5). The diver zigzagged along the coast between depths of c. 0 - 6 m searching for *Modiolus*. The diver's position was recorded by the covering vessel at three stations, including the start and end of the dive, where SACFOR abundance estimates were also obtained.

2.2.4.3 MNCR phase 2 survey

A diver MNCR phase 2 survey was carried out on the An Dunan *Modiolus* bed (site HM01, Figure 5) employing the methodology outlined in Section 2.2.1.3 for the Port Appin *Modiolus* bed. Location data are provided in Table 4.1 (Appendix 4).

Figure 5 Sampling stations within Loch Eil and Loch Leven.



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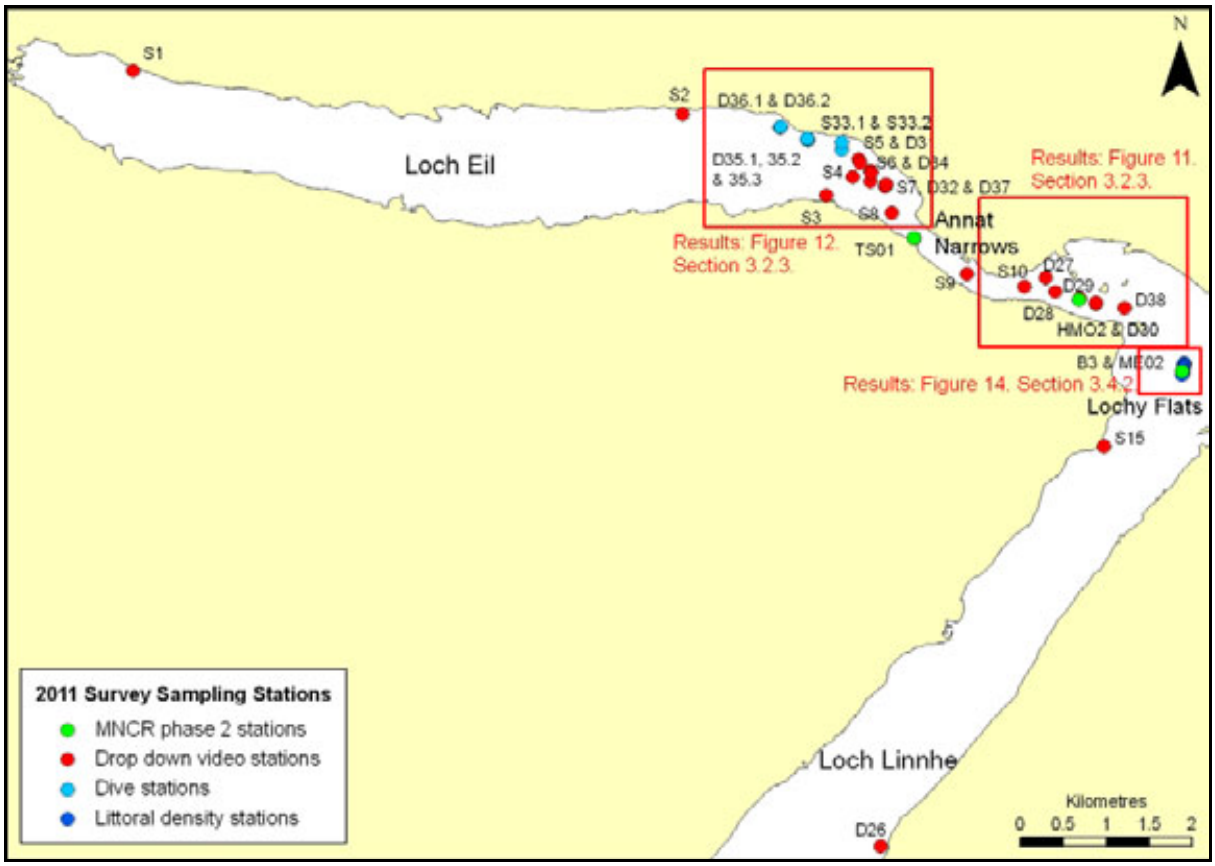
2.2.5 Annat Narrows, Lochs Eil and Linnhe (Modiolus beds)

2.2.5.1 Video survey

Areas of recorded *Modiolus* beds to the east and west of Annat Narrows (Connor, 1990) were surveyed at a total of five drop-down and nine diver video sites (Figure 6). Diver video largely replaced drop-down video to the east of the narrows to permit work in both areas to take place over the same slack water period. Diver video also supplemented drop-down video in the western area (i.e. Loch Eil) in an attempt to provide higher quality imagery. The same data were collected for both methods, as described in Section 2.1, except that no positional overlay system could be used on the diver video footage, and track data, apart from start and end of runs, was not available for the diver video. Site locations are provided in Table 2.1 (Appendix 2).

Figure 6 Sampling stations within Loch Eil and Loch Linnhe.



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2.2.5.2 Dive survey

In order to assess the western extent of the Loch Eil *Modiolus* bed, diver records were taken at a total of seven sites along three slope transects (D33.x, D35.x and D36.x, Figure 6), with the diver recording *Modiolus* SACFOR abundance and taking notes on the community present and substrate type. At each site positions were determined by the covering vessel (Figure 6, Appendix 3: Table 3.1).

2.2.5.3 MNCR phase 2 survey

A diver MNCR phase 2 survey was carried out on the bed to the east of Annat Narrows (site HM02, Figure 6) employing the methodology outlined in Section 2.2.1.3 for the Port Appin *Modiolus* bed. Location data are provided in Table 4.1 (Appendix 4).

2.2.6 Bernera Island, Lynn of Morvern (Northen sea fan and sponge community)

An MNCR phase 2 dive survey was performed at site NS01 midway along the north-west-facing coastline of the island along a very steep rock slope, vertical in places (Figure 4; Appendix 4: Table 4.1). Due to the nature of the shore and sublittoral topography no transect tape was deployed. Instead the survey was carried out within a band of around 4 m width extending from the upper limit of distribution of *Swiftia pallida* (19.9 m) to 26.9 m (i.e. 30 m below sea level). Methodology otherwise followed that described in Section 2.2.1.3 for the *Limaria* bed transect.

2.2.7 Dunstaffnage Bay, Loch Etive and Lochy Flats, Loch Linnhe (blue mussel beds)

Following preliminary work to locate the areas of mussel bed in Dunstaffnage Bay (Figure 4) and Lochy Flats (Figure 6), the beds were mapped by taking dGPS positions at frequent intervals around the margin. A mussel density of at least common on the SACFOR scale was regarded as representing the mussel bed habitat. At a number of sites spread evenly over each bed the position was recorded and observations made within an area of c. 2 x 2 m (Appendix 5, Table 5.2). Mussel density was assessed as percentage cover and SACFOR abundance, fucoid cover was assessed as percentage cover by the component species, substrate type was noted and digital still photographs taken to characterise the habitat using a Pentax Optio W10 camera. Bed extent was subsequently measured by determination of the area of polygons within ArcGIS 9.3. Intertidal height of the beds was measured by levelling from the water's edge using a Bosch GLM80 laser rangefinder/inclinometer. The height of the centre of the main Dunstaffnage bed (approximately that for the entire habitat) was measured and the upper and lower margins of the Lochy Flats bed.

An MNCR phase 2 survey was carried out at both locations within an area of approximately 5 x 5 m near the centre of the bed (sites ME01 and ME02, Figures 6 and 4). See Table 4.1 (Appendix 4) for location data. The substrate type and presence of conspicuous biota was noted, together with SACFOR estimates of abundance where possible, collecting material which needed to be identified in the laboratory. Photographs were taken to characterise the habitat.

2.2.8 Bishop's Bay and Carness, Loch Leven (sea loch egg wrack beds)

Beds at these sites were distinct and were mapped by taking dGPS positions at frequent intervals around the margin. Within the mapped boundary *A.nodosum* ecad *mackaii* coverage was at least 50%. At a number of sites spread evenly over each bed the position was recorded and observations made within an area of c. 4 x 4 m (Figure 5; Appendix 6: Table 6.2). *A.nodosum* ecad *mackaii* density was assessed as percentage cover and mean bed thickness measured using a ruler. Fucoid cover was assessed as percentage cover by the component species, substrate type was noted and digital still photographs taken to characterise the habitat using a Pentax Optio W10 camera. Bed extent was subsequently measured by determination of the area of polygons within ArcGIS 9.3. The tidal characteristics of Loch Leven are too imperfectly known for worthwhile intertidal levelling to chart datum. Some indication of bed height was obtained in relation to the characteristic fucoid zonation nearby and the low water line.

An MNCR phase 2 survey was performed within an area of c. 5 x 5 m near the centre of the largest beds at each location (sites SL01 and SL02, Figure 5). See Table 4.1 (Appendix 4) for location data. Methodology followed that for the blue mussel beds (Section 2.2.7).

2.2.9 Annat Narrows W, Loch Eil and Connel, Loch Etive (intertidal tide-swept algal communities)

MNCR phase 2 surveys were carried out at both sites within a 4 m wide band passing down the shore. Only zones displaying tide-swept communities were surveyed. This involved *Laminaria digitata*, *Fucus serratus* and *Ascophyllum nodosum* zones at Annat Narrows (site TS01, Figure 6) and *A. nodosum* at Connel (site TS02, Figure 4). See Table 4.1 (Appendix 4) for location data. Methodology followed that for the blue mussel beds (Section 2.2.7) except that photography employed a Canon Eos 60D camera. Upper and lower zone boundaries were levelled to the water's edge using a Bosch GLM80 laser rangefinder/inclinometer and their positions determined by dGPS. At each site a 25 ml water sample was collected at the water's edge near the time of low tide for salinity determination by refractometer.

3 RESULTS

3.1 Flame shell beds

3.1.1 Port Appin Narrows, Loch Linnhe

3.1.1.1 MNCR phase 2 survey (FS01)

This was carried out at a depth of 11.2 -11.7 m within a 25 x 4 m band at a site to the west of Port Appin, representing one of the densest areas of *Limaria hians* encountered (Figure 7). The mixed substrate consisted of coarse sand with 20% pebbles, 10% gravel and scattered cobbles and small boulders. The stones were bound by the byssal threads of abundant *Limaria hians* forming a turf covering 80% of the sea bed (**SS.SMx.IMx.Lim**). This consolidated turf formed a substrate for a thin kelp forest, predominantly composed of *Laminaria hyperborea*, with a profuse red algal understorey attached to the pebbles and *Limaria* nest material, with superabundant *Plocamium cartilagineum* and occasional *Delesseria sanguinea*. The red algal stipe community included *Cryptopleura ramosa* epiphytised by sparse *Heterosiphonia japonica*. Dominant members of the motile fauna included *Necora puber* and *Asterias rubens* (common) and *Carcinus maenas* and *Pagurus bernhardus* (frequent). Full details of the biota are provided in Table 4.2 (Appendix 4).

3.1.1.2 Video and dive surveys

A total of 15 video runs were completed in this area, designed to assess the distribution of both the flame shell bed and the presence of two *Modiolus* beds (Figure 7). Dives were carried out at a further 41 sites to provide more detailed information on *Limaria* and *Modiolus* presence. See Section 2.2.1 for further details of the methodology.

The detailed results of the surveys are given in Appendix 2 (video) and Appendix 3 (diver). They are collated and summarised here.

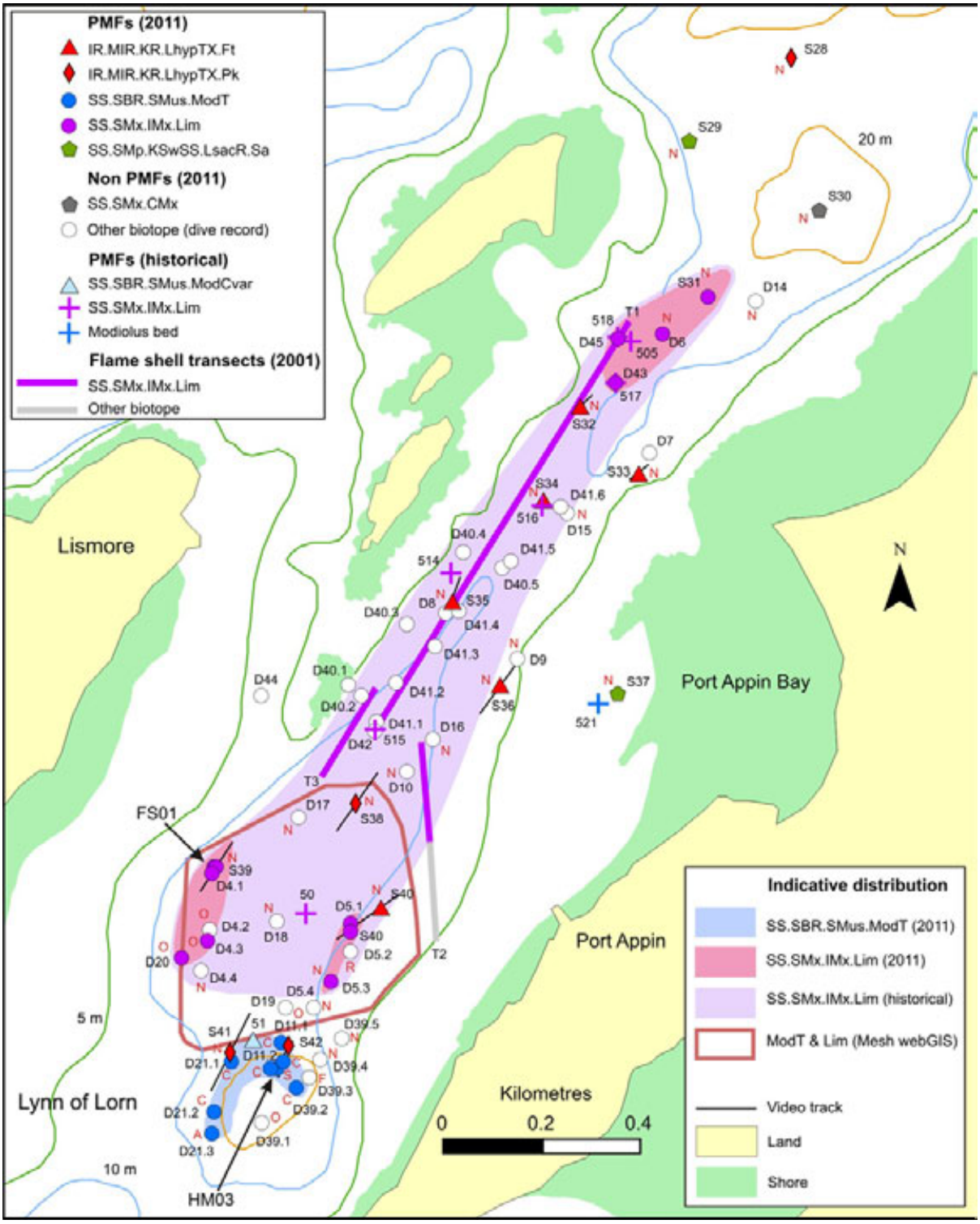
The sediment throughout the channel was generally a mixed substrate of coarse gravelly sand or shell gravel with a cover of pebbles, often dense, and scattered cobbles and occasional boulders. At the southernmost sites a muddy sediment was overlain by a veneer of shell gravel.

The flame shell biotope, **SS.SMx.IMx.Lim**, was only recorded at depths of 8.7 - 12.5 m at the northern and southern ends of the channel, separated by a distance of 1.4 km. Where nest material was observed, it covered 40 - 80% of the sea bed, although coverage was patchy, with the presence of some extensive bare areas. The flame shell biotope was generally very similar to that described for the MNCR phase 2 site (FS01) with a kelp forest or park dominated by *Laminaria hyperborea* with a profuse red algal understorey dominated by *Plocamium cartilagineum*. Delineation of the known *Limaria* patches produces a total estimate of extent of the biotope of the order of 3 ha.

Most of the surveyed area consisted of mixed coarse sand or gravelly sediments with dense pebbles and scattered cobbles and boulders, similar to that of the *Limaria* patches. From around 5 - 12 m depth the stones supported a forest of *Laminaria hyperborea*, with occasional *Saccharina latissima*, with the *L. hyperborea* stipes heavily epiphytised by red algae. A patchy red algal understorey was less well-developed than that of the *Limaria* bed and was generally dominated by *Plocamium cartilagineum*, with other conspicuous elements including *Delesseria sanguinea*, *Callophyllis laciniata* and *Dictyota dichotoma* (**IR.MIR.KR.LhypTX.Ft**). From around 12 - 15 m the forest thinned to a park of frequent *L. hyperborea* with many of the fronds densely coated with *Obelia geniculata*. The algal

understorey appeared generally similar to that of the kelp forest (**IR.MIR.KR.LhypTX.Pk**). Both of these tide-swept kelp biotopes are MPA search features.

Figure 7 *Distribution of PMF/MPA search feature biotope records from video and dive surveys in 2011 in Port Appin Narrows, with resultant indicative mapping of* Limaria *and* Modiolus *beds.* Modiolus *SACFOR abundances in red (N = not present). Also shown are previous PMF/MPA search feature biotope records and mapping, with numbered labels referring to site codes used in Appendix 10*



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In areas subject to reduced tidal streams at the northern and eastern fringes of the surveyed area *Laminaria hyperborea* was replaced by frequent-common *Saccharina latissima* on a substrate of slightly silty or gravelly sand (**SS.SMp.KSwSS.LsacR.Sa**) – a sub-biotope of the MPA search feature kelp and seaweed communities on sublittoral sediment.

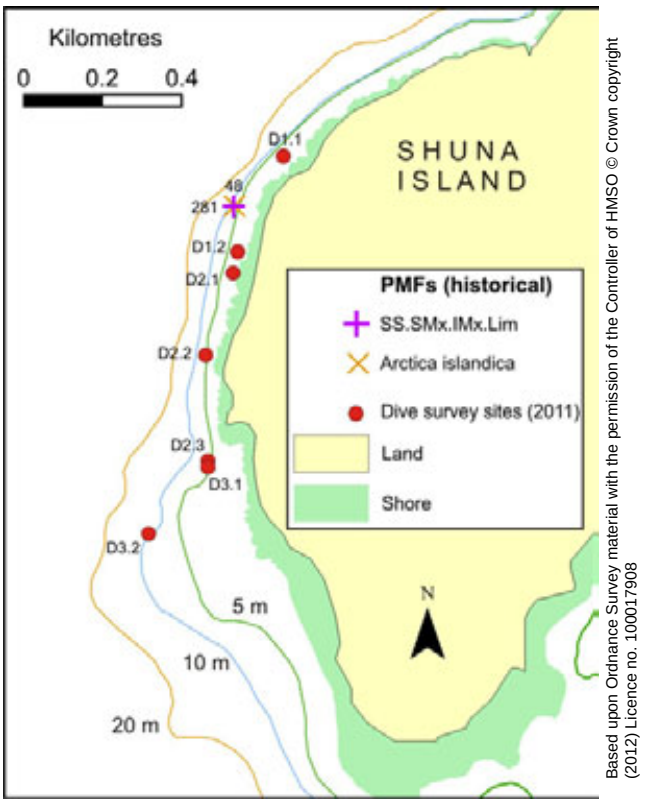
A *Modiolus* bed was recorded at the southern extremity of the surveyed area and this is described in Section 3.2.1.

Figure 7 permits a comparison of the 2011 distribution of the *Limaria* habitat with historical records. Connor (1990) provided the first record for the area of a dense bed of *Limaria* west of Port Appin close to the southern *Limaria* patches recorded in 2011, although the precise location of the site is unknown. All other records date from the last 10 years. In 2001 *Limaria* nest density was observed by diver along three transects covering much of the area surveyed in 2011 (Figure 7, T1 - T3) (Moore, unpublished; see Table 10.5, Appendix 10). Along T1 the diver noted a thick and topographically complex nest layer (c. 100% cover) over most of the ground covered, although with some large bare patches. Uprooted kelp plants were common. Along T2 nest cover increased from 10% at 7.8 m to c. 100% at 10.3 m, whilst at T3 nest cover increased from c.50% at 1.8 m to c.80% at 11.8 m. Subsequent observations by Heriot-Watt University divers have substantiated the widespread distribution of the *Limaria* habitat: in 2003 (O'Malley, 2004), 2004-5 (Forrest, 2005) and 2006 (Trigg and Moore, 2009; Trigg *et al*., 2011). Figure 7 includes a polygon delimiting all recorded observations of the *Limaria* biotope which equates to an area of 40 ha. A higher sampling intensity, particularly at the northern and southern ends of the 2011 survey area may have led to a significant increase in the 2011 extent estimate of 3 ha, but it appears that the habitat has disappeared over much of its previous range.

3.1.2 West Shuna Island, Loch Linnhe

The diver search of this area (Figure 8), where Connor (1990) reported the presence of a *Limaria* bed on muddy shell gravel at a depth of 6.0 - 10.2 m in 1989, failed to reveal such a bed. Shell gravel overlying mud was noted at this depth in 2011 but no *Limaria* were observed, nor were any other PMFs. *Modiolus modiolus* was present at low density. Details of diver observations are provided in Appendix 3 (sites D1.x - D3.x, Table 3.1)

Figure 8 *Locations of diver recording stations for* Limaria *and* Modiolus *density during three dives (D1-D3) off Shuna Island. The search continued between stations. Also shown are previous PMF/MPA search feature records, with numbered labels referring to site codes used in Appendix 10*



3.1.3 Rubha an Ridire, Lynn of Morvern

The two recorded sites for *Limaria* (Connor, 1990; Seasearch 2008 record in Marine Recorder) were searched by diver (Figure 4). No *Limaria* was observed at either site (viz. D13 and D12 - Table 3.1, Appendix 3), although the PMF, *Leptometra celtica*, was noted at the western site, D12.

3.2 Horse mussel beds

3.2.1 Port Appin, Loch Linnhe

3.2.1.1 MNCR phase 2 survey (HM03)

This was carried out at a depth of 19.5 - 20.4 m within a 25 x 4 m band at a site to the southwest of Port Appin on the northern margin of a small 27 m deep basin (Figure 7).

The substrate consisted of slightly silty shell gravel with around 60% coverage of dead *Modiolus* shell material. Live *Modiolus modiolus* was common overall but abundant in patches and the *Modiolus* shells supported a short hydroid turf (around 10 - 20% cover), frequent saddle oysters, occasional *Alcyonium digitatum* and fairly sparse barnacles and serpulid worms. Sponges were very sparse, in the form of *Myxilla incrustans*? and the shell-boring stage of *Cliona celata*. The motile fauna was dominated by galatheids, with *Galathea intermedia* common and *Munida rugosa* and *Galathea* sp. frequent, and echinoderms, with frequent *Echinus esculentus*, *Crossaster papposus* and *Asterias rubens*. The decapod fauna included occasional *Necora puber* and *Liocarcinus depurator*. Full details of the biota

are provided in Table 4.2 (Appendix 4). The overall visual impression was of a site with only moderate diversity. However, laboratory analysis of the *Modiolus* clump samples revealed a rich fauna with a total of 247 taxa recorded, with replicate clumps supporting 133 - 137 taxa (Appendix 4, Table 4.4). The location of the site and substrate type indicates that the area is likely to experience moderately strong tidal currents and the bed has been ascribed to **SS.SBR.SMus.ModT**.

3.2.1.2 Video and dive surveys

The Port Appin narrows area was covered by 15 video runs, designed to assess the distribution of both *Modiolus* and flame shell beds (Figure 7), with SACFOR abundance records taken for *Modiolus* at a further 30 dive sites. See Section 2.2.1 for further details of the methodology).

The detailed results of the surveys are given in Appendix 2 (video) and Appendix 3 (diver). They are collated and summarised here.

Over most of the surveyed area sparse or no *Modiolus* were observed. However, to the south of the *Limaria* bed, and in deeper water, *Modiolus* density ranged from common to superabundant at seven sites around the margin of a 27 m deep basin at depths of 14.3-23.5 m on a substrate of shell gravel or shell (Figure 7). Based on existing data the extent of the bed cannot be accurately determined but delineation of the area enclosing the known records indicates an extent of the order of 2 ha, although the bed may continue around the south of the basin.

There are two previous records of *Modiolus* beds in the Port Appin narrows area. Connor (1990) also recorded abundant *Modiolus* on the northern slope of the 27 m basin at a depth of 14 - 16 m (Figure 7, site 51). Comely (1978) studied the population structure and seasonal biology of a small (c. 0.25 ha) bed at a depth of 1.5 m in Port Appin Bay (Figure 7, site 521). No *Modiolus* was observed at the same depth here in 2011.

3.2.2 Lower Loch Leven

3.2.2.1 MNCR phase 2 survey (HM01)

The transect was located on a slope from 17.6 - 21.4 m in tide-swept conditions off the south-east point of the island An Dunan (Figure 9).

The substrate was composed of a mix of shell gravel and coarse sand with around 60% cover of *Modiolus* shells and large shell fragments. Abundant live *Modiolus modiolus* and dead shells supported dense *Balanus crenatus* and an abundant hydroid turf, dominated by *Rhizocaulus verticillatus* and *Halecium halecinum* (**SBR.SMus.ModT**). Other conspicuous sesssile forms included frequent *Alcyonium digitatum* and sparse sponges and ascidians. The algal flora was very rare, chiefly represented by scattered clumps of *Heterosiphonia japonica.* The motile fauna was dominated by the crustaceans, *Galathea intermedia* and *Carcinus maenas*, and the echinoderms, *Echinus esculentus*, *Asterias rubens*, *Crossaster papposus* and *Ophiothrix fragilis* (Appendix 4, Table 4.2).

Analysis of the *Modiolus* clump samples revealed a moderately rich associated biota with a total of 199 taxa recorded, with individual clumps supporting 97 - 128 taxa (Appendix 4, Table 4.4). Several specimens of *Limaria hians* were present in three of the four clumps equating to a SACFOR abundance of common. However, nest material was highly cryptic and was unobserved by divers and so *Limaria* does not appear to be a significant habitat-former at this site. The boring sponge *Cliona caledoniae* was recorded in one of the replicates, although a single atypical spicule among thousands examined (probably

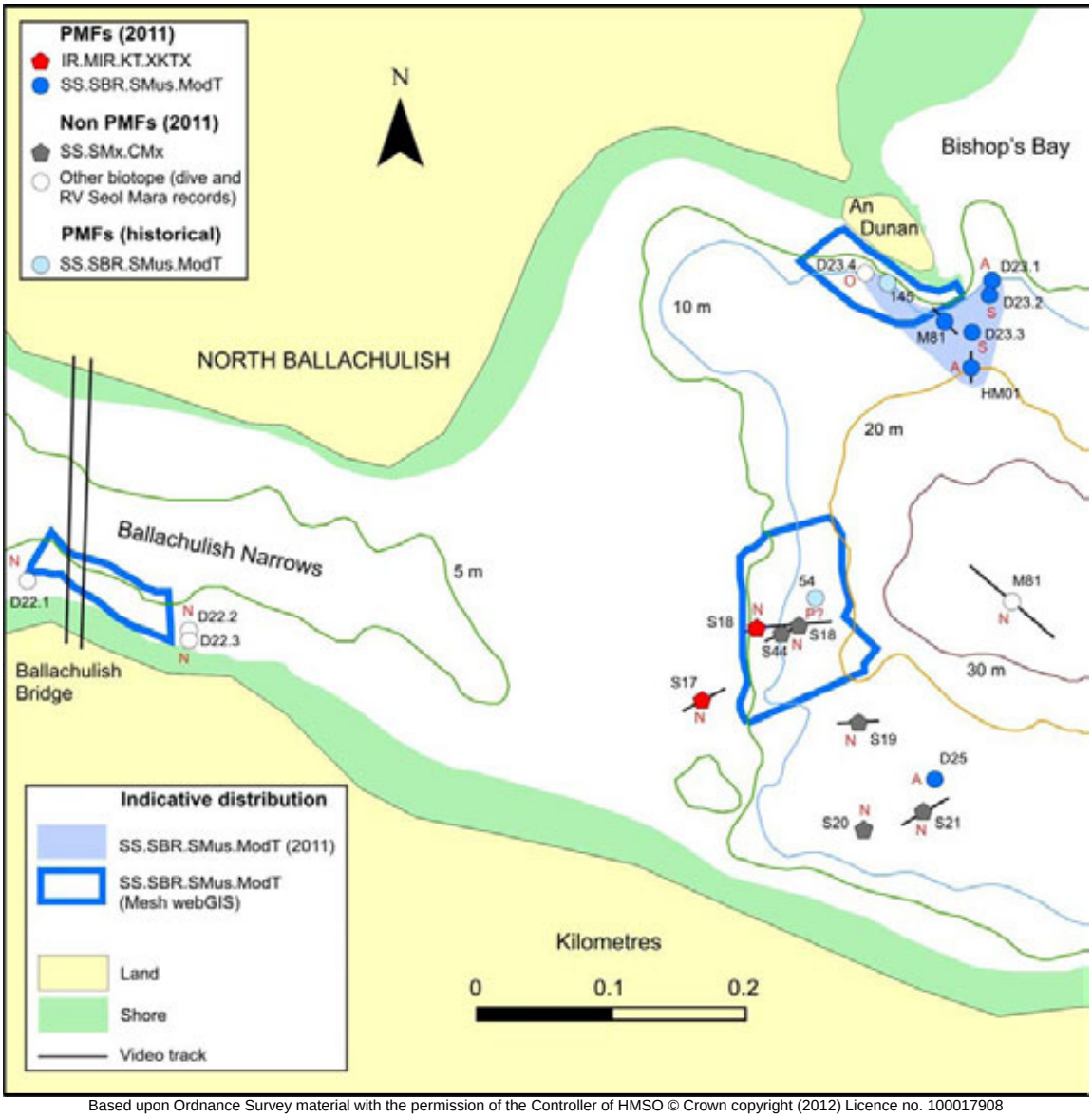
contamination from *Pione vastifica*, also present at the site) precludes certain identification. *Cliona caledoniae* has only recently been described from the Mingulay *Lophelia* reefs (van Soest and Beglinger, 2009) and this appears to be only the second record.

Davies (1991) carried out a phase 2 survey at a site about 80 m west of the 2011 MNCR site, recording the presence of a tide-swept *Modiolus* bed at a depth of 8.5 - 14.5 m, although the record has subsequently been transferred to **SS.SMx.CMx.CIloModHo** in Marine Recorder.

3.2.2.2 Video and dive surveys

The detailed results of the surveys are given in Appendix 2 (video) and Appendix 3 (diver). They are collated and summarised here.

Figure 9 *Distribution of PMF/MPA search feature biotope records from video and dive surveys in 2011 off Ballachulish, Loch Leven, with resultant indicative mapping of the main* Modiolus *bed found.* Modiolus *SACFOR abundances in red (N = not present) Also shown are previous PMF/MPA search feature biotope records and mapping, with numbered labels referring to site codes used in Appendix 10*



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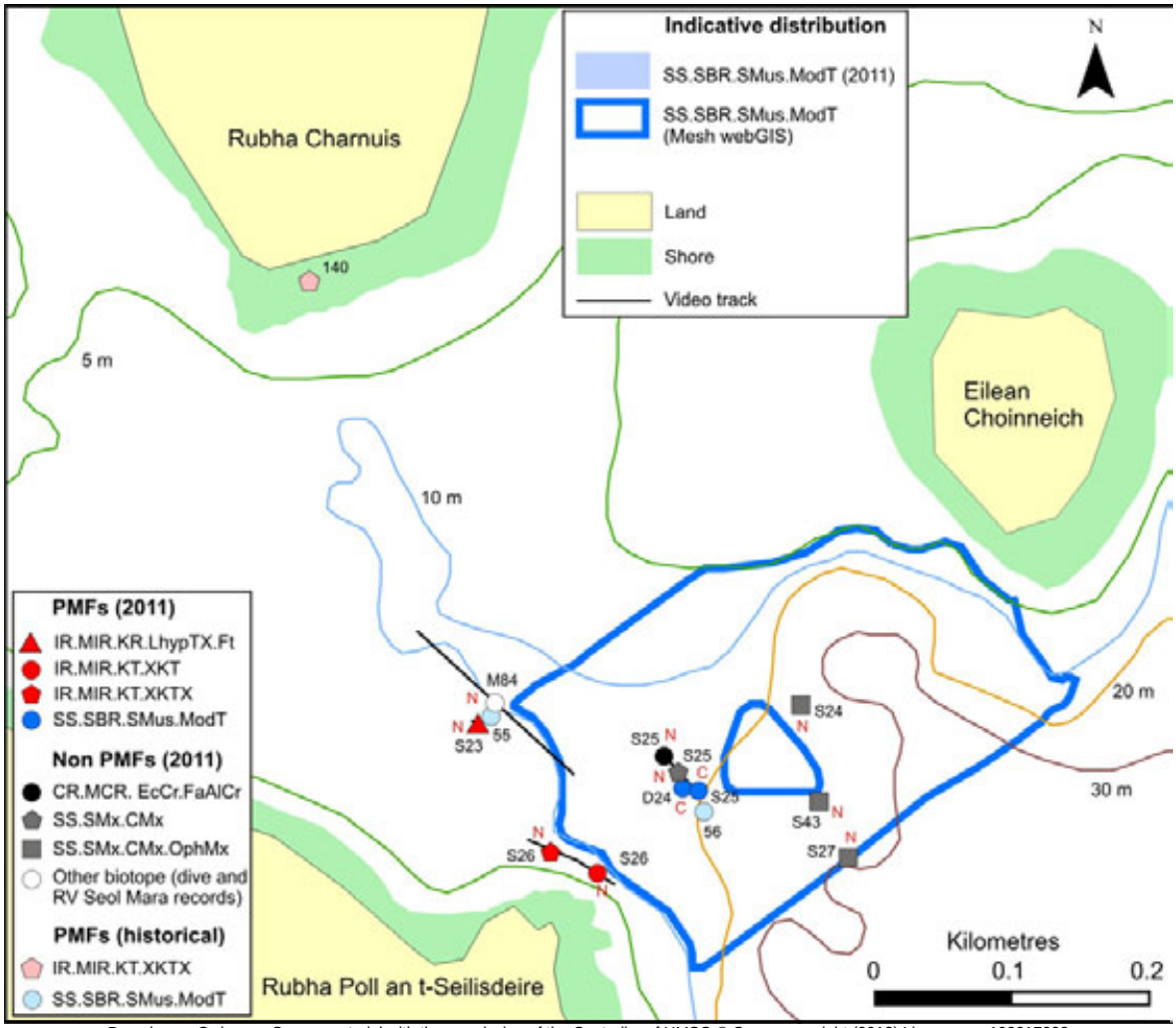
In 2011 the area off An Dunan was surveyed by diver, with observations recorded at four sites, and by drop-down video (one site from RV *Seol Mara*) (Figure 9). The western and northern boundaries of the bed were fixed. The southern and eastern limits are less certain, although it seems likely that the bed is restricted to an area of accelerated currents off the south-east point of An Dunan, with an extent of the order of 0.4 ha. The depth range in 2011 extended from 9.9 - 21.4 m and the substrate was predominantly coarse sand and gravel with *Modiolus* shell material. *Modiolus modiolus* abundance was high at the eastern stations, varying from abundant to superabundant, but appeared significantly reduced south of An Duin.

Figure 10 *Distribution of PMF/MPA search feature biotope records from video and dive surveys in 2011 south-east of Rubha Charnuis, Loch Leven.* Modiolus *SACFOR abundances in red (N = not present). Also shown are previous PMF/MPA search feature biotope records and mapping, with numbered labels referring to site codes used in Appendix 10*



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Seven drop-down sites were worked at the eastern entrance to Ballachulish Narrows in the vicinity of a 1990 record of a tide-swept *Modiolus* bed at 14 - 17 m (Davies, 1991; site 54 in Figure 9). In 2011 the sea bed here consisted of a slope of mixed coarse substrate of pebbles, cobbles and boulders with varying amounts of coarse sand, with stones supporting a *Laminaria* forest and park (**IR.MIR.KT.XKTX**), giving way at a depth of 8 - 19 m to serpulid and barnacle encrusted stones supporting *Alcyonium digitatum* and a hydroid/bryozoan turf. At the time of the survey there was an extensive mass swarming of *Onchidoris bilamellata*

here, covering 25% of the sea bed with its white egg ribbons (**SS.SMx.CMx**). Dense *Modiolus* shells were recorded at the base of the slope close to site 54 but live material appeared sparse or absent. However, a dive 160 m to the south-east in an area of very similar substrate (D25) recorded abundant live *M. modiolus* (**SS.SBR.SMus.ModT**). This bed is unlikely to exceed 1 ha in extent.

Davies (1991) also recorded the presence of a tide-swept *Modiolus* bed at the eastern entrance to the narrows south of Rubha Charnuis at depths of 8.5 - 11.0 m and 18.5 - 22.5 m (Figure 10, sites, 55, 56). Seven drop-down video sites and one dive site were worked here in 2011. Above the 10 m contour in the vicinity of Davies's site 55 mixed coarse sediments and bedrock supported tide-swept kelp communities (**IR.MIR.KR.LhypTX.Ft**, **KT.XKT**, **KT.XKTX**). In deeper water in the vicinity of site 56 the mixed substrate sea bed of dense pebbles and cobbles with varying amounts of coarse sand and gravel, sloped down eastwards. From 12.4 - 16.3 m the stones were densely encrusted with *Spirobranchus* spp. (**SS.SMx.CMx**). At around 16 m and extending to at least 18.3 m the encrusting fauna was augmented by moderate numbers of *M. modiolus*, which was common on the sediment and also in clumps on bedrock outcrops (**SS.SBR.SMus.ModT**). The bed here is considered unlikely to exceed 1 ha. in extent. Farther east, an *Ophiothrix fragilis* bed was recorded over a wide area at depths of 18.6 - 26.2 m.

Smith (1981) recorded the presence of clumps of *Modiolus modiolus* in the sublittoral fringe on the south side of Ballachulish narrows, which has been interpreted on the MESH biotope map (MESH webGIS, 2011) as an area of **SBR.SMus.ModT**. This area under Ballachulish bridge and enclosed by the polygon in Figure 4 was searched by a zigzagging diver in 2011 but no *Modiolus* was observed.

3.2.3 Annat Narrows, Lochs Eil and Linnhe

3.2.3.1 MNCR phase 2 survey (HM02)

The transect was located at a depth of 7.2 - 7.6 m in the tide-swept channel on the eastern side of the Annat Narrows, south of Eilean nan Craobh and Corpach (Figure 6).

The substrate was largely composed of large fragments and whole shells of *Modiolus modiolus* with around 10% cover of shell gravel, coarse sand and pebbles. Live *M. modiolus* was abundant and shells provided anchorage for a forest of small *Laminaria hyperborea* plants with a few stipes with heavy epiphytic growth of *Phycodrys rubens*. The shells supported a low diversity sessile community dominated by a patchy red algal turf (almost entirely *P. rubens* heavily encrusted with *Electra pilosa*), and dense *Protanthea simplex*. *Cerianthus lloydii* was locally common, emerging from sediment between the shells. The echinoderm fauna was dominated by large numbers of *Psammechinus miliaris*, with other frequent or common motile forms comprising *Pagurus bernhardus* and *Buccinum undatum*. Full details of the biota are provided in Table 4.2 (Appendix 4). Examination of the biota associated with clump samples revealed a lower diversity than those recorded for the other sites in Loch Leven and Port Appin, with a total of 162 taxa recorded, with individual clumps supporting 89 - 98 taxa (Appendix 4, Table 4.4).

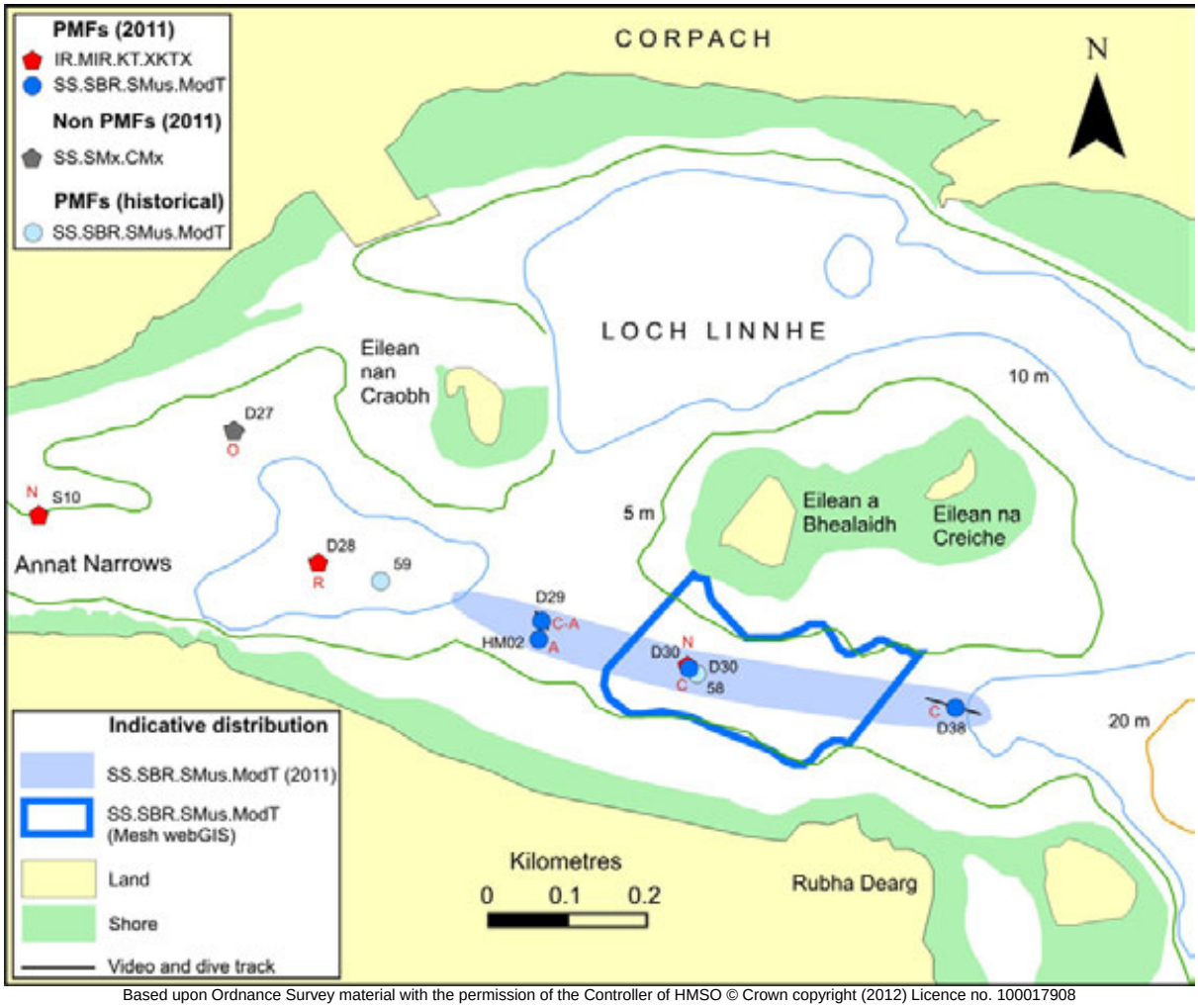
3.2.3.2 Video and dive surveys

The detailed results of the surveys are given in Appendix 2 (video) and Appendix 3 (diver records). They are collated and summarised here.

On the eastern side of Annat Narrows, Connor (1990) recorded the presence of tide-swept *Modiolus* beds at two sites: south of Eilean a Bhealaidh and south-west of Eilean nan

Craobh (sites 58 and 59 respectively in Figure 11). In 2011 this area was surveyed by diver video at five sites, in addition to the MNCR phase 2 survey at site HM02, and one drop-down video site. Between Annat Narrows and south of Eilean nan Craobh a mixed substrate of cobbles, pebbles and gravel supported a tide-swept park of *Laminaria hyperborea* (**IR.MIR.KT.XKTX**) with only sparse *Modiolus*. A *Modiolus* bed was recorded at four sites in the channel south of the islands Eilean nan Craobh, Eilean a Bhealaidh and Eilean na Creiche at depths of 7.1 - 10.1 m (Figure 11). The substrate was similar to that at site HM02 consisting of shell gravel with dense *Modiolus* shells with dense pebbles and cobbles in places. The biota was also similar throughout this area, consisting of a forest of small *Laminaria hyperborea* with an understorey of *Phycodrys rubens*, accompanied by common-abundant *M. modiolus* (**SS.SBR.SMus.ModT**). There was, however, some patchiness in the distribution of the bed, with no *Modiolus* being recorded at one site. A minimum bed width of around 50 m was recorded south of Eilean nan Craobh and, employing this, delineation of the area enclosing the known records provides an indication of extent of the order of 4 ha.

Figure 11 *Distribution of PMF/MPA search feature biotope records from video and dive surveys in 2011 east of Annat Narrows, Loch Linnhe.* Modiolus *SACFOR abundances in red (N= not present). Also shown are previous PMF/MPA search feature biotope records and mapping, with numbered labels referring to site codes used in Appendix 10*



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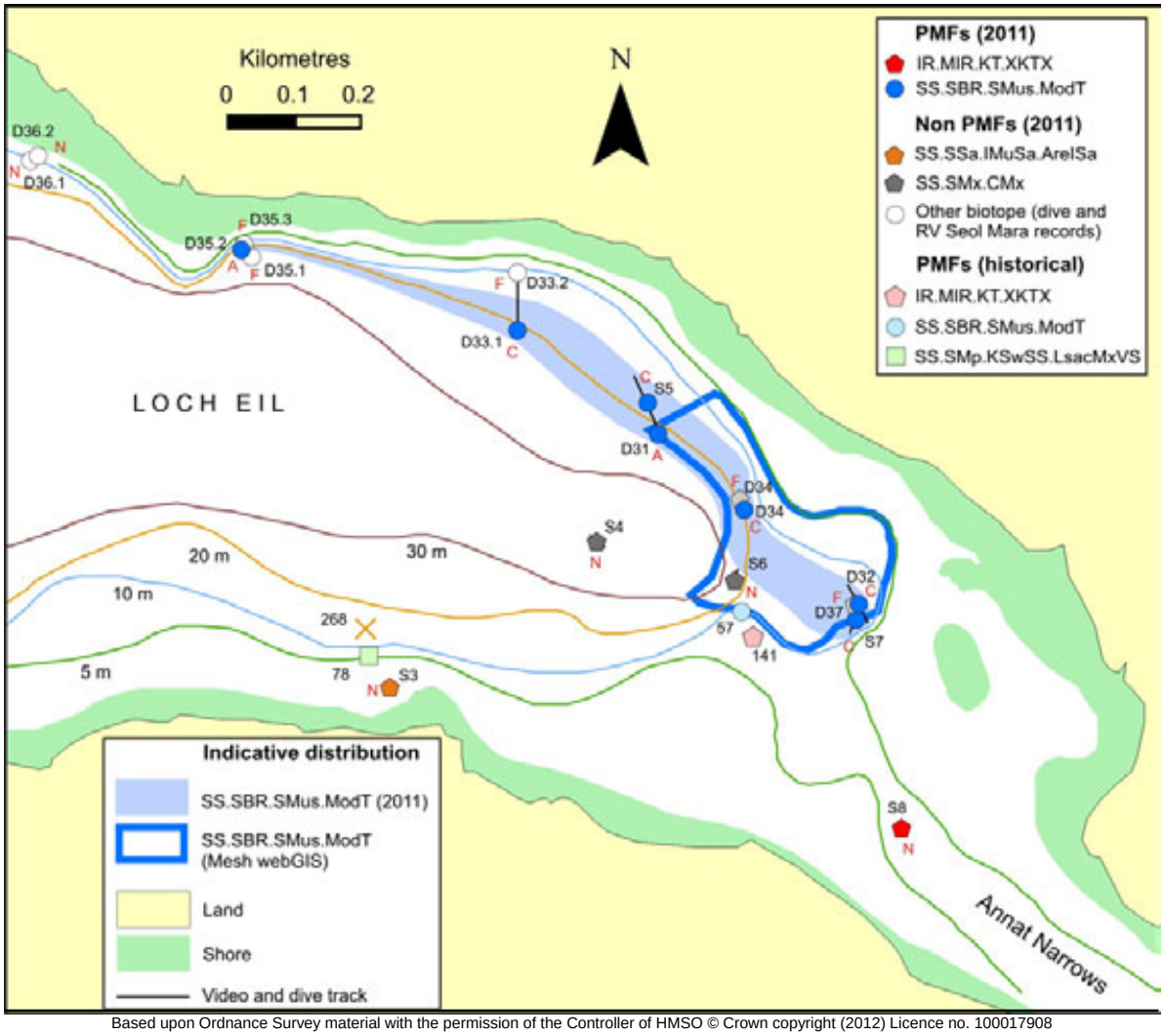
The indicative biotope map of Loch Eil of Dipper *et al.* (2008) includes an area of tide-swept *Modiolus* bed along the northern coastline of the western entrance to the Annat Narrows (Figure 12), based on a 1989 record by Connor (1990) (site 57, Figure 12). In 2011 this

region was surveyed by five drop-down and four diver video sites, supplemented by diver records of habitat and *Modiolus* SACFOR abundance at seven sites located along three slope transects. The substrate in this region was a mix of pebbles, cobbles and *Modiolus* shell material on shell gravel or sand, becoming silty in the west. *Modiolus* was widely distributed along a northern coastal band being recorded as frequent-abundant at depths of 10.1 - 24.1 m, and absent beyond 27 m. It was common-abundant (**SS.SBR.SMus.ModT**) over a distance of 1.1 km at depths of 10.1 - 23.1 m. Delineation of this area, aided by diver observations along transects, indicates a biotope extent of the order of 6 ha, although *Modiolus* density was significantly reduced in some areas (**SS.SMx.CMx**). The associated community of the bed differed from that east of the narrows by the virtual absence of kelp and red algae, presumably resulting from the generally greater depth. Shells and stones supported dense encrustations of serpulid worms, chiefly *Spirobranchus* spp., *Protanthea simplex* (abundant in places) and dense *Psammechinus miliaris*, with large numbers of *Ophiothrix fragilis* and patches of *Tubularia indivisa* locally.

Figure 12 *Distribution of PMF/MPA search feature biotope records from video and dive surveys in 2011 west of Annat Narrows, Loch Eil.* Modiolus *SACFOR abundances in red (N= not present). Also shown are previous PMF/MPA search feature biotope records and mapping, with numbered labels referring to site codes used in Appendix 10*



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3.3 Northern sea fan community

3.3.1 Bernera Island, Lynn of Morvern

Following the recording of the presence of *Swiftia pallida* off Bernera Island during a 2010 Seasearch survey (Seasearch, 2010), the distribution of the sea fan community in the area was examined by ROV in 2011, supplemented by a detailed MNCR phase 2 diver survey at one site.

3.3.1.1 MNCR phase 2 survey (NS01)

This site was located midway along the steep, north-west-facing coastline of the island and is likely to experience moderately strong tidal currents (Figure 4).

The transect extended from a depth of 19.9 m to 26.9 m along a steep, sand-dusted, rock slope, with vertical sections and accumulations of shelly sand and occasional boulders on steep ledges. The rock supported a rich hydroid and bryozoan turf, dominated by the hydroids, *Diphasia margareta*, *Nemertesia ramosa*, *Sertularella gayi* and *Halopteris catharina*, and the bryozoan, *Securiflustra securifrons*. A rich sponge fauna included frequent *Axinella infundibuliformis* and *Amphilectus fucorum*, as well as *Myxilla incrustans*, *M. rosacea*, *Suberites carnea*, *Pachymatisma johnstonia, Lophon nigricans* and *Polymastia penicillus*, whilst the ascidian fauna was dominated by frequent *Diazona violacea* and *Ascidia mentula*, which became common in the upper part of the transect. The rock also supported frequent *Swiftia pallida* and occasional *Caryophyllia smithii* and *Terebratulina retusa*. The PMF, *Leptometra celtica*, was present at low density. The site is clearly referable to the biotope, **CR.HCR.XFa.SwiLgAs**. The community matched the 2010 Seasearch record description at the same site of *S. pallida* with rich sponge and hydroid communities. Full details of the biota are provided in Table 4.2 (Appendix 4).

3.4 Blue mussel beds

3.4.1 Dunstaffnage Bay, Loch Etive

3.4.1.1 Bed mapping and density assessment

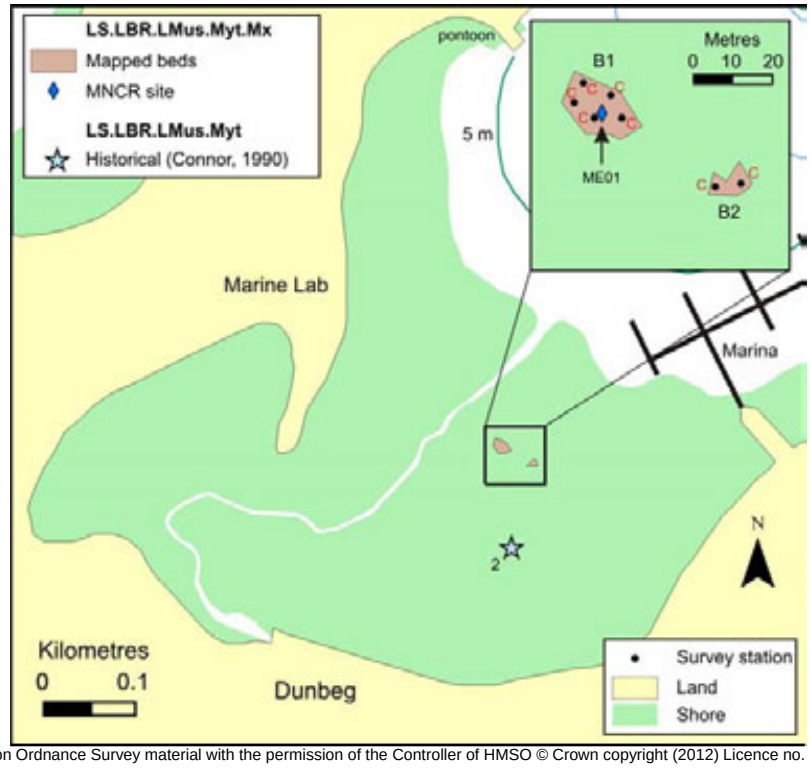
An initial search of the beach revealed areas of sparsely scattered small boulders supporting sparse clumps of *Mytilus edulis* at the bottom and upper region of the lower shore. Between these locations were two adjacent, slightly elevated, patches of dense pebbles supporting sparse mussel beds at a height of 1.1 m above chart datum (Figure 13). The maximum dimensions were approximately 22 x 12 m (bed B1) and 12 x 15 m (bed B2). GPS tracking of the boundaries provided extent measures of 208 m^2 and 54 m^2 respectively. Mussel coverage of the substrate was low at 10 - 20%, although SACFOR abundance, based on mussel counts, was common at all seven stations examined (Figure 13).

3.4.1.2 MNCR phase 2 survey (ME01)

The site was located in the centre of the larger bed, B1 (Figure 13). The substrate was composed of a slightly muddy fine sand with much fine broken shell and a surface scatter of pebbles (25%) and gravel (10%) and very sparse cobbles and small, largely buried, boulders. A black layer commenced at a depth of around 2 mm. *Mytilus edulis* occurred singly and in small clumps attached to pebbles and cobbles, with a coverage of 20% (common). The mussels and pebbles were densely encrusted with *Semibalanus balanoides* and provided a substrate for numerous *Littorina littorea* and sparse *L saxatilis*. The stones also supported sparse *Patella vulgata* and *Hildenbrandia* spp. (Table 4.3, Appendix 4). The

site can be considered a low-diversity and mussel-impoverished example of **LS.LBR.LMus.Myt.Mx**.

Figure 13 *Distribution of* Mytilus edulis *beds (B1-B2) in Dunstaffnage Bay. The inset shows the SACFOR abundance of mussels (in red) at seven stations within the beds and the location of the MNCR phase 2 survey site (ME01). Numbered labels refer to site codes used in Appendix 10*



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3.4.2 Lochy Flats, Loch Linnhe

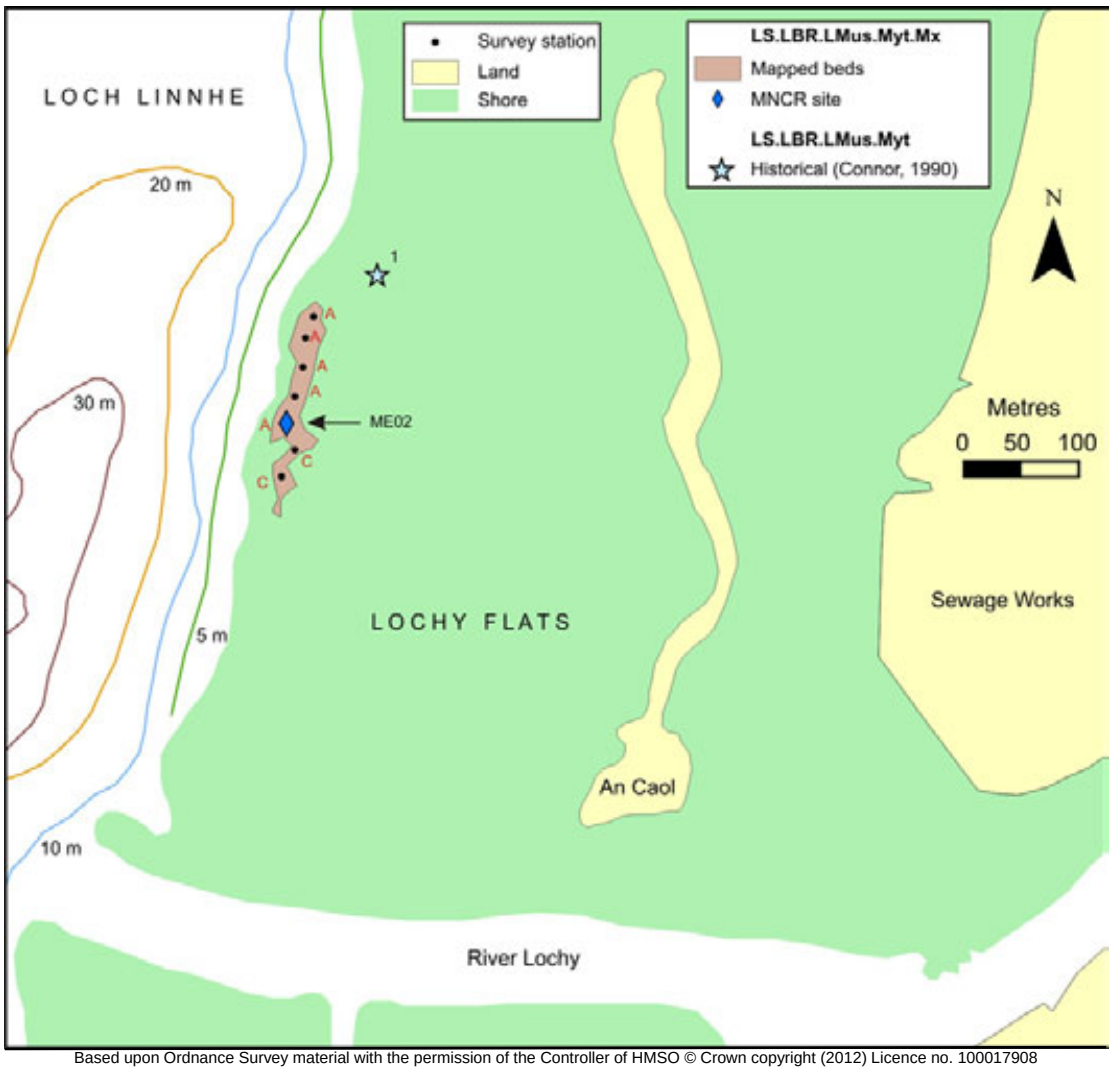
3.4.2.1 Bed mapping and density assessment

Mytilus edulis was found to be widely distributed at low density over the lower shore of the flats but formed a dense bed at the bottom of the shore at 0.2 - 0.7 m above chart datum (Figure 14). The bed extended as a band of around 18 m width for a distance of 188 m, with an area of 3365 m^2. The substrate of muddy sand with dense gravel and pebbles, accompanied by cobbles to the south, supported patchy *Fucus serratus* (frequent to locally abundant). *Mytilus* coverage at the seven stations examined varied from 10% to 95%, with SACFOR estimates based on numerical density, generally abundant (Figure 14).

3.4.2.2 MNCR phase 2 survey (ME02)

The substrate was composed of slightly muddy sand with much gravel, pebbles and occasional cobbles. Live *Mytilus edulis* exhibited around 50% coverage of the substrate in a single sheet, with dead shells constituting another 45%. The algal flora was dominated by *Fucus serratus* and *Mastocarpus stellatus* (common) with sparse *Chondrus crispus*, *Ceramium pallidum* and *Neosiphonia elongella*. Stones and shells were densely encrusted with *Semibalanus balanoides*, whilst the motile fauna included abundant *Littorina littorea* and small *Carcinus maenas*, as well as numerous *Gammarus salinus* (**LS.LBR.LMus.Myt.Mx**). Full details of the biota are provided in Table 4.3 (Appendix 4).

Figure 14 *Distribution of* Mytilus edulis *bed (B3) on Lochy Flats, Fort William. Also shown is the SACFOR abundance of mussels (in red) at 7 stations within the bed and the location of the MNCR phase 2 survey site (ME02). Numbered labels refer to site codes used in Appendix 10*



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3.5 Sea loch egg wrack beds

3.5.1 Bishop's Bay, Loch Leven

3.5.1.1 Bed mapping and density assessment

A preliminary examination of the bay revealed that *Ascophyllum nodosum* ecad *mackaii* was widely distributed, but that there were eight distinct beds where coverage of was at least 50%. Figure 15 shows the results of GPS tracking of the bed boundaries and Table 3 the resulting calculated bed sizes. Beds were located on the flatter, more sheltered, western and eastern sides of the bay and were spread over different levels of the shore from the *Fucus serratus* zone to just below the *Pelvetia* zone. The basic sediment type was muddy sand, but over most of the area this was augmented by varying densities of gravel, pebbles and cobbles. Based on observations at 14 stations, mean cover of *mackaii* ranged from 50 - 93% (Table 3) and bed thickness averaged 12 cm (Table 6.2, Appendix 6). In most areas

the bed included frequent to abundant *Fucus vesiculosus* overlying the *mackaii*, with sparser wracks including attached *Ascophyllum nodosum*, *F. ceranoides* and loose-lying *F. serratus* (**LR.LLR.FVS.Ascmac**).

Figure 15 *Distribution of* Ascophyllum nodosum *ecad* mackaii *beds (W1-W8) in Bishop's Bay. Also shown is the percentage cover of mackaii (in red) at 14 stations within the beds and the location of the MNCR phase 2 survey site (SL01). Numbered labels refer to site codes used in Appendix 10*

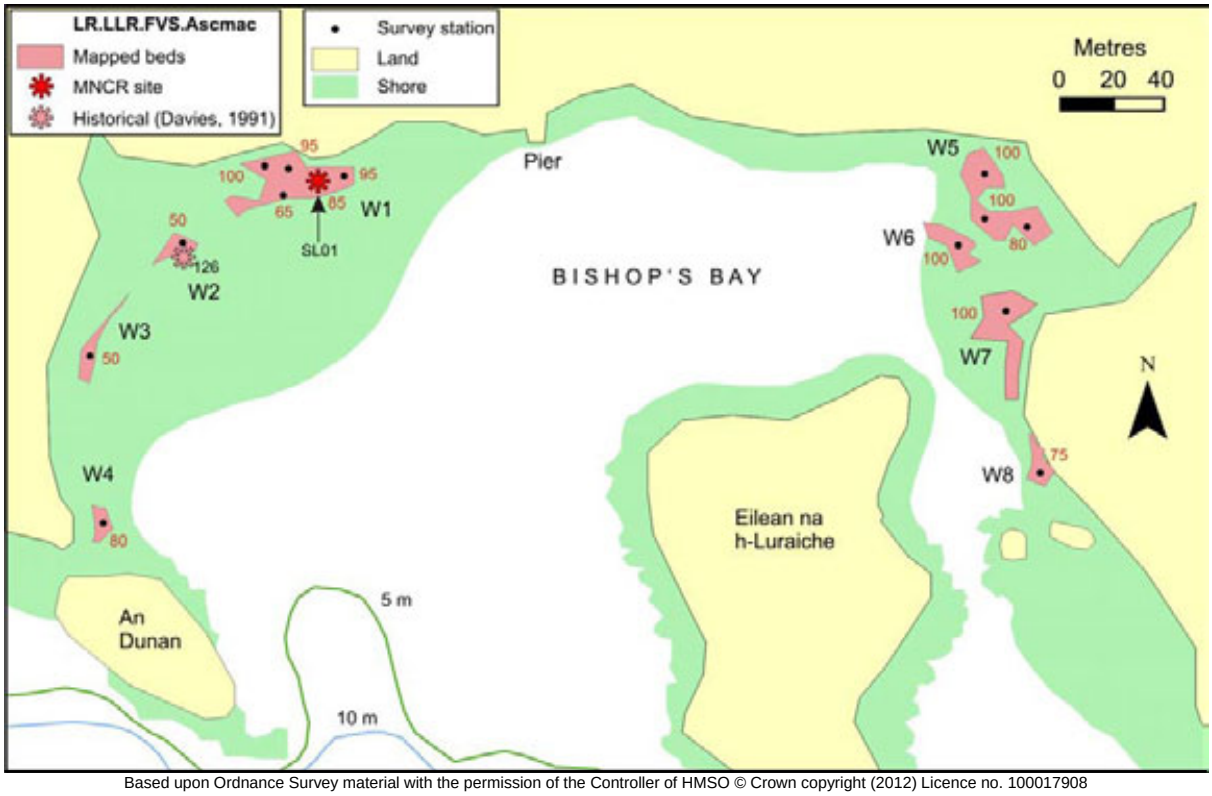

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Table 3 *Measurements of bed extent and mean cover of* Ascophyllum nodosum *ecad* mackaii *for sea loch egg wrack beds in Loch Leven*

Bed	Location	Extent (m^2)	Mean cover (%)
W1	Bishop's Bay	549	88
W2	Bishop's Bay	91	50
W3	Bishop's Bay	112	50
W4	Bishop's Bay	76	80
W5	Bishop's Bay	510	93
W6	Bishop's Bay	190	100
W7	Bishop's Bay	417	100
W8	Bishop's Bay	106	75
W9	Carness	1507	89
W10	Carness	121	70

3.5.1.2 MNCR phase 2 survey (SL01)

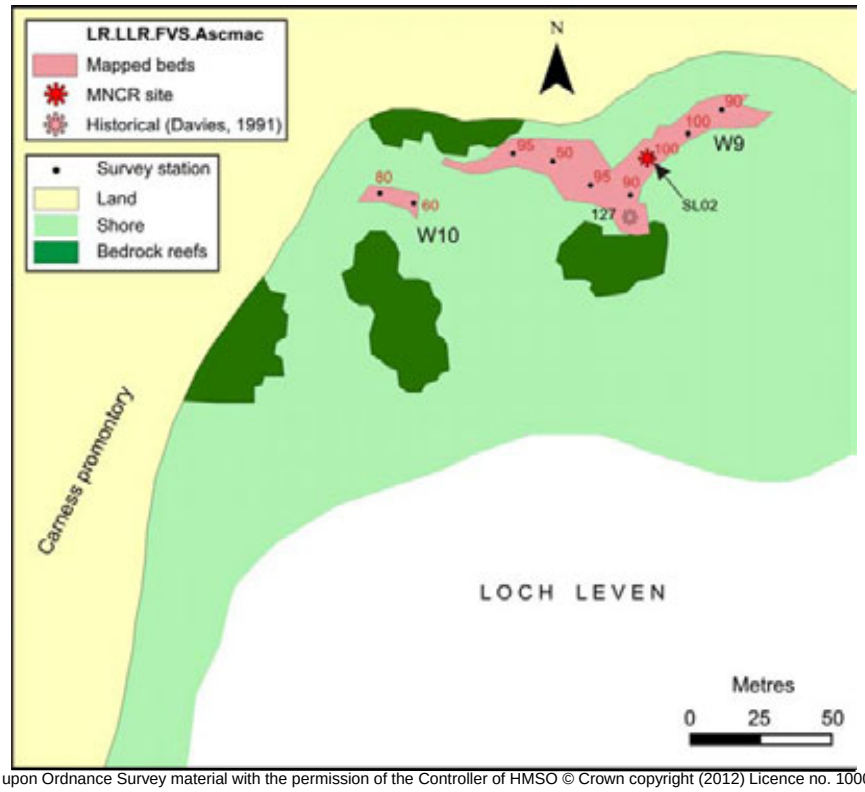
The survey took place near the centre of the largest bed, W1 (Figure 15). There was 100% cover by *A.nodosum* ecad *mackaii* overlain by abundant *Fucus vesiculosus* and frequent *Ulva intestinalis* on a substrate of muddy sand with dense gravel and scattered pebbles and cobbles. The algae supported frequent *Littorina obtusata* and *Vertebrata lanosa*, beneath which *Carcinus maenas* and *Grammarus marinus* were common. Stones were sparsely encrusted with *Semibalanus balanoides* and *Hildenbrandia* spp. Full details of the community are provided in Table 4.3 (Appendix 4).

3.5.2 Carness, Loch Leven

3.5.2.1 Bed mapping and density assessment

Two beds were present at this site ascribable to **LR.LLR.FVS.Ascmac** (Figure 16). The largest bed surveyed in 2011 occupied 1507 m^2 in a predominantly lower shore band, partly in the shelter of a bedrock outcrop (W9), whilst a small patch of *A.nodosum* ecad *mackaii* had accumulated in a strip running down the shore between a rock outcrop and a pair of adjacent fences (W10). *A.nodosum* ecad m*ackaii* cover was high at both sites (Table 3), although W9 contained small patches where it was replaced by *Fucus vesiculosus* or attached *Ascophyllum nodosum*. In places the sea loch egg wrack was overlain by *F. vesiculosus*, attached *A. nodosum* and, at several sites in the lower part of W9, large amounts of loose-lying *F. serratus*, which had clearly become detached from rock, but some of which appeared to be still functional. Bed thickness averaged 15 cm (Table 6.2, Appendix 6). The underlying substrate was basically muddy sand with varying amounts of gravel and pebbles, as well as scattered cobbles and boulders.

Figure 16 Distribution of Ascophyllum nodosum *ecad* mackaii *beds (W9-W10) at Carness. Also shown is the percentage cover of* mackaii *(in red) at nine stations within the beds and the location of the MNCR phase 2 survey site (SL02). Numbered labels refer to site codes used in Appendix 10*



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3.5.2.2 MNCR phase 2 survey (SL02)

The survey took place near the centre of bed W9 (Figure 16). The substrate of dense gravel and pebbles in muddy sand with occasional boulders supported 95% coverage of *A.nodosum* ecad *mackaii* in a layer 15 cm thick, together with *Fucus vesiculosus* (common) and frequent attached *Ascophyllum nodosum*, *Vertebrata lanosa* and loose-lying *F. serratus*. *Littorina obtusata* was frequent on the algae, whilst beneath it dominant forms included *Carcinus maenas* and *Gammarus marinus* (common) and frequent *L. littorea*. Stones were sparsely encrusted with *Semibalanus balanoides* and *Hildenbrandia* spp. and supported occasional *Mytilus edulis* (Table 4.3, Appendix 4).

3.6 Intertidal tide-swept algal communities

3.6.1 Annat Narrows W (Loch Eil)

In 1989 Connor (1990) recorded zones of tide-swept *Ascophyllum nodosum* and tide-swept *Laminaria digitata*, separated by a variable salinity *Fucus serratus* community on the southern shore at the west end of Annat Narrows. In 2011 MNCR phase 2 surveying was carried out along a transect passing through all these zones at the same site (TS01, Figure 6). The biotopes encountered are summarised below, with full details in Table 4.3 (Appendix 4).

The shore at this location was composed of steep, smooth bedrock. Only the upper part of the *Laminaria digitata* zone was emergent at the time of the survey, from 0.4 - 1.0 m above chart datum. A dense forest of *L. digitata* supported a sparse stipe community dominated by *Palmaria palmata*. Beneath the canopy the rock was densely encrusted with *Balanus crenatus* and supported a patchy turf of *Eucratea loricata* and occasional patches of *Halichondria panicea*, with tufts of *Tubularia indivisa* also present. A fairly sparse red algal understorey, colonised by *Alcyonidium diaphanum* and *A. gelatinosum*, included *Membranoptera alata*, *Phycodrys rubens* and *Chondrus crispus*. Sparse *Saccharina latissima, Odonthalia dentata* and *Dendrodoa grossularia* were found just outside the transect band (**IR.MIR.KT.LdigT**).

A zone of superabundant *Fucus serratus* extended from 1.0 - 2.5 m above chart datum and contained a patchy band of dense *Mytilus edulis* around 60 cm in width. In the lower half of the zone *F. serratus* plants were densely colonised by *Dynamena pumila*, *Alcyonidium diaphanum* and *A. gelatinosum*, beneath which was an understorey of *Mastocarpus stellatus*. A *Cladophora rupestris* turf dominated the understorey in the upper zone. The rock surface was encrusted with *Semibalanus balanoides* (common), frequent *Hildenbrandia* spp. and, towards the bottom of the zone, *Halichondria panicea*. Dominant members of the motile community included *Nucella lapillus* and *Littorina littorea* (common), as well as frequent *L. obtusata* and *Patella vulgata* (**LR.HLR.FT.FserT**).

A blanket of *Ascophyllum nodosum* supporting frequent *Dynamena pumila* and *Vertebrata lanosa* covered the rock from 2.5 - 3.3 m above chart datum. An understorey dominated by *Cladophora rupestris* was augmented by *Mastocarpus stellatus* in the lower part of the zone and by a patchy narrow band of superabundant *Rhodochorton purpureum* at the top of the zone. The *Cladophora* turf contained a variety of additional filamentous forms including *Aglaothamnion hookeri* and *Rhizoclonium riparium*. The rock surface was encrusted with frequent *Semibalanus balanoides* and *Hildenbrandia* spp., as well as occasional *Verrucaria mucosa.* The motile fauna was dominated by *Littorina littorea* (common) and frequent *L. obtusata*. The community may be influenced by lowered salinities but is more diverse than **LR.LLR.FVS.AscVS**. It displays a similar community to **LR.LLR.F.Asc.FS** but is strongly

tide-swept. Although it does not have the high diversity of filter feeders typical of **LR.HLR.FT.AscT**, it has been ascribed to this biotope.

3.6.2 Connel (Loch Etive)

Tide-swept *Ascophyllum nodosum* communities were recorded at sites on the northern and southern shores of the Kilmaronag Narrows at the entrance to Loch Etive in 1989 by Connor (1990). Connor's southern site was visited in 2011 where MNCR phase 2 surveying was carried out along a transect through the *Ascophyllum* zone (TS02, Figure 4). The findings are summarised below with full details provided in Table 4.3 (Appendix 4).

The *Ascophyllum* zone occurred on steep bedrock, which was near-vertical in places, and extended from 0.5 - 1.5 m above chart datum in a narrow band 1.1 - 1.4 m in width. *Ascophyllum nodosum* blanketed the rock and supported abundant *Vertebrata lanosa* and a range of filter feeders at low density, including *Dynamena pumila*, *Flustrellidra hispida*, *Alcyonium gelatinosum* and *Clava multicornis*. The understorey was dominated by a dense turf of *Cladophora rupestris*, which included other filamentous species such as *Rhizoclonium riparium* and *Aglaothamnion hookeri*, which also formed conspicuous patches up to 5 cm in diameter. A dense band of *Rhodochorton purpureum* was present at the top of the zone. Foliose forms included frequent *Ulva lactuca* and occasional *Chondrus crispus*. In gaps in the *Cladophora* turf the rock was encrusted with occasional *Semibalanus balanoides*, and with *Verrucaria mucosa* towards the top of the zone. The motile fauna was dominated by *Littorina obtusata* (common) and *L. littorea* (frequent), with occasional *Patella vulgata*. A water sample collected when the tide was at the lower edge of the zone had a salinity of 15 ‰. In spite of this low salinity the zone has been ascribed to **LR.HLR.FT.AscT**, as it is strongly tide-swept and supports several of the filter feeders lacking in **LR.LLR.FVS.AscVS**.

4 DISCUSSION

4.1 Flame shell beds

There is good evidence for a marked temporal decline in the extent of the Port Appin *Limaria* bed over the last ten years. Although even early records indicate some patchiness in coverage, it now appears to be absent from most of its previous range, especially over the central area. This region received a high level of sampling intensity in 2011. Previously considered to be one of the largest Scottish *Limaria* beds (Moore *et al*., 2011), current evidence suggests that it is now one of the smallest.

Despite a thorough examination of the coastline off the west of Shuna Island in 2011, the *Limaria* bed recorded by Connor (1990) in 1989 was not refound. Nor was the bed off Rubha an Ridire, reported by Connor (1990), although this was small and could have been missed by the low sampling intensity in 2011.

The presence of mounds, some clearly formed into linear features or hedges, of uprooted kelp plants was recorded by both remote video and diver at Port Appin in 2011. Creel fishing, presumably for crabs, was observed to be taking place on several occasions by at least two vessels in 2011 in the central, degraded region of the historical bed (Moore, unpublished). On some occasions the creel line was seen to be deployed across the channel, perpendicular to the current direction. On retrieval the creels and creel line were observed to be draped in kelp plants. Dragging of creels across a *Limaria* bed is likely to disrupt the nest material, and uprooting of kelp holdfasts by creels and creel lines will certainly cause damage to the bed. Any lateral movement of the vessel across the current direction during hauling of the creels might be expected to produce hedges of uprooted kelp, which is likely to be relatively easily dislodged from the *Limaria* nest habitat. However, the significance of this impact in terms of contributing to a widespread decline is unknown. Given the apparent disappearance of the Shuna Island bed, this may signify a general reduction in the success of *Limaria* populations in the area, although the Shuna bed may have been dependent upon the formerly extensive Port Appin bed for recruitment. Useful information on the possible cause of decline could be obtained by examination of the current status of the bed in nearby Loch Creran (Trigg *et al*., 2011) and investigation of possible recruitment failure by examination of the population structure of the Port Appin *Limaria* bed.

With regard to the diversity and composition of the Port Appin *Limaria* biotope, a similar number of taxa were recorded by MNCR phase 2 surveys by Connor (1990) in 1989 (55) and by the present survey (63) and this level of diversity appears typical of the habitat (Moore *et al*., 2011). However, community composition was rather different, with the shallower 2011 site in an area of kelp forest overlying a dense but low diversity red algal flora, whilst in 1989 a much more diverse algal flora accompanied very sparse kelp plants. The difference is probably explicable in terms of natural ecological factors. MNCR phase 2 surveys record only a fraction of the community present at a site. Trigg *et a*l. (2011) enumerated 211 species at one Port Appin *Limaria* bed site in 2006, although this was achieved by sieving core samples using a 0.5 mm mesh screen.

The introduced Pacific red alga *Heterosiphonia japonica* was recorded at the Port Appin MNCR phase 2 site in 2011. It was only present at very low density as a constituent of the kelp stipe epiphyte community and appears to be currently exercising an insignificant ecological impact. It has also been recently recorded from the lower shore and shallow infralittoral at Port Appin (Moore, unpublished).

4.2 Horse mussel beds

Historical records of horse mussel beds at Port Appin (1), Annat Narrows (2), and lower Loch Leven (3) were validated for 2011. The small, shallow bed in Port Appin Bay reported by Comely (1978) was not refound in 2011. However, no positional coordinates for this site were provided by Comely, and much of this area was covered by an algal blanket, so its continued presence in 2011 may have been missed.

Due to time constraints no precise measurements of horse mussel bed extent were possible in 2011, although the likely scale of coverage has been estimated. Historical records are too sparse for temporal comparisons of extent to be possible. All three beds observed in Loch Leven are likely to be small (<1 ha). Of these, the highest *Modiolus* abundances were recorded on the An Dunan bed, where horse mussels were locally superabundant. The Port Appin bed is believed to be of the order of 2 ha in extent, with *Modiolus* density attaining superabundance locally. The Annat Narrows beds appear to be the largest, with the eastern bed of the order of 4 ha and the western bed 6 ha. However, they are both patchy, with SACFOR densities reaching the level of abundant in places.

There appear to be no extent measurements available for other Scottish *Modiolus* beds for comparative purposes. However, in a UK context the beds appear small, with tide-swept beds up to c. 350 ha being recorded elsewhere in the UK (Lindenbaum *et al*., 2008).

Table 4 places the diversity of the beds examined into a Scottish context. Analysis of variance of the clump sample data reveals that there is a significant ($p<0.001$) decreasing trend in mean taxon richness of the 2011 survey sites from Port Appin to Loch Leven to Corpach. Port Appin is significantly richer than all the other sites examined over the years, whereas Loch Leven and Corpach are fairly similar to most other sites. For the 2011 survey sites the trend in diversity of conspicuous epibiota as revealed by MNCR survey is precisely the reverse of that for the clump biota, with Port Appin diplaying the lowest diversity and all three sites displaying relatively low levels of diversity, although such data are not amenable to statistical analysis. Connor (1990) listed 78 taxa for the Port Appin bed in 1989, compared to 35 in 2011. In fact there are marked differences in the nature of the community described by Connor (1990) and that observed in 2011, with Connor's site supporting a dense hydroid turf and a diverse algal flora, which will reflect the significantly shallower depth range surveyed in 1989.

Table 4 *Number of taxa recorded by MNCR phase 2 survey and* Modiolus *clump analysis for* Modiolus *beds examined during the current survey, for the same beds examined previously and for other Scottish beds examined using the same methodology*

Location	Date	Clump taxa	MNCR taxa	Reference
Corpach	24/08/2011	89-98	50	This study
Corpach	21/06/1989	N/A	47	Connor, 1990
Port Appin	25/08/2011	133-137	35	This study
Port Appin	18/06/1989	N/A	78	Connor, 1990
Loch Leven	22/08/2011	97-128	44	This study
Loch Leven	24/04/1990	N/A	19	Davies, 1991
Busta Voe	22/08/1999	48-74	66	Mair *et al*., 2000
Loch Creran	14/08/1999	80-87	62	Mair *et al*., 2000
Loch Creran	17/07/2005	88-104	58	Moore *et al*., 2006
Loch Alsh	05/09/1999	90-116	77	Mair *et al*., 2000

4.3 Northern sea fan community

There are five valid historical records of the biotope **CR.HCR.XFa.SwiLgAs** in the search area: three around Bach Island (from unpublished surveys by NCC in 1988 and JNCC in 1995 - see Appendix 10: Table 10.1), and two in the bight at the south-western end of Lismore Island at Liath Sgeir (Bishop, 1984) and Bàgh Clach an Dobhrain (Connor, 1990). However, the characterising species, *Swiftia pallida*, frequent at the 2011 survey site off Bernera Island (NS01) was only recorded at Bàgh Clach an Dobhrain, its perceived absence at the other sites possibly resulting from limitations in the surveyed depth range. MNCR phase 2 surveys recorded 25 - 45 taxa at Bach Island, 52 at Liath Sgeir and 67 at Bàgh Clach an Dobhrain. Although only 51 taxa were noted at NS01, no ranking of diversity should be inferred from these figures. Methodological differences between surveys included the surveying of a significantly wider depth range at Bàgh Clach an Dobhrain (19 m) compared to NS01 (7 m).

4.4 Blue mussel beds

Beds in Dunstaffnage Bay and on Lochy Flats observed in 1989 by Connor (1990) were still found to be present in 2011. However, the beds were found to be very small in size, with total extent measurements in 2011 of 0.03 ha for Dunstaffnage and 0.34 ha for Lochy Flats. Individual beds representing the same PMF are known to cover hundreds of hectares elsewhere in Europe (OSPAR, 2010). The Dunstaffnage bed is also of low quality, with a low mussel density and community diversity. The Lochy Flats site represents a bed of moderate abundance and diversity. Records of taxon richness at both sites were somewhat higher in 2011 (8 and 17 respectively) than in 1989 (5 and 11 respectively).

4.5 Sea loch egg wrack beds

The extent and coverage details for sea loch egg wrack beds in Bishop's Bay and Carness in Loch Leven are provided above in Table 3 (Section 3.3.6.1) The nature of the beds was very similar at both sites, with *mackaii* thickness generally between 12 and 15 cm, the same mean *mackaii* cover of 84%, and similar species composition.

The largest single bed was recorded at Carness (0.15 ha), although total coverage was greater in Bishop's Bay (0.21 ha). These can be regarded as small beds. Moore *et al.* (2011) recorded total extent values of 1.3 ha for Badachro Bay (Loch Gairloch) and 0.7 ha for Loch Thùrnaig (Loch Ewe). Gibb (1957) cited a figure of 4.0 ha for a bed in Loch Feochan and Mercer *et al.* (2007) recorded a total coverage of 6.9 ha for Loch Sunart, with individual beds up to 3.3 ha. Bed thickness in Loch Leven appears moderate with some beds known to reach 20 - 30 cm (Connor, 1990).

Davies (1991) also recorded the presence of *mackaii* beds at both sites in 1990. In Bishop's Bay he reported areas of *mackaii* and **LR.LLR.F.AscX** extending over most of the shore from 0.7 - 3.5 m above chart datum. Davies (1991) only assessed *mackaii* density as frequent, compared to superabundant in 2011, but he recorded more species at this site (18 compared to 11 in 2011). This probably reflects the combination of biotopes from which the species list and abundance values were compiled.

At Carness Davies (1991) recorded the presence of a *mackaii* bed at the site of W9 (Figure 11, site 127). The community appears similar to that in 2011 with a superabundant cover of *mackaii*, although only seven species were recorded, compared to 14 in 2011. Davies (1991) described the bed as quite extensive and provided an extent estimate of 100 m^{-2}. Assuming a typographical error in the units given, this would represent a very great temporal increase in size of the bed to its level of 1507 m^2 in 2011.

4.6 Intertidal tide-swept algal communities

Historical records of the presence of tide-swept *Ascophyllum nodosum* communities (**LR.HLR.FT.AscT**) in the entrance narrows to Loch Eil and Loch Etive (Connor, 1990) were validated for 2011 by the present study, as was the presence of tide-swept *Laminaria digitata* (**IR.MIR.KT.LdigT**) in Loch Eil. In addition, the presence of a tide-swept *Fucus serratus* biotope (**LR.HLR.FT.FserT**) was recognised in Loch Eil in 2011. Although the 2011 records indicate higher diversities for these biotopes than those recorded by Connor (1990) at the same sites, they are still poor examples of their types, in particular displaying a poorly developed filter feeding fauna. This probably results from the reduced salinity at these locations.

4.7 Arctica islandica

Although *Arctica islandica* was not a focus for the current survey, ocassional living specimens were recorded by divers at the eastern extremity of the Loch Eil *Modiolus* bed in an area of dense *Arctica* shells (sites D32.2 and D37). A bed of dense *Arctica* shells was also reported by diver from off Rubha an Ridire at the entrance to the Sound of Mull (site D12), but no live specimens were evident.

4.8 Concluding remarks

The current survey work revealed that all targeted PMFs for which there are historical records were still present in the Loch Linnhe system in 2011. Of particular importance was the validation of six tide-swept horse mussel beds in Lochs Linnhe, Leven and Eil, sea loch egg wrack beds at two locations in Loch Leven and the flame shell bed at Port Appin, Loch Linnhe. Despite strong evidence for the recent decline of this latter bed, it possibly still represents, in combination with the nearby bed in Loch Creran (Trigg *et al.*, 2011), the major supplier of *Limaria hians* larvae for the Loch Linnhe system.

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Appendix 1 Data recording forms

Appendix 1.1 Drop-down video survey recording form

Loch Linnhe 2011 video survey *Surveyors:*

Site code	Target PMF:		Target depth (m):
Vessel		**Date**	

Time in			
GPS waypoint in		Latitude & longitude in	
Depth BSL in			

Time out			
GPS waypoint out		Latitude & longitude out	
Depth BSL out			

Substrate notes	
Biological notes & abundance estimates	
Video footage (tape no)	

Appendix 1.3 Pro forma *for diver surveying of* Limaria *and* Modiolus *habitat*

Site			
Depth (BSL m)			
% Limaria nest cover			
Thickness Limaria nest (mean cm)			
Limaria seen? (Y/N)			
Isolated Limaria nests seen? (Y/N)			
Sediment type			
% brittlestar cover			
Modiolus SACFOR abundance			
Comments/biota notes			
Surveyor			

Appendix 2 Video survey data

Table 2.1 Details of sites and video data collected for the drop-down and diver video survey. Drop-down sites are coded Sx and the video medium is miniDV tape, whilst diver sites are coded Dx and the medium is computer file

Site	Date	Latitude in	Long'de in	Latitude out	Long'de out	Depth in (m)	Depth out (m)	Media identifier (tape no. or original filename)	Video in (m:s)	Video out (m:s)
S1	23/08/2011	56.85732	-5.31397	56.85717	-5.31378	1.2	4.2	D-LINNHE-0811-5	00:00	08:00
S2	23/08/2011	56.85459	-5.20875	56.85456	-5.20878	1.2	3.4	D-LINNHE-0811-5	08:00	15:43
S3	23/08/2011	56.84667	-5.18103	56.84653	-5.18097	2.5	1.5	D-LINNHE-0811-4	08:17	13:54
S4	23/08/2011	56.84860	-5.17590	56.84874	-5.17628	41.2	40.2	D-LINNHE-0811-4	22:42	26:42
S5	23/08/2011	56.85016	-5.17464	56.85091	-5.17534	20.1	16.8	D-LINNHE-0811-4	13:54	22:42
S6	23/08/2011	56.84808	-5.17273	56.84836	-5.17260	27.2	30.1	D-LINNHE-0811-4	26:42	32:24
S7	23/08/2011	56.84753	-5.16986	56.84796	-5.16966	13.0	10.1	D-LINNHE-0811-4	32:24	43:44
S8	23/08/2011	56.84495	-5.16840	56.84497	-5.16845	5.0	5.1	D-LINNHE-0811-4	43:44	48:50
S9	23/08/2011	56.83895	-5.15428	56.83873	-5.15323	5.2	5.2	D-LINNHE-0811-4	48:50	53:41
S10	23/08/2011	56.83774	-5.14259	56.83775	-5.14260	4.6	4.7	D-LINNHE-0811-4	53:41	59:10
S15	23/08/2011	56.82138	-5.12626	56.82121	-5.12695	6.3	2.9	D-LINNHE-0811-4	00:00	08:17
S17	22/08/2011	56.68771	-5.17449	56.68755	-5.17499	3.3	3.7	D-LINNHE-0811-3	32:06	34:54
S18	22/08/2011	56.68817	-5.17321	56.68813	-5.17396	18.8	8.8	D-LINNHE-0811-3	34:54	38:20
S18	22/08/2011	56.68813	-5.17396	56.68810	-5.17427	8.8	4.1	D-LINNHE-0811-3	38:20	39:36
S19	22/08/2011	56.68752	-5.17259	56.68750	-5.17311	18.1	14.1	D-LINNHE-0811-3	39:36	45:12
S20	22/08/2011	56.68683	-5.17265	56.68678	-5.17282	14.8	12.3	D-LINNHE-0811-3	45:12	49:49
S21	22/08/2011	56.68703	-5.17173	56.68683	-5.17227	17.7	14.4	D-LINNHE-0811-3	49:49	55:42
S23	22/08/2011	56.68234	-5.15974	56.68238	-5.15988	8.5	8.6	D-LINNHE-0811-3	00:00	05:37
S24	22/08/2011	56.68257	-5.15590	56.68252	-5.15602	22.0	18.6	D-LINNHE-0811-3	05:37	09:34
S25	22/08/2011	56.68195	-5.15709	56.68199	-5.15721	17.6	16.3	D-LINNHE-0811-3	09:34	12:50
S25	22/08/2011	56.68199	-5.15721	56.68219	-5.15757	16.3	12.4	D-LINNHE-0811-3	12:50	16:22
S25	22/08/2011	56.68219	-5.15757	56.68220	-5.15758	12.4	12.4	D-LINNHE-0811-3	16:22	16:25
S26	22/08/2011	56.68133	-5.15809	56.68148	-5.15857	8.4	6.9	D-LINNHE-0811-3	16:25	20:09
S26	22/08/2011	56.68148	-5.15857	56.68161	-5.15916	6.9	7.1	D-LINNHE-0811-3	20:09	25:38
S27	22/08/2011	56.68157	-5.15532	56.68156	-5.15537	26.0	26.2	D-LINNHE-0811-3	25:38	29:59
S28	19/08/2011	56.56919	-5.40814	56.56936	-5.40821	14.3	15.2	D-LINNHE-0811-2	36:34	41:14
S29	19/08/2011	56.56773	-5.41161	56.56772	-5.41134	10.2	10.5	D-LINNHE-0811-2	26:17	31:31
S30	19/08/2011	56.56653	-5.40702	56.56656	-5.40718	22.9	22.8	D-LINNHE-0811-2	31:31	36:34
S31	19/08/2011	56.56446	-5.41141	56.56530	-5.41007	10.0	11.0	D-LINNHE-0811-1	00:00	05:58
S32	19/08/2011	56.56254	-5.41521	56.56299	-5.41440	6.4	7.9	D-LINNHE-0811-1	05:58	11:18
S33	19/08/2011	56.56174	-5.41246	56.56145	-5.41308	5.0	5.7	D-LINNHE-0811-1	11:18	17:59
S34	19/08/2011	56.56094	-5.41590	56.56112	-5.41586	7.6	7.1	D-LINNHE-0811-1	17:59	27:38
S35	19/08/2011	56.55956	-5.41858	56.55871	-5.41908	7.5	9.1	D-LINNHE-0811-1	27:38	35:30
S36	19/08/2011	56.55815	-5.41645	56.55711	-5.41777	4.8	4.6	D-LINNHE-0811-1	35:30	43:20
S37	19/08/2011	56.55758	-5.41315	56.55752	-5.41320	1.4	1.6	D-LINNHE-0811-1	43:20	47:25
S38	19/08/2011	56.55595	-5.42103	56.55486	-5.42237	12.1	14.2	D-LINNHE-0811-1	47:25	52:18
S39	19/08/2011	56.55462	-5.42577	56.55368	-5.42681	10.1	11.4	D-LINNHE-0811-1	52:18	56:29
S40	19/08/2011	56.55377	-5.42017	56.55323	-5.42141	7.4	8.8	D-LINNHE-0811-2	00:00	05:52
S40	19/08/2011	56.55323	-5.42141	56.55290	-5.42219	8.8	9.3	D-LINNHE-0811-2	05:52	09:00
S41	19/08/2011	56.55147	-5.42499	56.55004	-5.42621	12.2	11.3	D-LINNHE-0811-2	09:00	15:25

Table 2.1 continued

Site	Date	Latitude in	Long'de in	Latitude out	Long'de out	Depth in (m)	Depth out (m)	Media identifier (tape no. or original filename)	Video in (m:s)	Video out (m:s)
S42	19/08/2011	56.55101	-5.42350	56.55087	-5.42376	12.5	14.3	D-LINNHE-0811-2	15:25	17:45
S42	19/08/2011	56.55087	-5.42376	56.55033	-5.42400	14.3	21.9	D-LINNHE-0811-2	17:45	26:17
S43	22/08/2011	56.68197	-5.15575	56.68189	-5.15566	21.7	22.6	D-LINNHE-0811-3	29:59	32:06
S44	22/08/2011	56.68814	-5.17362	56.68803	-5.17400	14.1	7.6	D-LINNHE-0811-3	55:42	57:53
D26	23/08/2011	56.77885	-5.16680	56.77880	-5.16655	5.5	1.1	20110823121339.m2ts	00:00	05:31
D27	23/08/2011	56.83873	-5.13838	56.83880	-5.13883	8.4	9.0	20110823131110.m2ts	00:00	08:34
D28	23/08/2011	56.83727	-5.13657	56.83732	-5.13697	15.8	14.2	20110823134513.m2ts	00:00	07:47
D29	23/08/2011	56.83680	-5.13223	56.83660	-5.13193	8.6	7.9	20110823144541.m2ts	00:00	10:58
D30	23/08/2011	56.83618	-5.12900	56.83623	-5.12900	7.1	7.5	20110823152351.m2ts	00:00	03:10
D30	23/08/2011	56.83623	-5.12900	56.83627	-5.12900	7.5	7.8	20110823152351.m2ts	03:10	05:09
D31	23/08/2011	56.85002	-5.17468	56.85023	-5.17467	21.8	19.8	20110823160434.m2ts	00:00	05:43
D32	23/08/2011	56.84770	-5.16943	56.84820	-5.16998	13.9	11.1	20110823164955.m2ts	00:00	02:21
D34	24/08/2011	56.84933	-5.17267	56.84923	-5.17260	21.5	15.4	20110824134120.m2ts	00:00	02:30
D34	24/08/2011	56.84923	-5.17260	56.84905	-5.17247	15.4	11.3	20110824134120.m2ts	02:30	06:40
D37	24/08/2011	56.84795	-5.16972	56.84795	-5.16972	14.1	10.1	20110824152024.m2ts	00:00	18:02
D38	24/08/2011	56.83593	-5.12402	56.83578	-5.12290	7.4	10.1	20110824160237.m2ts	00:00	06:18

Table 2.2 Substrates, biota, biotopes and PMFs/MPA search features recorded during the drop-down and diver video survey. Drop-down sites are coded Sx and diver sites Dx

Site	Substrate	Biota	Biotopes	PMFs
S1	Silty pebbles and gravel	Stones with extensive cover by short algal turf, dominated by *Trailliella intricata* (S) (sampled) and sparse foliose red algae (R). Serpulid worms are also present on stones but appear largely dead. Sparse *Saccharina latissima* (O). Paguridae spp. (F), *Pomatoschistus* sp. (R), *Psammechinus miliaris* (O)	SS.SMp.KSwSS.LsacR.Mu	KS
S2	Muddy sand with generally dense cover of pebbles and gravel	Patches of dense *Saccharina latissima* (possibly F overall), otherwise mostly a short algal turf covering the stones (S), apparently mostly filamentous with only sparse foliose red algae (R). The stones are sparsely encrusted with serpulid worms (P) and pink coralline algae (R). *Carcinus maenas* (O), Paguridae sp. (R), *Pomatoschistus* sp. (P)	SS.SMp.KSwSS.LsacR.Mu	KS
S3	Fine sand with large *Arenicola* hummocks in places and very sparse cobbles	Some patches of *Saccharina latissima* (at least some of which is drift) but an infaunally-dominated habitat with other algae and other surface life very sparse. *Arenicola marina* (C) and a brown diatomaceous mat (A). *Asterias rubens* (R)	SS.SSa.IMuSa.AreISa	
S4	Cobbles, small boulders and pebbles on gravelly sediment	Impoverished fauna. Stones encrusted with serpulid worms (C) including *Spirobranchus* spp. (C) and supporting sparse *Protanthea simplex* (R). *Psammechinus miliaris* (F), *Hyas arenarius* (O), *Asterias rubens* (R), *Munida rugosa* (R), Paguridae sp. (R)	SS.SMx.CMx	
S5	Dense pebbles and cobbles with *Modiolus* shells on shell gravel	Scattered clumps and individuals of live *Modiolus modiolus* (C?) with shells and stones encrusted with *Spirobranchus* spp. (C) but otherwise a fairly sparse fauna. *Psammechinus miliaris* (F), *Echinus esculentus* (O), *Protanthea simplex* (O), *Pagurus bernhardus* (R), Paguridae sp. (R), *Asterias rubens*? (R)	SS.SBR.SMus.ModT	HM
S6	Highly mixed substrate of pebbles, cobbles and gravel on coarse sand	Fairly bare looking stones apart from light encrustation of serpulid worms (F), frequent *Protanthea simplex* and fairly sparse hydroid clumps (O). *Cerianthus lloydii frequent* in the sediment between stones. *Psammechinus miliaris* (F), Paguridae sp. (R), *Echinus esculentus* (P), *Ophiothrix fragilis* (R), *Asterias rubens*? (P)	SS.SMx.CMx	

Table 2.2 continued

Site	Substrate	Biota	Biotopes	PMFs
S7	Mixed cobbles, pebbles, gravel and occasional boulders with areas of dense *Modiolus* shells	Stones and shells encrusted with serpulid worms (C) including *Spirobranchus* spp. (C) and pink coralline algae (R) and supporting dense population of *Protanthea simplex* (C, locally A) and hydroids (R) including *Tubularia indivisa*. *Psammechinus miliaris* is common and abundant in places. Live *Modiolus modiolus* is present, possibly common at least in places. *Asterias rubens* (F), *Ophiothrix fragilis* (C), *Pagurus bernhardus* (O), *Hyas arenarius* (R)	SS.SBR.SMus.ModT	HM
S8	Cobbles, boulders and pebbles	Forest of *Laminaria hyperborea* (A) with some fronds heavily epiphytised with *Obelia geniculata* and some stipes with dense red algae (especially *Phycodrys rubens*), *Halichondria panicea* and *Mytilus edulis*. Stones are encrusted with *Balanus* spp. (C), serpulid worms (C) and pink coralline algae (O) and support *Onchidoris bilamellata* (locally S) and its egg strings, together with hydoid/bryozoan clumps (F) including *Tubularia indivisa* (O) and a fairly sparse foliose red algal flora (F) including *Delesseria sanguinea* and *P. rubens*. *Psammechinus miliaris* (P)	IR.MIR.KT.XKTX	TS
S9	Cobbles, boulders and pebbles	Forest of *Laminaria hyperborea* (A) with some fronds heavily epiphytised with *Obelia geniculata*. Stones are encrusted with *Balanus* spp. (C), pink coralline algae (O) and *Halichondria panicea* (R) and support occasional hydoid clumps including *Tubularia indivisa* (R) and a foliose red algal flora (C) including *Phycodrys rubens* (P) and *Delesseria sanguinea* (P). *Asterias rubens* (P)	IR.MIR.KT.XKTX	TS
S10	Cobbles, pebbles and gravel	Scattered *Laminaria hyperborea* with some fronds heavily epiphytised with *Obelia geniculata*. Stones are encrusted with *Balanus* spp. (C) and pink coralline algae (O) and support a foliose red algal turf (C) composed of *Delesseria sanguinea* (P), *Phycodrys rubens*? (P) and *Odonthalia dentata* (P)	IR.MIR.KT.XKTX	TS
S15	Slightly silty fine sand with very sparse surface scatter of gravel, pebbles and shells	Although *Saccharina latissima* is occasional, clearly an infaunally-dominated habitat with few if any other algae and little sign of surface life apart from occasional *Asterias rubens* and *Astropecten irregularis*? (R). Apparently a thin brown diatomaceous mat covers the sediment surface (A)	SS.SSa. IMuSa	

Table 2.2 continued

Site	Substrate	Biota	Biotopes	PMFs
S17	Boulders and cobbles	Dense *Laminaria hyperborea* forest (A), with *Saccharina latissima* (F). Boulders apparently encrusted with *Balanus* spp. (C) and support a flora dominated by *Desmarestia* spp. (*D. aculeata*, O; *D. viridis* possibly also present), with sparse red algae (O) and *Ulva* sp. (R). Older kelp stipes support a dense red algal flora, while *Callithamnion* sp.? is present on frond tips.	IR.MIR.KT.XKTX	TS
S18	Cobbles with some pebbles, small boulders and *Modiolus* shells	Cobbles encrusted with *Balanus* spp. (C) and serpulid worms (C) and supporting an erect sessile fauna of *Alcyonium digitatum* (F) and a bryozoan/hydroid turf (C), possibly largely *Eucratea loricata*; *Tubularia indivisa* (R). Some live *Modiolus modiolus* may be present. The stones are heavily coated (c. 25% cover) in the white spiral egg ribbons of *Onchidoris bilamellata*. The motile fauna includes *Asterias rubens* (C), *Echinus esculentus* (C), *Carcinus maenas* (O), *Liocarcinus* sp. (R), *Cancer pagurus* (P) and *Hyas* sp. (P)	SS.SMx.CMx	
S18	Cobbles and pebbles with occasional boulders	Park of *Laminaria hyperborea* with stones encrusted with serpulid worms (C) and pink coralline algae and supporting turf of bryozoans/hydroids (*Eucratea loricata*?, F) and foliose red algae (C) and extensive coverage of *Onchidoris bilamellata* egg ribbons (c.25%). *Asterias rubens* (C), *Echinus esculentus* (P)	IR.MIR.KT.XKTX	TS
S19	Cobbles and small boulders on pebbly gravelly substrate	Stones encrusted with *Balanus* spp. (A, probably *B. crenatus*) and serpulid worms (C), including *Spirobranchus* spp. (C), and supporting an erect fauna including a patchy turf of *Eucratea loricata*? (C), *Alcyonium digitatum* (O), *Protanthea simplex* (R), *Urticina* spp. (R), *Metridium senile* and *Sagartia elegans* (R). The habitat is experiencing a mass swarming of *Onchodis bilamellata* (A, locally S) which has coated around 20% of the stone surface with its egg ribbons. *Cerianthus lloydii* is common in sediment between the stones. *Carcinus maenas* (C), *Galathea* sp. (P), Paguridae spp. (O), *Asterias rubens* (F), *Crossaster papposus* (R), *Solaster endeca* (R), *Echinus esculentus* (R)	SS.SMx.CMx	

Table 2.2 continued

Site	Substrate	Biota	Biotopes	PMFs
S20	Cobbles and pebbles on gravelly coarse sand	Stones encrusted with *Balanus* spp. (F) and serpulid worms (C), including *Spirobranchus* spp. (P) and supporting sparse patches of hydroids/bryozoans (O) and around 20% coverage by *Onchidoris bilamellata* egg ribbons. Occasional kelp plants including *Laminaria hyperborea* and *Saccharina latissima*. *Cerianthus lloydii* present in sediment. *Urticina* sp. (R), *Asterias rubens* (O), *Necora puber* (R), *Galathea* sp. (P), *Crossaster papposus* (R)	SS.SMx.CMx	
S21	Cobbles and pebbles on gravelly coarse sand	Stones encrusted with serpulid worms (A), including *Spirobranchus* spp. (C-A), *Balanus* spp. (P) and supporting *Alcyonium digitatum* (F), sparse patches of hydroids/bryozoans (O) and around 20% coverage by *Onchidoris bilamellata* egg ribbons. Dense aggregations of *Onchidoris bilamellata* (A) occur on the stones. *Cerianthus lloydii* is common in the sediment. *Urticina eques* (R), *Asterias rubens* (F), *Carcinus maenas* (O), *Echinus esculentus* (P), *Crossaster papposus* (O)	SS.SMx.CMx	
S23	Dense pebbles and cobbles on coarse sand	Scattered kelp (mostly *Laminaria hyperborea*- C) with red algal turf dominated by *Phycodrys rubens* (A). Stones are encrusted with pink coralline (R) and red (R) algae and serpulid worms (C), with occasional *Alcyonium digitatum*. Motile fauna includes *Echinus esculentus* (C), *Taurulus bubalis* (P), *Galathea* sp. (P), *Crossaster papposus* (P), *Psammechinus miliaris* (P). *Modiolus modiolus* is present at low density (P) and dense *Cerianthus lloydii* occurs in the sediment (C)	IR.MIR.KR.LhypTX.Ft	TS
S24	Dense pebbles and cobbles on sand	Dense bed of *Ophiothrix fragilis* (S) with bare patches. Stones are encrusted with serpulid worms (F) and provide cover for *Munida rugosa* (F). *Echinus esculentus* (P), *Psammechinus miliaris* (P), *Pagurus bernhardus* (O), *Pholis gunnellus* (P), *Crossaster papposus* (P)	SS.SMx.CMx.OphMx	

Table 2.2 continued

Site	Substrate	Biota	Biotopes	PMFs
S25	Dense pebbles and cobbles with *Modiolus* shells	Apparent clumps of *Modiolus modiolus* (possibly C) - confirmed by diving observations. Stones encrusted with serpulid worms (C) including *Spirobranchus* spp. (C) and supporting sparse *Alcyonium digitatum* (O) and hydroids (R). *Ophiothrix fragilis* initially abundant but rare overall; *Ophiocomina nigra* (R). *Crossaster papposus* (P), *Aequipecten opercularis* (P), *Echinus esculentus* (P)	SS.SBR.SMus.ModT	HM
S25	Dense pebbles and occasional cobbles on gravelly sand and (towards end) shell gravel	Stones encrusted with *Spirobranchus* spp. (A) and pink coralline algae (O) and supporting sparse *Alcyonium digitatum* (R). *Aequipecten opercularis* (R), *Munida rugosa* (R), *Psammechinus miliaris* (O), *Echinus esculentus* (F), *Callionymus* sp.? (P), Brachyura sp. (R). *Laminaria hyperborea* present but probably drift material	SS.SMx.CMx	
S25	Smooth bedrock slope	Rock encrusted with *Spirobranchus* spp. (C) and grazed by *Echinus esculentus* (C). *Alcyonium digitatum* (R)	CR.MCR. EcCr.FaAlCr	
S26	Bedrock slope with small coarse sand pockets	A park of *Laminaria hyperborea* with older stipes densely epiphytised with red algae, hydroids? and *Sabella* sp., and some fronds densely coated with *Obelia geniculata*. The rock supports a rich stand of *Alcyonium digitatum* (C, locally A) and a red algal turf (C) dominated by *Phycodrys rubens* (C), which diminishes with depth. The rock is also encrusted with *Spirobranchus* spp. (C) and pink coralline algae (F). *Echinus esculentus* (C), *Crossaster papposus* (O), *Asterias rubens* (O), Crinoidea sp. (R), *Saccharina latissima* (P)	IR.MIR.KT.XKT	TS
S26	Dense pebbles and cobbles and sparse *Modiolus* shells on coarse sand with small bedrock outcrops	A park of small *Laminaria hyperborea* (F) with a red algal turf (C) dominated by *Phycodrys rubens* (C). Stones are encrusted with serpulid worms (C) including *Spirobranchus* spp. (C), *Balanus* spp. (C) and pink coralline algae (O) and support scattered *Alcyonium digitatum* (O, locally F). *Echinus esculentus* (C), *Asterias rubens* (F), *Carcinus maenas* (O)	IR.MIR.KT.XKTX	TS
S27	Dense pebbles and cobbles and occasional small boulders on coarse sand	A patchy *Ophiothrix fragilis* bed (A, locally S), with stones encrusted with serpulid worms (C), including *Spirobranchus* spp. (C), and sparse *Chaetopterus variopedatus* (R) in the sediment	SS.SMx.CMx.OphMx	

Table 2.2 continued

Site	Substrate	Biota	Biotopes	PMFs
S28	Dense pebbles and cobbles on gravelly sand	Park of small *Laminaria hyperborea* (F) with fronds coated in moderate cover of *Obelia geniculata*. Stones support an extensive algal turf (A) dominated by *Plocamium cartilagineum*? (A), with *Callophyllis laciniata* (R), *Dictota dichotoma* (P) and *Ulva lactuca* (R). *Echinus esculentus* (F), *Asterias rubens* (P), *Liocarcinus* sp. (P)	IR.MIR.KR.LhypTX.Pk	TS
S29	Slightly silty sand with surface scatter of pebbles	Park of *Saccharina latissima* (F) with patchy red algal turf (C); *Ulva lactuca* (R). *Astropecten irregularis*? (P), *Echinus esculentus* (P), *Inachus* sp. (R)	SS.SMp.KSwSS.LsacR.Sa	KS
S30	Gravelly sand with variable cover of pebbles, dense in places	Stones support encrusting community of serpulid worms (C), pink coralline algae (O) and possibly barnacles (P). Drift kelp and smaller algae present but attached red algae rare. *Echinus esculentus* (O), *Asterias rubens* (P), *Henricia* sp.? (R), shoal of juvenile gadoids	SS.SMx.CMx	
S31	Dense pebbles and gravel on coarse? sand with scattered cobbles	Patchy *Limaria* nest turf covering around 50% of the seabed, although bare patches present, particularly towards the end of the run. The turf and stones support a luxuriant sward of red algae strongly dominated by *Plocamium cartilagineum* (S) with *Delesseria sanguinea* (O), as well as *Laminaria hyperborea* (C). The motile fauna includes *Liocarcinus depurator* (P), *Macropodia* sp. (P) and *Asterias rubens* (P)	SS.SMx.IMx.Lim	FS
S32	Pebbles and gravel with scattered cobbles	Kelp forest dominated by *Laminaria hyperborea* (C) (with older stipes heavily epiphytised by red algae) and with occasional *Saccharina latissima*. Stones support a patchy red algal turf dominated by *Plocamium cartilagineum* (C), with *Delesseria sanguinea* (O), *Callophyllis laciniata*? (R) and *Dilsea carnosa* (R), as well as serpulid worms (C). Motile species include *Asterias rubens* (P) and *Echinus esculentus* (P)	IR.MIR.KR.LhypTX.Ft	TS

Table 2.2 continued

Site	Substrate	Biota	Biotopes	PMFs
S33	Coarse sand with gravel, pebbles and occasional boulders	Kelp forest dominated by *Laminaria hyperborea* (C) (with older stipes heavily epiphytised by red algae) and with occasional *Saccharina latissima*. There appears to be patches of uprooted drift kelp material. Stones support a patchy algal turf dominated by *Plocamium cartilagineum* (F) and *Dictyota dichotoma* (O, locally F), with *Odonthalia dentata* (R), *Callophyllis laciniata* (R), *Ulva lactuca* (R) and *Dilsea carnosa* (R). Motile species include *Liocarcinus* sp. (P) and *Echinus esculentus* (P)	IR.MIR.KR.LhypTX.Ft	TS
S34	Coarse sand with dense gravel and pebbles and with scattered cobbles and boulders	Abundant *Laminaria hyperborea* with some stipes heavily epiphytised by red algae and holdfasts supporting *Alcyonium digitatum* (P). A sparse red algal turf (F) includes *Callophyllis laciniata* (P); *Desmarestia aculeata* (R). Stones are encrusted with serpulid worms (C). *Hyas araneus* (P)	IR.MIR.KR.LhypTX.Ft	TS
S35	Dense pebbles and gravel on coarse sand with scattered cobbles	Kelp forest dominated by *Laminaria hyperborea* (C) (with some stipes heavily epiphytised by red algae) and with occasional *Saccharina latissima*. Stones support a patchy algal turf dominated by *Plocamium cartilagineum* (C), with *Dictyota dichotoma* (R), *Callophyllis laciniata* (P) and *Delesseria sanguinea* (R) and serpulid worms (C) including *Spirobranchus* spp. (P). Motile species include *Asterias rubens* (C), *Echinus esculentus* (F) and Brachyura sp. (P)	IR.MIR.KR.LhypTX.Ft	TS
S36	Pebbles with scattered cobbles and boulders	Dense kelp forest dominated by *Laminaria hyperborea* (with some stipes heavily epiphytised by red algae) and with sparse *Saccharina latissima*. Sparse and patchy algal turf (F), dominated by red algae but with *Dictyota dichotoma* (R). *Asterias rubens* (P), *Echinus esculentus* (P)	IR.MIR.KR.LhypTX.Ft	TS
S37	Gravelly sand with scattered *Ensis* shells	Dense algal turf (A) dominated by *Dictyota dichotoma* (C), *Ulva lactuca* (F), red algae (O) and *Desmarestia aculeata* (R), with abundant *Chorda filum* and *Saccharina latissima* (C). *Macropodia* sp. (P)	SS.SMp.KSwSS.LsacR.Sa	KS

Table 2.2 continued

Site	Substrate	Biota	Biotopes	PMFs
S38	Pebbles and cobbles	Stones encrusted with serpulid worms (C) and barnacles (P) and supporting a patchy red algal turf (F) including *Delesseria sanguinea* (P) and *Plocamium cartilagineum*? (P). *Laminaria hyperborea* is initially common but is frequent overall, the fronds supporting dense *Obelia geniculata*. *Echinus esculentus* (O)	IR.MIR.KR.LhypTX.Pk	TS
S39	Dense pebbles on gravelly sand	*Limaria* nest material covers around 80% of the seabed and supports a luxuriant turf of *Plocamium cartilagineum* (S), *Laminaria hyperborea* (F-C) and *Saccharina latissima* (P). *Asterias rubens* (P), *Necora puber* (P)	SS.SMx.IMx.Lim	FS
S40	Pebbles and shells on gravelly sand with scattered cobbles	*Laminaria hyperborea* and *Saccharina latissima* common with patchy algal turf (F) dominated by *Plocamium cartilagineum* (F) with *Dictyota dichotoma* (O); some *L. hyperborea* stipes supporting rich red algal epiphyte community. Motile fauna includes *Asterias rubens* (P), *Echinus esculentus* (P) and *Necora puber* (P)	IR.MIR.KR.LhypTX.Ft	TS
S40	Dense pebbles on gravelly sand with scattered cobbles and boulders	*Limaria* nest material increases during run, averaging around 80% cover and supporting luxuriant red algal turf strongly dominated by *Plocamium cartilagineum* (S); *Delesseria sanguinea* (P), *Callophyllis laciniata* (P), *Ulva lactuca* (P). *Asterias rubens* (P), *Echinus esculentus* (P)	SS.SMx.IMx.Lim	FS
S41	Pebbles and shell gravel with patches of dead *Modiolus* shells and scattered cobbles and boulders	A park of *Laminaria hyperborea* (F) supporting dense coverage of *Obelia geniculata* and some *Membranipora membranacea* on the fronds. Stones and shells encrusted with serpulid worms (C) and supporting sparse red algal tufts (O). *Asterias rubens* (F), *Echinus esculentus* (P), *Liocarcinus* sp. (P)	IR.MIR.KR.LhypTX.Pk	TS
S42	Pebbles and gravel with scattered cobbles	Stones support a red algal turf dominated by *Plocamium cartilagineum* (C) and serpulid worms (C) with scattered plants of small *Laminaria hyperborea* (F) with fronds densely coated in *Obelia geniculata*. *Asterias rubens* (F), *Echinus esculentus* (P), *Necora puber* (P)	IR.MIR.KR.LhypTX.Pk	TS

Table 2.2 continued

Site	Substrate	Biota	Biotopes	PMFs
S42	Pebbles and shell gravel on sand with extensive areas of dense *Modiolus* shells	Dense coverage of *Modiolus* shells includes some live material (probably C, but locally A). Stones and shells support serpulid worms (C), a hydroid turf (C) and *Alcyonium digitatum* (R but locally O). The motile fauna includes *Asterias rubens* (F), *Echinus esculentus* (F), *Liocarcinus depurator* (O), *Galathea* sp. (P), *Buccinum undatum* (P), *Calliostoma zizyphinum* (P), *Carcinus maenas* (P) and a shoal of juvenile gadoids	SS.SBR.SMus.ModT	HM
S43	Dense pebbles and cobbles on coarse sand	A patchy brittlestar bed with *Ophiothrix fragilis* (S) and *Ophiocomina nigra* (C). Stones are encrusted with serpulid worms (C), including *Spirobranchus* spp. (C). *Psammechinus miliaris* (O), *Echinus esculentus* (P), *Asterias rubens* (P)	SS.SMx.CMx.OphMx	
S44	Cobbles and pebbles on gravelly coarse sand	Stones encrusted with serpulid worms (C), including *Spirobranchus* spp. (C) and supporting *Alcyonium digitatum* (O, initially F), a patchy hydroid/bryozoan turf (C) and around 20% coverage by *Onchidoris bilamellata* egg ribbons. *Onchidoris bilamellata* (P), *Asterias rubens* (C), *Carcinus maenas* (P), *Crossaster papposus* (P), *Laminaria hyperborea* (R)	SS.SMx.CMx	
D26	Fine sand	*Arenicola marina* common with sediment covered by a brown diatomaceous film (C) and supporting *Caerianthus lloydii* (C), *Lanice conchilega* (R) and *Myxicola infundibulum* (R). Scattered plants of *Saccharina latissima* (O). *Chorda filum* (R), *Asterias rubens* (R), *Carcinus maenas* (O), *Pomatoschistus* sp. (P), Paguridae sp. (R)	SS.SSa.IMuSa.AreISa	
D27	Fine-medium sand with scattered pebbles and shells increasing in coverage to attain around 50% towards end	Stones and shells encrusted with serpulid worms (F) including *Spirobranchus* spp. (F), and sparse pink coralline algae (R) and supporting very sparse foliose red algae (R). A few live *Modiolus modiolus* observed (O). The infauna includes *Cerianthus lloydii* (C) and *Myxicola infundibulum* (R). The epifanal community is dominated by *Psammechinus miliaris* (C) and *Ophiura albida* (F), with *Buccinum undatum* (R), Paguridae sp. (R) and *Asterias rubens* (R)	SS.SMx.CMx	

Table 2.2 continued

Site	Substrate	Biota	Biotopes	PMFs
D28	Dense pebbles and cobbles on shell gravel	Scattered small kelp plants (F) including *Laminaria hyperborea* and *Saccharina latissima* with stones sparsely encrusted with serpulid worms (F) and pink coralline (O) and red (R) algae and supporting sparse foliose red algae (R), including *Delesseria sanfguinea*, and clumps of *Tubularia indivisa* (R). Paguridae spp. (O), *Buccinum undatum* (P), *Asterias rubens*? (P), Acmaeidae sp. (P). One live *Modiolus modiolus* observed	IR.MIR.KT.XKTX	TS
D29	Pebbles and *Modiolus* shells on shell gravel	Small kelp is common and locally abundant, mostly *Laminaria hyperborea*, with some fronds densely covered in *Obelia geniculata*. Stones and shells are encrusted in serpulid worms (C), including *Spirobranchus* spp. (C), pink coralline (F) and red (O) algae and support a patchy turf of foliose red algae (F), apparently dominated by *Phycodrys rubens* (F), and sparse hydroid tufts (R). *Modiolus modiolus* increases in density throughout the run, possibly varying from common to abundant. In the sediment between the stones and shells is *Cerianthus lloydii* (C, at least locally) and *Lanice conchilega* (R). *Psammechinus miliaris* (C), Paguridae spp. (O), Buccinidae sp. (R)	SS.SBR.SMus.ModT	HM
D30	Shell gravel with dense cover of *Modiolus* shells, pebbles and occasional cobbles	Apparently a *Modiolus modiolus* bed though proportion of live shells difficult to determine (possibly C). A forest of small *Laminaria hyperborea* (A) with shells and stones encrusted with serpulid worms (C) and pink coralline algae (O) and supporting a patchy turf of foliose red algae (C) which appears to be largely *Phycodrys rubens* (C). *Psammechinus miliaris* (C), *Gibbula cineraria* (P)	SS.SBR.SMus.ModT	HM
D30	Shell gravel with scattered pebbles and sparse shells	A park of small *Laminaria hyperborea* (C) with shell and stones sparsely encrusted with serpulid worms (P) and pink coralline algae (O) and supporting a patchy turf of foliose red algae (C), probably largely *Phycodrys rubens* (C). *Psammechinus miliaris* (P)	IR.MIR.KT.XKTX	TS
D31	Pebbles and *Modiolus* shells on shell gravel	Live *Modiolus modiolus* apparently abundant amongst the dead shells. The stones and shells are encrusted with serpulid worms (C) including *Spirobranchus* spp. (C) and *Serpula vermicularis* (P), and support *Protanthea simplex* (F), Paguridae spp. (O) and *Psammechinus miliaris* (P)	SS.SBR.SMus.ModT	HM

Table 2.2 continued

Site	Substrate	Biota	Biotopes	PMFs
D32	Mixed cobbles, pebbles, gravel and *Modiolus* shells	Stones and shells encrusted with serpulid worms (C) including *Spirobranchus* spp. (C) and supporting dense *Protanthea simplex* (C). *Modiolus modiolus* and *Psammechinus miliaris* are common	SS.SBR.SMus.ModT	HM
D34	Dense cobbles, pebbles and occasional small boulders with scattered *Modiolus* shells on sand	Stones and shells encrusted with serpulid worms (C), including *Spirobranchus* spp. (C) and *Serpula vermicularis* (P), and Anomiidae sp. (C on boulders). *Modiolus modiolus* is frequent. *Psammechinus miliaris* (A), *Ophiothrix fragilis* (P), Paguridae spp. (O), *Munida rugosa* (F), *Echinus esculentus* (P)	SS.SMx.CMx	
D34	Dense cobbles and small boulders with pebbles and *Modiolus* shells on sand	Live *Modiolus modiolus* common. Stones and shells encrusted with serpulid worms (C), including *Spirobranchus* spp. (C) and *Serpula vermicularis* (P), pink coralline algae (R) and Anomiidae sp. (C on boulders) and supporting sparse hydroids (R) including clumps of *Tubularia indivisa*, *Protanthea simplex* (R) and *Chlamys* sp. (R). *Psammechinus miliaris* (A), *Ophiothrix fragilis* (P), Paguridae spp. (O), *Munida rugosa* (F), *Echinus esculentus* (P), *Carcinus maenas* (R), Pleuronectiformes sp. (P). *Cerianthus lloydii* is present in sediment between the stones	SS.SBR.SMus.ModT	HM
D37	Dense pebbles and gravel with occasional cobbles on sand with areas of dense *Modiolus* and *Arctica* shells	Live *Modiolus modiolus* (F). Stones and shells encrusted with serpulid worms (C) including *Spirobranchus* spp. (C) and sparse pink coralline algae (R), and supporting dense *Protanthea simplex* (C, locally A); other anemones include *Sagartiogeton undatus*? (R) and *Actinothoe sphyrodeta*? (R). *Psammechinus miliaris* is generally abundant but is superabundant on drift kelp. Motile forms include *Asterias rubens* (F), *Liocarcinus* sp. (R), Paguridae spp. (F), *Ophiothrix fragilis* (F), *Hyas arenarius* (O) and *Callionymus lyra* (P). *Arctica islandica* (O), foliose red algae (R), hydroid clumps (R)	SS.SMx.CMx	AI

Table 2.2 continued

Site	Substrate	Biota	Biotopes	PMFs
D38	Initially shell gravel with shells and scattered cobbles becoming dense pebbles and cobbles in deeper water	Live *Modiolus* common. Stones and shells encrusted with *Spirobranchus* spp. (C) and pink coralline algae (O) and supporting a red foliose algal turf (C), apparently dominated by *Phycodrys rubens* (C), which declines in second half of run. Small *Laminaria hyperborea* is abundant in shallower water during the first half of the run. *Psammechinus miliaris* (C), hydroids (O), *Asterias rubens* (P), Paguridae spp. (P), *Flabellina pedata* (R)	SS.SBR.SMus.ModT	HM

Appendix 3 Diver survey data

Table 3.1 Positional and diver-collected data for all sites examined during flame shell and horse mussel bed surveys

Site	D1.1	D1.2	D2.1	D2.2	D2.3	D3.1	D3.2
Latitude	56.59160	56.58937	56.58890	56.58702	56.58465	56.58453	56.58298
Longitude	-5.40202	-5.40378	-5.40392	-5.40497	-5.40465	-5.40468	-5.40700
Survey area	Shuna Island West	Shuna Island West	Shuna Island West	Shuna Island West	Shuna Island West	Shuna Island West	Shuna Island West
Surveyor	Graham Saunders	Graham Saunders	Rob Cook	Rob Cook	Rob Cook	Colin Trigg	Colin Trigg
Date	19/08/2011	19/08/2011	19/08/2011	19/08/2011	19/08/2011	19/08/2011	19/08/2011
Time	08:50	09:32	09:59	10:16	10:36	11:12	11:51
Depth_BSL	11	11.5	13.3	13.8	14.5	12	12.7
Depth_CD	7.5	8.0	9.9	10.5	11.2	8.9	9.9
Substrate	Mixed gravel & muddy medium sand	Pebble, cobble & shell gravel overlaying mud	Sandy gravel + pebbles	Sandy gravel + pebbles	Shell + muddy sand	Gravel / shell on soft mud	Gravel on silty mud
Limaria nest % cover	0	0	0	0	0	0	0
Limaria nest thickness (cm)	0	0	0	0	0	0	0
Limaria seen (Y/N)	N	N	N	N	N	N	N
Brittle star % cover	0	0	1	5	0	0	0
Modiolus SACFORN	N	N	N	N	O	O	N
Notes	*Saccharina latissima* on boulders and cobbles. Moderate slope until 10.2m, then steep silt-covered bedrock	Well-grazed cape-form *Saccharina latissima* and scatttered red algal turf. Sediment becomes uniform mud at around 9.0 m	Possible dredge / scour marks present	Several dead *Dosinia* sp	Large expanse of dead *Dosinia* sp, with occasional *Modiolus* either singly or in small clumps	Filamentous reds 30%, *Dosinia* shells, *Modiolus* shells, *Saccharina latissima*, maerl <5%	Filamentous reds 40%, *Saccharina latissima*
Video (Y)							
Biotope							
PMF							

Table 3.1 continued

Site	D4.1	D4.2	D4.3	D4.4	D5.1	D5.2	D5.3
Latitude	56.55413	56.55300	56.55278	56.55222	56.55318	56.55268	56.55210
Longitude	-5.42640	-5.42647	-5.42653	-5.42667	-5.42180	-5.42175	-5.42240
Survey area	Appin	Appin	Appin	Appin	Appin	Appin	Appin
Surveyor	Colin Moore	Colin Moore	Colin Moore	Colin Moore	Dan Harries	Dan Harries	Dan Harries
Date	19/08/2011	19/08/2011	19/08/2011	19/08/2011	19/08/2011	19/08/2011	19/08/2011
Time	15:05	15:17	15:29	15:40	16:02	16:17	16:33
Depth_BSL	12.4	14.5	13.7	12.8	10.8	9.9	9.9
Depth_CD	11.1	13.2	12.5	11.6	9.6	8.7	8.7
Substrate	Gravelly sand with many pebbles and small cobbles	Dense pebbles and cobbles on shelly sand	Gravelly sand with dense cover of pebbles and small cobbles		Pebbles (~40%), gravel and coarse sand	Pebbles (~40%), gravel and coarse sand	Pebbles (~50%), gravel and coarse sand
Limaria nest % cover	80	0	50	0	70	0	40
Limaria nest thickness (cm)	12	0	5	0	5	0	5
Limaria seen (Y/N)	Y	N	Y	N	Y	N	Y
Brittle star % cover	0	0	0	0	0	0	0
Modiolus SACFORN	N	O	O	N	N	R	N
Notes	Dense *Plocamium; Laminaria hyperborea* common	*Plocamium* 5-10%, *Laminaria hyperborea* frequent, dense *Spirobranchus* on stones. 40 m beyond end of *Limaria* patch	*Laminaria hyperborea* common, *Plocamium* 45%. 10 m beyond start of *Limaria* patch	*Plocamium* 45%, *Laminaria hyperborea* frequent, *Spirobranchus* abundant on stones	*Laminaria hyperborea* common, *Plocamium* 60-70%. Swam south from here, after ~25m *Limaria* becomes more sparse, then no more seen	~10 m into open gravel area lacking *Limaria, Laminaria hyperborea* common, *Plocamium* 5-10%. From here swam slightly west of south to maintain depth; dense banks of dragged *L. hyperborea*. *Modiolus* seen	*Limaria* appeared ~30 m before this point with gradually increasing density. *Laminaria hyperborea* common, *Plocamium* 40%. From here swam ~190 deg; after ~20m *Limaria* ~80%, density remains high (40-80%) for long distance
Video (Y)							
Biotope	SS.SMx.IMx.Lim		SS.SMx.IMx.Lim		SS.SMx.IMx.Lim		SS.SMx.IMx.Lim
PMF	FS		FS		FS		FS

Table 3.1 continued

Site	D5.4	D6	D7	D8	D9	D10	D11.1
Latitude	56.55162	56.56415	56.56198	56.55890	56.55812	56.55600	56.55097
Longitude	-5.42292	-5.41218	-5.41247	-5.41905	-5.41658	-5.42010	-5.42395
Survey area	Appin	Appin	Appin	Appin	Appin	Appin	Appin
Surveyor	Dan Harries	Rob Cook	Tom Wilding	Dan Harries	Graham Saunders	Colin Trigg	Rob Cook
Date	19/08/2011	20/08/2011	20/08/2011	20/08/2011	20/08/2011	20/08/2011	20/08/2011
Time	16:48	12:10	12:31	15:11	15:30	15:52	16:20
Depth_BSL	11.1	12.5	9.5	10.9	7	14.2	16
Depth_CD	9.8	9.7	6.8	9.2	5.4	12.7	14.6
Substrate	Pebbles (~40%), gravel and coarse sand	Gravely sand, with pebbles and cobbles	Sand, gravel, rock	Pebbles (~90%), cobbles, gravel, coarse sand	Pebbles and shell gravel	Cobbles & stones on gravel	Shell gravel
Limaria nest % cover	5	80	0	0	0	0	0
Limaria nest thickness (cm)	2	5	0	0	0	0	0
Limaria seen (Y/N)	Y	Y	N	N	N	N	N
Brittle star % cover	0	0	0	0	0	0	0
Modiolus SACFORN	N	N	N	N	N	N	C
Notes	*Limaria* density reduced for ~20m before this point	*Limaria* abundant, *Laminaria hyperborea* occasional, red algal cover 80%.	*Saccharina latissima*, *Laminaria hyperborea*, 'turf' ~20-40%	*Laminaria hyperborea* common, *Plocamium* 10%	Tideswept dense and heavily fouled *Laminaria hyperborea*, often with understory of foliose and filamentous red algal clumps and common patches of *Dictyota dichotoma*	*Laminaria hyperborea* occasional, *Phycodrys* ~1%, *Delesseria* ~1%, *Cerianthus* frequent, *Urticina* frequent, hydroid turf 10%, *Crossaster* common, *Echinus*	Looked like either *Modiolus* reef, or old declined reef. Occasional *Alcyonium digitatum*
Video (Y)							
Biotope		SS.SMx.IMx.Lim					SS.SBR.SMus.ModT
PMF		FS					HM

Table 3.1 continued

Site	D11.2	D12	D13	D14	D15	D16	D17
Latitude	56.55050	56.49695	56.49715	56.56483	56.56082	56.55662	56.55508
Longitude	-5.42407	-5.68732	-5.68353	-5.40915	-5.41508	-5.41927	-5.42365
Survey area	Appin	Rubha an Ridire	Rubha an Ridire	Appin	Appin	Appin	Appin
Surveyor	Rob Cook	Tom Wilding	Morven	Rob Cook	Tom Wilding	Morven Carruthers	Dan Harries
Date	20/08/2011	21/08/2011	21/08/2011	21/08/2011	21/08/2011	21/08/2011	21/08/2011
Time	16:30	10:49	11:28	13:05	13:27	13:44	13:58
Depth_BSL	22.4	25	20	14.6	12.2	10.2	14.7
Depth_CD	21.0	21.9	17.0	12.0	9.6	7.7	12.3
Substrate	Shell gravel and dead *Modiolus* shells	GPS point at rocky reef, see notes		Pebbles and cobbles over sand		Shelly with stones & cobbles	Pebbles 60%,gravel 30%, coarse sand 10%
Limaria nest % cover	0	0	0	0	0	0	0
Limaria nest thickness (cm)	0	0	0	0	0	0	0
Limaria seen (Y/N)	N	N	N	N	N	N	N
Brittle star % cover	0	0	0	0	0	0	0
Modiolus SACFORN	S	N	N	N	N	N	N
Notes	Nice reef, patches of superabundant and abundant *Modiolus.* Juveniles present infaunaly. Would estimate it became *Modiolus* reef from 16.6m downwards.	GPS point on rocky reef. Also fine sand turning to coarse sand with megaripples, and at 21.3m dense *Arctica* shells,. *Antedon bifida* and *Virgularia*	Sandy slope beneath bedrock - shell scree - *Alcyonium,* foliose reds, *Saccharina latissima* & hydroids. *Antedon* + *Leptometra, Aequipecten opercularis*, nudibranchs	*Laminaria hyperborea* occasional.		Kelp, foliose reds, coralline algae	*Laminaria hyperborea* common. *Plocamium* 1-5%
Video (Y)							
Biotope	SS.SBR.SMus.ModT						
PMF	HM		LC				

Table 3.1 continued

Site	D18	D19	D20	D21.1	D21.2	D21.3	D22.1
Latitude	56.55320	56.55160	56.55245	56.55058	56.54967	56.54925	56.68828
Longitude	-5.42422	-5.42388	-5.42737	-5.42557	-5.42612	-5.42613	-5.18302
Survey area	Appin	Appin	Appin	Appin	Appin	Appin	Leven
Surveyor	Rob cook	Colin Trigg	Morven Carruthers	Graham Saunders	Graham Saunders	Graham Saunders	Tom Wilding
Date	21/08/2011	21/08/2011	21/08/2011	21/08/2011	21/08/2011	21/08/2011	22/08/2011
Time	14:15	15:20	15:45	16:16	16:25	16:35	11:02
Depth_BSL	13.5	12.8	13.2	16.1	18.1	19.6	8.5
Depth_CD	11.1	10.8	11.3	14.3	16.3	17.8	5.6
Substrate	Shell and gravel with pebbles and cobbles	Dead Maerl/gravel/shell	Shelly sand with cobbles and pebbles	Dead shell	Shell gravel over mud	Shell gravel over mud	
Limaria nest % cover	0	0	80	0	0	0	N/A
Limaria nest thickness (cm)	0	0	5	0	0	0	N/A
Limaria seen (Y/N)	N	N	Y	N	N	N	N/A
Brittle star % cover	0	0	0	0	0	0	N/A
Modiolus SACFORN	N	O	O	C	C	A	N
Notes	Occasional *Laminaria hyperborea* and red algal tufts	Dead maerl 90%, foliose reds 12%, live mearl <1%, *Laminaria hyperborea* rare, filamentous brown algae	Foliose red algae + *Ulva,* coralline algae, *Liocarcinus,* kelp.			Less dense shell; *Alcyonium digitatum*	
Video (Y)							
Biotope			SS.SMx.IMx.Lim	SS.SBR.SMus.ModT	SS.SBR.SMus.ModT	SS.SBR.SMus.ModT	
PMF			FS	HM	HM	HM	

Table 3.1 continued

Site	D22.2	D22.3	D23.1	D23.2	D23.3	D23.4	D24
Latitude	56.68798	56.68792	56.69050	56.69040	56.69015	56.69052	56.68198
Longitude	-5.18102	-5.18103	-5.17142	-5.17143	-5.17163	-5.17295	-5.15735
Survey area	Leven	Leven	Leven	Leven	Leven	Leven	Leven
Surveyor	Tom Wilding	Tom Wilding	Colin Trigg	Colin Trigg	Colin Trigg	Colin Trigg	Graham Saunders
Date	22/08/2011	22/08/2011	22/08/2011	22/08/2011	22/08/2011	22/08/2011	22/08/2011
Time	11:12	11:22	12:04	12:14	12:24	12:35	13:25
Depth_BSL			12.9	15.5	19.5	13.5	21.1
Depth_CD			9.9	12.5	16.5	10.5	18.3
Substrate			Sand/shell	Sand/shell	Reef/coarse sand/shell		Coarse gravel, pebbles, cobbles and *Modiolus* shell with areas of rocky reef
Limaria nest % cover	N/A	N/A	0	0	0	0	N/A
Limaria nest thickness (cm)	N/A	N/A	0	0	0	0	N/A
Limaria seen (Y/N)	N/A	N/A	N	N	N	N	N/A
Brittle star % cover	N/A	N/A	0	0	0	0	N/A
Modiolus SACFORN	N	N	S/A	S	S	O/R	C
Notes			Several metres north of position, bed ends abruptly. Bed appears to continue to east heading SW. Red algae	Ascidians, hydroids. Bed appears densest heading south. Few brittlestars	Rich fauna, head south extends west all the way to rock island	Bed ends	Sparse *Saccharina latissima*, *Ophiocomina nigra/Ophiothrix fragilis* common, *Modiolus* on sediment and clumps on rocky reef
Video (Y)							
Biotope			SS.SBR.SMus.ModT	SS.SBR.SMus.ModT	SS.SBR.SMus.ModT		SS.SBR.SMus.ModT
PMF			HM	HM	HM		HM

Table 3.1 continued

Site	D25	D26.1	D26.2	D27.1	D27.2	D28.1	D28.2
Latitude	56.68715	56.77885	56.77880	56.83873	56.83880	56.83727	56.83732
Longitude	-5.17192	-5.16680	-5.16655	-5.13838	-5.13883	-5.13657	-5.13697
Survey area	Leven	Upper Linnhe	Upper Linnhe	Upper Linnhe	Upper Linnhe	Upper Linnhe	Upper Linnhe
Surveyor	Tom Wilding	Graham Saunders	Graham Saunders	Morven Carruthers	Morven Carruthers	Colin Trigg	Colin Trigg
Date	22/08/2011	23/08/2011	23/08/2011	23/08/2011	23/08/2011	23/08/2011	23/08/2011
Time	14:59	12:14	12:20	13:11	13:20	13:45	13:53
Depth_BSL	20	8.1	3.7	10.9	11.4	18.3	16.7
Depth_CD	17.4	5.5	1.1	8.3	8.8	15.8	14.2
Substrate		Medium sand	Medium sand	Sandy with shells	Shelly sand with *Modiolus* shells	Cobbles on shelly sand	Cobbles on shelly sand
Limaria nest % cover	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Limaria nest thickness (cm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Limaria seen (Y/N)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Brittle star % cover	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Modiolus SACFORN	A	N	N	N	O	O	O
Notes		Steep slope with occasional-frequent *Cerianthus* and rare *Lanice*	Shallow slope with occasional *Saccharina latissima,* and *Lanice* present		Occasional live infaunal *Modiolus,* anemones, red algae	*Laminaria hyperborea* and *Saccharina latissima* on cobbles	Sponge on kelp
Video (Y)		Y	Y	Y	Y	Y	Y
Biotope	SS.SBR.SMus.ModT	SS.SSa.IMuSa.AreISa	SS.SSa.IMuSa.AreISa	SS.SMx.CMx	SS.SMx.CMx	IR.MIR.KT.XKTX	IR.MIR.KT.XKTX
PMF	HM						

Table 3.1 continued

Site	D29.1	D29.2	D30.1	D30.2	D31.1	D31.2
Latitude	56.83680	56.83660	56.83618	56.83627	56.85002	56.85023
Longitude	-5.13223	-5.13193	-5.12900	-5.12900	-5.17468	-5.17467
Survey area	Upper Linnhe	Upper Linnhe	Upper Linnhe	Upper Linnhe	Eil	Eil
Surveyor	Graham Saunders	Graham Saunders	Morven Carruthers	Morven Carruthers	Colin Trigg	Colin Trigg
Date	23/08/2011	23/08/2011	23/08/2011	23/08/2011	23/08/2011	23/08/2011
Time	14:46	14:57	15:24	15:29	16:05	16:10
Depth_BSL	11.1	10.4	9.7	10.4	24.3	22.2
Depth_CD	8.6	7.9	7.3	8.0	21.8	19.8
Substrate	Shell gravel, pebbles and cobbles	Shell gravel, pebbles and cobbles. *Modiolus* shells abundant	Coarse shell sand	Coarse shell sand	Cobbles/gravel	Gravel/broken shell
Limaria nest % cover	N/A	N/A	N/A	N/A	N/A	N/A
Limaria nest thickness (cm)	N/A	N/A	N/A	N/A	N/A	N/A
Limaria seen (Y/N)	N/A	N/A	N/A	N/A	N/A	N/A
Brittle star % cover	N/A	N/A	N/A	N/A	N/A	N/A
Modiolus SACFORN	C	A/S	A/S	O/F	A	A
Notes	Sparse *Saccharina latissima* and clumps of foliose red algae. *Modiolus* common	*Modiolus* increased to at least abundant. A mixture of *Saccharina latissima* and *Laminaria hyperborea* park with clumps of foliose red algae	Kelp and red alage	Kelp and red algae. Video transect met the edge of the Modiolus bed at approx half way. However, recce after video transect confirmed the bed continued in the other direction beyond transect length. Full extent not therefore confirmed		
Video (Y)	Y	Y	Y	Y	Y	Y
Biotope	SS.SBR.SMus.ModT	SS.SBR.SMus.ModT	SS.SBR.SMus.ModT	IR.MIR.KT.XKTX	SS.SBR.SMus.ModT	SS.SBR.SMus.ModT
PMF	HM	HM	HM		HM	HM

Table 3.1 continued

Site	D32.1	D32.2	D33.1	D33.2	D34.1	D34.2	D35.1
Latitude	56.84770	56.84820	56.85148	56.85223	56.84933	56.84905	56.85232
Longitude	-5.16943	-5.16998	-5.17825	-5.17830	-5.17267	-5.17247	-5.18475
Survey area	Eil	Eil	Eil	Eil	Eil	Eil	Eil
Surveyor	Graham Saunders	Graham Saunders	Morven Carruthers	Morven Carruthers	Dan Harries	Dan Harries	Rob Cook
Date	23/08/2011	23/08/2011	24/08/2011	24/08/2011	24/08/2011	24/08/2011	24/08/2011
Time	16:50	16:52	13:30	13:45	13:41	13:48	14:12
Depth_BSL	16.2	13.3	25.7	12.7	24.1	14	26.8
Depth_CD	13.9	11.0	23.1	10.1	21.5	11.4	24.1
Substrate	Pebble, cobble, shell gravel (shells mainly *Modiolus* and *Arctica*)	Pebble, cobble, shell gravel (shells mainly *Arctica*)	Coarse sand with cobbles	Coarse sand with cobbles	Steep (~20 deg?) slope of cobbles, small boulders & pebbles	Steep (~20 deg?) slope of cobbles, small boulders & pebbles	Steep slope of cobbles, small boulders & pebbles, over a coarse shelly substratum
Limaria nest % cover	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Limaria nest thickness (cm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Limaria seen (Y/N)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Brittle star % cover	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Modiolus SACFORN	C	F/C	C	F	F	C	F
Notes	*Modiolus* common (possibly abundant in clumps)	*Modiolus* reduced in density as depth decreases. *Arctica* dead shell increases substantially when compared with deeper. Live *Arctica* seen	*Echinus,* spirorbids, common dead shell. At points *Modiolus* abundant. At 16.3 m seabed starts to rise steeply. At 11.4 m no dead shell and *Modiolus* abundant		*Modiolus* appears quite sparse	*Modiolus* becoming more abundant at ~15.4 m. At 11.4 m abundance reduced but still higher than at 21.4 m	
Video (Y)	Y	Y			Y	Y	
Biotope	SS.SBR.SMus.ModT	SS.SBR.SMus.ModT	SS.SBR.SMus.ModT		SS.SMx.CMx	SS.SBR.SMus.ModT	
PMF	HM	AI	HM			HM	

Table 3.1 continued

Site	D35.2	D35.3	D36.1	D36.2	D37	D38.1
Latitude	56.85243	56.85248	56.85353	56.85360	56.84795	56.83593
Longitude	-5.18500	-5.18497	-5.19023	-5.19008	-5.16972	-5.12402
Survey area	Eil	Eil	Eil	Eil	Eil	Upper Linnhe
Surveyor	Rob Cook	Rob Cook	Colin Trigg	Colin Trigg	Graham Saunders	Morven Carruthers
Date	24/08/2011	24/08/2011	24/08/2011	24/08/2011	24/08/2011	24/08/2011
Time	14:19	14:27	14:55	15:05	15:30	16:03
Depth_BSL	20	15	19.7	6.1	17 to 13m	10.1
Depth_CD	17.3	12.2	16.9	3.2	14.1-10.1	7.4
Substrate	Bedrock cliff and terrace	Steep slope of cobbles, small boulders (more boulders shallower) & pebbles, over a coarse shelly substratum	Cobbles + stone on soft sediment	Boulders/cobbles on silty mud	Initially (14.1 m) hard packed pebbles, cobbles & shell gravel becoming increasingly dominated by shells *(Modiolus* & *Arctica*) at shlallower depths also muddier sediment. Steep bedrock seen at 10.1 m.	Coarse shell gravel
Limaria nest % cover	N/A	N/A	N/A	N/A	N/A	N/A
Limaria nest thickness (cm)	N/A	N/A	N/A	N/A	N/A	N/A
Limaria seen (Y/N)	N/A	N/A	N/A	N/A	N/A	N/A
Brittle star % cover	N/A	N/A	N/A	N/A	N/A	N/A
Modiolus SACFORN	A	F	N	N	F	C
Notes	No *Modiolus* on cliff, but abundant on terrace above cliff, together with abundant *Ophiothrix fragilis* and dense *Protanthea simplex*		*Protanthea* + *Galathea*	Edge of *Saccharina latissima*	*Modiolus* in clumps. 2 live *Arctica* found. *Saccharina latissima* in shallows. Abundant *Psammechinus*	
Video (Y)					Y	Y
Biotope	SS.SBR.SMus.ModT				SS.SMx.CMx	SS.SBR.SMus.ModT
PMF	HM					HM

Table 3.1 continued

Site	D38.2	D39.1	D39.2	D39.3	D39.4	D39.5
Latitude	56.83578	56.54950	56.55015	56.55035	56.55070	56.55108
Longitude	-5.12290	-5.42450	-5.42337	-5.42298	-5.42262	-5.42193
Survey area	Upper Linnhe	Appin	Appin	Appin	Appin	Appin
Surveyor	Morven Carruthers	Morven Carruthers	Morven Carruthers	Morven Carruthers	Morven Carruthers	Morven Carruthers
Date	24/08/2011	25/08/2011	25/08/2011	25/08/2011	25/08/2011	25/08/2011
Time	16:09	12:02	12:10	12:18	12:26	12:35
Depth_BSL	12.8	29.5	25.6	17.2	12.5	7.5
Depth_CD	10.1	27.4	23.5	15.0	10.3	5.2
Substrate	Stony bottom with coralline algae	Stones & pebbles on sand	Shelly drifts on sand	Shelly sand	Shelly sand	Sand
Limaria nest % cover	N/A	0	0	0	0	0
Limaria nest thickness (cm)	N/A	0	0	0	0	0
Limaria seen (Y/N)	N/A	N	N	N	N	N
Brittle star % cover	N/A	0	0	0	0	0
Modiolus SACFORN	C	F/O	C/A	F	N	N
Notes	Semi-infaunal *Modiolus*		Scallops, hydroids on *Modiolus*	Waypoint marks end of 'common' *Modiolus* but it continues as 'frequent'; red algae attached to shells	Waypoint marks end of 'frequent' *Modiolus;* red algae attached to shells	*Saccharina latissima*, red foliose algae, *Ulva,* maerl (dead)
Video (Y)	Y					
Biotope	SS.SBR.SMus.ModT		SS.SBR.SMus.ModT			
PMF	HM		HM			

Table 3.1 continued

Site	D40.1	D40.2	D40.3	D40.4	D40.5	D41.1	D41.2
Latitude	56.55753	56.55735	56.55870	56.56005	56.55978	56.55690	56.55763
Longitude	-5.42213	-5.42173	-5.42032	-5.41850	-5.41718	-5.42118	-5.42058
Survey area	Appin	Appin	Appin	Appin	Appin	Appin	Appin
Surveyor	Dan Harries	Dan Harries	Dan Harries	Dan Harries	Dan Harries	Colin Trigg	Colin Trigg
Date	25/08/2011	25/08/2011	25/08/2011	25/08/2011	25/08/2011	25/08/2011	25/08/2011
Time	13:20	13:30	13:40	13:50	14:00	14:30	14:39
Depth_BSL	6	9.1	9.5	9.9	13.5		12.4
Depth_CD	3.5	6.5	6.9	7.2	10.8	-2.8	9.5
Substrate	Rock slope	Pebbles & coarse sand with occasional boulders	Pebbles & coarse sand with occasional boulders	Pebbles & coarse sand with occasional boulders	Cobbles, pebbles & scattered boulders		Cobbles & boulders with shelly sand infill
Limaria nest % cover	0	0	0	0	0	0	0
Limaria nest thickness (cm)	0	0	0	0	0	0	0
Limaria seen (Y/N)	N	N	N	N	N	N	N
Brittle star % cover	0	0	0	0	0	0	0
Modiolus SACFORN	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Notes	Entry point for dive - landed in 3.5 m at base of rock slope with dense *Laminaria hyperborea.* Beyond this there was a boulder slope and areas of coarse sand. Base of boulder slope at 6.2 m - coarse sand with pebbles and scattered boulders. Large *Laminaria hyperborea* on the boulders and ~50% *Plocamium* on sediment surface (attached to pebbles)	Waypoint is the point reached at end of prev description (mixed sediment area a short distance beyond base of the rocky slope) - *Laminaria hyperborea* common, *Saccharina latissima*, *Plocamium* 50-60%	Drifted NE from previous waypoint - habitat basically unchanged	Drifted NE from previous waypoint - habitat basically unchanged	Swam SE into the channel from previous waypoint - *Laminaria hyperborea* common	Entry point for dive	Foliose reds & *Laminaria hyperborea* park
Video (Y)							
Biotope							
PMF							

Table 3.1 continued

Site	D41.3	D41.4	D41.5	D41.6
Latitude	56.55832	56.55897	56.55990	56.56093
Longitude	-5.41932	-5.41858	-5.41692	-5.41532
Survey area	Appin	Appin	Appin	Appin
Surveyor	Colin Trigg	Colin Trigg	Colin Trigg	Colin Trigg
Date	25/08/2011	25/08/2011	25/08/2011	25/08/2011
Time	14:48	14:57	15:06	15:15
Depth_BSL	12.4	12.7	13.3	11.5
Depth_CD	9.5	9.8	10.3	8.5
Substrate	Cobbles & occasional boulders with coarse shell gravel	Cobbles & occasional boulders with coarse shell gravel	Cobbles & occasional boulders with coarse shell gravel	Cobbles & occasional boulders with coarse shell gravel
Limaria nest % cover	0	0	0	0
Limaria nest thickness (cm)	0	0	0	0
Limaria seen (Y/N)	N	N	N	N
Brittle star % cover	0	0	0	0
Modiolus SACFORN	N/A	N/A	N/A	N/A
Notes	*Phycodrys*, *Delesseria*, *Laminaria hyperborea* park	*Phycodrys*, *Delesseria*, *Laminaria hyperborea* park. Kelp forming occasional strips with *Modiolus* shells underneath	Slightly denser kelp park	Dense kelp park
Video (Y)				
Biotope				
PMF				

Appendix 4 MNCR phase 2 survey data

Table 4.1 Site details for MNCR phase 2 surveys

Site	Location	Date	PMF	Biotope	Latitude at start	Longitude at start	Latitude at end	Longitude at end	Bearing (°T)	Start depth (m)	End depth (m)	Surveyors
FS01	Port Appin N, Loch Linnhe	20/08/2011	FS	SS.SMx.IMx.Lim	56.55413	-5.42640	56.55391	-5.42644	185	11.2	11.7	Dan Harries, Colin Moore
NS01	Bernera Island, Lynn of Morvern	21/08/2011	NS	CR.HCR.XFa.SwiLgAs	56.49578	-5.58567	56.49578	-5.58567	320	19.9	26.9	Dan Harries, Colin Moore
HM01	Ballachulish, Loch Leven	22/08/2011	HM	SS.SBR.SMus.ModT	56.69002	-5.17163	56.68980	-5.17160	175	17.6	21.4	Dan Harries, Colin Moore
HM02	Corpach S, Loch Linnhe	24/08/2011	HM	SS.SBR.SMus.ModT	56.83660	-5.13210	56.83639	-5.13222	197	7.6	7.2	Dan Harries, Colin Moore
HM03	Port Appin S, Loch Linnhe	25/08/2011	HM	SS.SBR.SMus.ModT	56.55050	-5.42407	56.55048	-5.42447	265	19.5	20.4	Dan Harries
ME01	Dunstaffnage, Loch Etive	29/08/2011	ME	LS.LBR.LMus.Myt.Mx	56.44963	-5.43675	56.44963	-5.43675	N/A	-1.1	N/A	Colin Moore
ME02	Lochy Flats, Loch Linnhe	30/08/2011	ME	LS.LBR.LMus.Myt.Mx	56.82942	-5.11208	56.82942	-5.11208	N/A	-0.4	N/A	Colin Moore
TS01	Annat Narrows W, Loch Eil	03/08/2011	TS	IR.MIR.KT.LdigT	56.84245	-5.16405	56.84245	-5.16407	332	-1.0	-0.4	Colin Moore
TS01	Annat Narrows W, Loch Eil	03/08/2011	TS	LR.HLR.FT.FserT	56.84245	-5.16407	56.84242	-5.16402	332	-2.5	-1.0	Colin Moore
TS01	Annat Narrows W, Loch Eil	03/08/2011	TS	LR.HLR.FT.AscT	56.84242	-5.16402	56.84242	-5.16402	332	-3.3	-2.5	Colin Moore
TS02	Connel, Loch Etive	18/06/2011	TS	LR.HLR.FT.AscT	56.45465	-5.36790	56.45466	-5.36790	5	-1.5	-0.5	Colin Moore
SL01	Bishop's Bay, Loch Leven	31/08/2011	SL	LR.LLR.FVS.Ascmac	56.69243	-5.17168	56.69243	-5.17168	N/A	mid-lower shore	N/A	Colin Moore
SL02	Carness, Loch Leven	01/09/2011	SL	LR.LLR.FVS.Ascmac	56.68838	-5.15690	56.68838	-5.15690	N/A	lower shore	N/A	Colin Moore

Table 4.2 SACFOR abundance records for species recorded during subtidal MNCR phase 2 surveys. Localised abundance in brackets

Taxon	Site				
	FS01	**HM01**	**HM02**	**HM03**	**NS01**
Porifera sp.			P		
Sycon ciliatum					P
Pachymatisma johnstonia					O
Suberites carnosus					P
Polymastia penicillus					P
Cliona celata	P			P	
Axinella infundibuliformis					F
Raspailia (Raspailia) ramosa?					P
Amphilectus fucorum		R			F
Myxilla (Myxilla) rosacea					O
Myxilla (Myxilla) incrustans					P
Myxilla (Myxilla) incrustans?				R	
Hymedesmia (Hymedesmia) paupertas					R
Iophon nigricans					P
Haliclona (Haliclona) urceolus?		P	P		
Hydroidolina spp.			R	C	C
Tubularia indivisa			P		
Bougainvilliidae sp.					P
Eudendrium sp.			R		
Eudendrium rameum?		P			
Hydractiniidae sp.			P		
Hydractinia echinata	P				
Lafoea dumosa					P
Halecium halecinum		O			
Halecium beanii	P				
Diphasia sp.		P			
Diphasia margareta					F
Rhizocaulus verticillatus		F			
Halopteris catharina					P
Kirchenpaueria sp.		O			
Nemertesia ramosa					F
Sertularia cupressina?			R		
Sertularella gayi					P
Obelia geniculata	P		P		
Alcyonium digitatum	P	F	R	O	R
Swiftia pallida					F
Cerianthus lloydii			(C)		
Protanthea simplex		P	C		R
Urticina sp.	P				
Urticina felina				P	
Sagartia sp.			P		
Edwardsia claparedii			P		
Caryophyllia (Caryophyllia) smithii					O

Table 4.2 continued

Taxon	Site				
	FS01	**HM01**	**HM02**	**HM03**	**NS01**
Eupolymnia nebulosa	P			P	
Lanice conchilega	P	P			
Sabella sp.	P		P		P
Spirobranchus spp.	R	R	R	R	
Spirobranchus triqueter					P
Serpula vermicularis	P			P	
Protula tubularia			P	R	
Serpula/Protula spp.		R			P
Filograna implexa?					R
Spirorbinae spp.	P				
Balanus spp.		C	R	O	
Verruca stroemia	R				P
Pandalus sp.?	O				
Pandalus montagui		O		P	
Pagurus bernhardus	F	P	(C)	P	
Galathea sp.	P	P		F	
Galathea intermedia		C		C	
Munida rugosa		O		F	O
Pisidia longicornis	P				
Hyas araneus	P	O	O		
Macropodia sp.	P	P			
Cancer pagurus	P	P			P
Liocarcinus corrugatus				P	
Liocarcinus depurator	P	P		O	
Necora puber	C	P		O	
Carcinus maenas	F	F	P		
Leptochiton asellus			O(F)		
Tonicella sp.?			P		
Testudinalia testudinalis	P		F		
Patella pellucida			P		
Gibbula tumida			P		
Gibbula cineraria	P		P		
Calliostoma zizyphinum				O	
Lacuna vincta	P				
Neptunea antiqua			P		
Buccinum undatum	P		F		
Nudibranchia sp.		P			
Limacia clavigera			P		
Dendronotus frondosus	P				
Diaphorodoris luteocincta					P
Onchidoris bilamellata			P		
Coryphella sp.				P	
Bivalvia (siphons)			P		
Modiolus modiolus	O	A	A	C(A)	
Chlamys sp.				O	
Aequipecten opercularis		P			
Pecten maximus	P				

Table 4.2 continued

Taxon	Site				
	FS01	**HM01**	**HM02**	**HM03**	**NS01**
Limaria hians	A				
Anomiidae spp.		R	O	F(C)	
Heteranomia squamula	P				
Monia patelliformis					P
Terebratulina retusa					O(F)
Bryozoa indet crusts				R	
Bryozoa sp. A					P
Bryozoa sp. B					P
Crisia sp.?		P			
Alcyonidium sp.			R		
Nolella dilatata					P
Membranipora membranacea	P				
Electra pilosa	P		O		
Securiflustra securifrons					F
Scrupocellaria scruposa	P				
Scrupocellaria sp.?			P		
Leptometra celtica					P
Solaster endeca		P			
Crossaster papposus	P	F(C)	P	F	
Henricia sp.	P	O	P	P	P
Asterias rubens	C	C	P	F	
Ophiothrix fragilis	P	F		P	
Ophiura albida					P
Echinus esculentus	F	C		F	
Psammechinus miliaris			C		
Holothuroidea sp.	P				
Diazona violacea					F(C)
Didemnum maculosum?					P
Tridemnum tenerum	P				
Diplosoma sp.		R	P		
Ciona intestinalis			P		R
Corella parallelogramma					P
Ascidia mentula				P	F(C)
Ascidia mentula?		P			
Ascidia conchilega					F
Ascidia virginea		O		R	O
Polycarpa pomaria		P			F
Dendrodoa grossularia		P			
Botryllus schlosseri					P
Pyura microcosmus?	P				
Trisopterus minutus				P	
Taurulus bubalis	P				
Labrus mixtus					P
Pholis gunnellus	P			P	
Callionymus lyra		P			P
Gobiusculus flavescens	P		P		
Thorogobius ephippiatus					P
Rhodophyceae crusts			R		

Table 4.2 continued

Taxon	Site				
	FS01	**HM01**	**HM02**	**HM03**	**NS01**
Colaconema daviesii?	R				
Bonnemaisonia hamifera (Trailliella)	R	R			
Callophyllis laciniata	R				
Corallinaceae indet pink crusts	R		R	R	
Lithophyllum pustulatum?	R				
Plocamium cartilagineum	S			R	
Ceramium sp.	R				
Cryptopleura ramosa	R				
Delesseria sanguinea	O		R		
Membranoptera alata	R		P		
Phycodrys rubens	R		C		
Heterosiphonia japonica	R	R			
Odonthalia dentata			R		
Dictyota dichotoma	R				
Desmarestia aculeata	R				
Laminaria hyperborea	C		A		
Saccharina latissima	F	R			
Ulva lactuca	R				

Table 4.3 SACFOR abundance records for species recorded during intertidal MNCR phase 2 surveys. Localised abundance in brackets

Taxon	Site							
	ME01	**ME02**	**SL01**	**SL02**	**TS01.1**	**TS01.2**	**TS01.3**	**TS02**
Halichondria (Halichondria) panicea					O	R(O)		
Tubularia indivisa					P			
Clava multicornis						R		R
Dynamena pumila					R	F(A)	F	R
Spirorbinae spp.					P			R
Semibalanus balanoides	F	C	R(C)	O		C	F	O
Balanus crenatus					A			
Gammarus salinus		P						
Echinogammarus marinus			C	C				
Pagurus bernhardus					P			
Carcinus maenas		A	C	C	P	P		P
Lepidochitona (Lepidochitona) cinerea					P			
Testudinalia testudinalis		P						
Patella vulgata	R			O		F		O
Littorina littorea	C	A		F		C	C	F
Littorina fabalis						P	P	
Littorina obtusata		R	F	F		F	F	C
Littorina saxatilis	R	P	P	P				
Nucella lapillus						C	P	
Mytilus edulis	C	A		O		O(S)	R	
Cerastoderma edule	R							
Alcyonidium diaphanum					F	O(C)		
Alcyonidium gelatinosum					R	O(R)		R
Flustrellidra hispida								R
Eucratea loricata					F			
Electra pilosa					R	R		
Asterias rubens					P			
Dendrodoa grossularia					P			
Verrucaria mucosa							O	R
Erythrotrichia carnea								R
Colaconema sp.					R		R	
Rhodochorton purpureum							R(S)	F
Palmaria palmata					P			
Hildenbrandia spp.	R	R	R	O		F	F	R
Corallinaceae indet pink crusts					R	R		
Mastocarpus stellatus		C				C	O(C)	
Mastocarpus stellatus (Petrocelis)							R	
Chondrus crispus		R			R	R	R	O
Aglaothamnion hookeri							P	R
Ceramium pallidum		R						
Ceramium virgatum					R			R
Membranoptera alata					O			
Phycodrys rubens					R			

Table 4.3 continued

Taxon	Site							
	ME01	**ME02**	**SL01**	**SL02**	**TS01.1**	**TS01.2**	**TS01.3**	**TS02**
Odonthalia dentata					R			
Neosiphonia elongella		R						
Vertebrata lanosa			F	F		R	F	A
Polysiphonia stricta					R	R		
Phaeophyceae sp.							R	
Pilayella littoralis		R			R			
Sphacelaria sp.								R
Sphacelaria cirrosa					R			
Laminaria sp. juv.						R		
Laminaria digitata					S			
Saccharina latissima		R			R			
Ascophyllum nodosum			R	F		R	S	S
Ascophyllum nodosum ecad *mackaii*	R		S	S				
Fucus serratus		C		F		S	R	R
Fucus vesiculosus			A	C		O	R	R
Syncoryne reinkei								R
Ulva compressa					R		R	R
Ulva intestinalis		R	F					
Ulva intestinalis?								O
Ulva lactuca						R		F
Cladophora rupestris						F	C	S
Rhizoclonium riparium							P	R

Table 4.4 Abundance of taxa recorded in four replicate clumps of Modiolus modiolus *collected from MNCR phase 2 sites in Loch Leven (HM01), off Corpach (HM02) and off Port Appin (HM03). + denotes presence*

	Clumps											
	HM01				HM02				HM03			
Taxon	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Foraminifera spp.	+	+	+	+								
Porifera sp.						+		+	+			
Leucosolenia sp.	+					+						
Halichondria sp.?					+							
Cliona celata									+	+	+	+
Cliona caledoniae?				+								
Pione vastifica	+	+	+		+	+	+	+				
Amphilectus fucorum		+	+	+					+			
Eudendrium sp.							+	+				
Eudendrium rameum			+									
Bougainvillia sp.		+										
Bougainvillia sp.?			+	+								
Bougainvillia muscus									+	+	+	+
Clytia gracilis						+						+
Clytia hemisphaerica	+	+	+	+	+	+	+	+	+	+	+	+
Gonothyraea loveni?									+			+
Obelia sp.			+	+					+	+	+	+
Obelia dichotoma	+	+										
Rhizocaulus verticillatus			+									
Lafoea dumosa											+	
Campanulina pumila	+	+	+	+								
Campanularia hincksii											+	
Calycella syringa			+			+		+	+	+	+	+
Sertularia argentea						+	+	+	+	+	+	+
Sertularella gayi/polyzonias									+	+		+
Sertularella tenella											+	
Halecium sp.									+			
Halecium beanii?		+										
Halecium halecinum?			+									
Alcyonium digitatum	+	+	+	+		+						+
Cerianthus lloydii				2	8	3		4				1
Actinaria spp. juv.	1	3	1		11	6	7	12	15	1	3	
Edwardsia claparedii					1	2	1					
Platyhelminthes spp.					3			5	2	2		2
Nemertea spp.	5	17	3	1	2		5	2		4	2	7
Tubulanus polymorphus							1		1			1
Lineidae spp.			1					3			3	3
Nematoda spp.	43	1	16	1	8	9	12	3	2	12	1	5
Priapulus caudatus							1					
Chaetognatha sp.										1		
Golfingia spp. juv/indet.					1				3	6	1	2
Golfingia elongata			1									
Golfingia (Golfingia) vulgaris vulgaris	3								1	2	1	1

Table 4.4 continued

	Clumps											
	HM01				HM02				HM03			
Taxon	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Subadyte pellucida	3	1	3							3		
Alentia gelatinosa											1	
Harmothoe spp. juv/indet.	13	10	7	8	7	9	11	5	26	18	14	14
Harmothoe extenuata		2	3						1	1		2
Harmothoe fragilis			1						1		1	
Harmothoe imbricata	1											
Harmothoe impar			1			2		1			1	2
Malmgreniella mcintoshi			1									
Malmgreniella arenicolae					1							
Malmgreniella darbouxi?	1			1								
Lepidonotus squamatus	1		1	1	2		4	1	5	1	3	2
Pholoe inornata		1	1			1		3	1	3	2	1
Pholoe baltica	3	1	2	1	4	5	5	5	4	3	7	3
Sthenelais boa										1		
Phyllodocidae spp. juv/indet.	8	1			6	1	2	3	3	3	2	6
Eteone longa		1				1	1					
Phyllodoce spp. juvs										1		
Eulalia bilineata									1			
Eumida sanguinea	1	13	4	5	3	2	4	3		1		
Nereiphylla paretti									2			
Pirakia punctifera			1									
Glycera spp. juv.					4	1	3	4	2	1		2
Glycera alba					1							
Glycera lapidum	7	6	6	2	3	6	2	4	4	3	4	4
Sphaerodorum gracilis	3	1	2	2				1	1			
Hesionidae sp. juv/indet.	1	2									4	
Amphiduros fuscescens											1	2
Hesiospina similis	2		3						2	2	4	1
Kefersteinia cirrata		1				1			4	8	2	3
Nereimyra punctata	29	17	20	13	31	42	60	96	65	59	27	46
Syllidae sp. stolon							1					
Eurysyllis tuberculata		1										1
Syllis sp. 1					1	2	5	9				
Trypanosyllis coeliaca	1	1								2		
Syllis armillaris		1	2	2	7	6	3	3	2			3
Eusyllis blomstrandi		2			1	9	12	13	7	4	3	3
Odontosyllis gibba			1									
Syllides benedicti				1								1
Syllides japonicus										1		2
Exogone (Parexogone) hebes										1		1
Exogone (Exogone) naidina									2			2
Exogone verugera	2											
Sphaerosyllis sp. Indet.						1						
Sphaerosyllis bulbosa	6	1	1	3								
Sphaerosyllis taylori	2	8		3					7	4	1	2
Prosphaerosyllis tetralix	1		2									

Table 4.4 continued

	Clumps											
	HM01				HM02				HM03			
Taxon	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Autolytinae stolons	3		6			3		3	5	4	2	
Myrianida spp.	11	17	28	9	5	11	8	11	34	26	27	22
Proceraea spp.		1	1	1	1	7	2	6		3	3	5
Procerastea halleziana									2			
Nereididae sp. juv.		2	3	1	2	7	9	7	3	2	2	
Eunereis longissima											1	
Nereis pelagica	4	3					2	2	1		1	2
Nereis zonata		1										
Nephtys kersivalensis										1		
Eunice pennata					1							
Nematonereis hebes										2		2
Lumbrineris gracilis		1							8	6	2	5
Ophryotrocha sp.		1										
Ougia macilenta							1					
Protodorvillea kefersteini		1	2	1	1		1	2	1	2		3
Schistomeringos rudolphii											1	1
Orbiniidae sp. juv.									1			
Cirrophorus branchiatus									1			
Paradoneis lyra			1		7	6	10	7				
Spionidae spp. juv/indet.					3							1
Aonides oxycephala	2	2		4	5		2	3	2	7	3	9
Aonides paucibranchiata		3	1	1								
Laonice bahusiensis									3	2	3	2
Malacoceros sp. indet.			1									
Scolelepis fuliginosa					2	2		1				
Minuspio cirrifera	3	1	6			1	2	1	6	7	6	8
Dipolydora coeca	5		2	5	8	10	8	2	5	1	2	5
Dipolydora caulleryi	4	2		5		1			6	6		5
Dipolydora flava				3			1			1		
Prionospio sp. juv.										2	1	
Microspio mecznikowianus	1											
Spiophanes kroyeri					3	3	2	1		1		
Cirratulidae spp. indet.									1			
Caulleriella alata										1		
Caulleriella zetlandica					1					1		
Cirratulus spp.					10	13	10	7				
Cirriformia tentaculata					2	1	3	2				
Dodecaceria spp.					3	1	2	2				
Aphelochaeta sp. indet.						2						
Brada inhabilis								2				
Flabelligera affinis	3	6	3					1		1	4	
Pherusa flabellata								1				
Pherusa plumosa	1				3		1		1			1
Heteromastus filiformis									1			
Mediomastus fragilis	6	6	9	5	3		6	3	16	18	10	29
Notomastus sp. juv												1
Notomastus latericeus	4	4	2	3					1		4	2

Table 4.4 continued

	Clumps											
	HM01				HM02				HM03			
Taxon	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Arenicola marina juv.							1					
Polyphysia crassa					1	2		2	1		1	2
Scalibregma celticum			1		3		1					4
Scalibregma inflatum					2	4		3	1	2	1	1
Protodrilus sp.			4									
Terebellides stroemii												1
Trichobranchus glacialis	1	2	3	2						1	2	2
Terebellinae spp. juv/indet.					1	2	1		1			
Amphitrite cirrata									1			
Eupolymnia nesidensis												1
Amphitrite affinis							1					
Neoamphitrite figulus						1		2				
Phisidia aurea			1		3	4	7	6		1		1
Pista bansei								1				
Pista malmgreni		3										
Polycirrus spp. indet.	1	1			1	3					1	1
Polycirrus aurantiacus	2	1		2	2			1				
Polycirrus medusa			1		1		2					
Polycirrus norvegicus	4	10	6			4	5	4	6	3	3	11
Thelepodinae sp. indet.							1					
Sabellidae sp. indet.					4				1	2		1
Branchiomma bombyx								1				
Chone duneri			2			1						1
Paradialychone filicaudata	8	12	11	7	5	2	6	5	5	1	2	2
Fabricia sabella	1	1		1								
Pseudopotamilla reniformis									1	1		
Serpulidae spp. juv/indet.								2	17	2	1	6
Serpulidae sp. A	3											
Apomatus similis	1								2	3	4	1
Hydroides norvegicus	7	5	2	2	5	1	3	1	4		1	
Spirobranchus spp. juv/indet.	48	29	26	32	11	14	11	4	1	2		
Spirobranchus lamarcki		2	10	5	10	6	6	7	5		11	2
Spirobranchus triqueter	22	37	22	18	26	24	22	11	20	22	15	17
Serpula/Hydroides spp. indet.	3	3	1	1	1	3	6	2	4			
Serpula vermicularis											1	2
Spirorbis (Spirorbis) tridentatus	5	8	2	1								
Janua (Dexiospira) pagenstecheri			1								1	3
Jugaria granulata	15	51	66	8					50	24	8	18
Paradexiospira (Spirorbides) vitrea	3	6	4	7								
Spirorbinae spp	25	13	2	6								
Tubificoides amplivasatus			2						3	7		3
Limnodriloides sp.				3		1						
Enchytraeidae sp.			2	8						3		
Barentsia gracilis		+	+	+		+	+			+		+
Pedicellina sp.											+	+
Pedicellina cernua	+	+		+								
Achelia echinata juv.									1			

Table 4.4 continued

	Clumps											
	HM01				HM02				HM03			
Taxon	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Achelia echinata									1		1	1
Endeis spinosa										1		
Callipallene spectrum	4	4	6	8						2		
Callipallene brevirostris											1	
Copepoda spp.										1		
Ostracoda spp.	5	5	11	6				1	6	15	4	6
Verruca stroemia	4	5	6	4	3	6	3	2	1	2	2	1
Balanus crenatus	578	163	433	71	1	1	9	1	46	59	51	15
Balanus balanus	229	156	439	260	1	1	2		5	7	9	8
Chirona hameri								2				
Nebalia herbstii												1
Heteromysis (Heteromysis) formosa		1									1	
Amphipoda spp indet		2				1			5	2	1	
Apherusa bispinosa						1						1
Gammarellus homari					1	1	1					
Deflexilodes subnudus									1	1		
Parapleustes bicuspis											1	
Amphilochus manudens									1			
Gitana sarsi											3	
Cressa dubia									3	3	3	
Stenothoe marina				1					4		6	
Stenothoe monoculoides									1			
Urothoe elegans										2		5
Harpinia crenulata	1		1						2	2		
Metaphoxus fultoni	1	1		2					2	3	6	2
Lysianassidae spp. juvs									3			
Lysianassa ceratina									1			
Lysianassa plumosa									1		3	1
Tryphosella sarsi	2	1	1						1			
Iphimedia minuta											1	
Iphimedia obesa			1						2	1	2	
Liljeborgia kinahani						1	2			1	2	
Dexamine spinosa										1		
Dexamine thea									1			
Melitidae spp. juvs							3					
Animoceradocus semiserratus									1			
Cheirocratus sp. ♀	1											
Othomaera othonis				5								
Isaeidae spp. ♀/indet											1	
Gammaropsis maculata											3	3
Ischyroceridae spp. juvs/♀							8		2			1
Microjassa cumbrensis									1			
Aoridae spp. ♀/indet.	1	1									3	
Lembos websteri				2								
Microdeutopus versiculatus									1			
Corophium spp. juv/indet .						2			14	9	17	2
Crassicorophium bonnellii	3	2	5		3	1	2	20			2	

Table 4.4 continued

	Clumps											
	HM01				HM02				HM03			
Taxon	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Corophium volutator					1							
Phtisica marina											2	
Pseudoprotella phasma	1	1	8	2					1			
Isopoda sp. juv/indet.											1	
Gnathia sp. (praniza)										2		
Gnathia vorax										1		
Anthura gracilis	1									2		
Janira maculosa	2	6	4	3	4	1		2	3	4	3	3
Munna sp.										1	1	
Munna boecki	1										1	
Pleurogonium rubicundum								1				
Idotea neglecta									1			
Tanaopsis graciloides						1						
Vaunthompsonia cristata											1	
Caridea spp. indet.									2			
Eualus sp. indet.	3	1										
Eualus occultus										2		1
Eualus pusiolus	1	2							3	5	8	5
Galathea sp. indet.		1										1
Galathea intermedia	2	1								1	1	3
Galathea nexa	1	2	1							2	1	
Pisidia longicornis			1						1	7	7	2
Hyas coarctatus						1					1	
Macropodia sp. juv.	1											
Eurynome aspera		1										
Leptochiton asellus	8	8	16	5	11	5	16	15	9	6	5	9
Stenosemus albus	1	2			1	1						
Callochiton septemvalvis					1	1						
Gastropoda spp. juv/indet.						1					1	
Emarginula fissura	1	2			1	8	1	6	1	1	4	
Testudinalia testudinalis					3	4	5	3			1	1
Margarites groenlandicus					2	1	3	1	1		1	
Gibbula tumida					2							
Calliostoma zizyphinum										1		
Onoba semicostata	3		1	2			1					
Capulus ungaricus	2		6	3							1	2
Boreotrophon truncatus											1	
Buccinum undatum					1							
Akera bullata			1									
Nudibranchia sp. indet.			1									
Nudibranchia sp. 1						1	1					
Nudibranchia sp. 2											1	
Nudibranchia sp. 3									1	4	1	3
Tritonia sp?	6	4	1	3								
Dendronotus frondosus			1								3	1
Goniodoris sp?	1		1	1								
Onchidoris sp.												1

Table 4.4 continued

	Clumps											
	HM01				HM02				HM03			
Taxon	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Palio dubia ?	1											
Onchidoris muricata?										1		
Limacia clavigera						1						
Polycera sp.?						2		1				
Coryphella sp.											1	
Eubranchus sp?			3						4	1	3	2
Eubranchus pallidus?						1		1				
Otina ovata						1		1				
Bivalvia spp. indet.		2	5	2			1	1				
Nucula nucleus	1		1		1				1	2	1	
Mytilus edulis juvs	1		1	5								
Musculus discors			1								2	1
Modiolus modiolus	25	16	20	11	9	17	9	9	10	9	13	13
Modiolus modiolus spat	3			1								
Limaria hians	2	4	3									
Pectinidae sp. juv.	1											
Palliolum tigerinum		2	1							1		
Talochlamys pusio	1											
Aequipecten opercularis										1		
Anomiidae spp. juv.	3	4	8	16								
Monia patelliformis	8	8	2	2	2		1	5	5	4	6	3
Heteranomia squamula	1		2	1					2	3	6	1
Myrtea spinifera							1					
Lucinoma borealis								1				
Thyasira flexuosa								1				
Kellia suborbicularis		1										
Kurtiella bidentata	19	2		16	3					1		3
Astarte sulcata							1					
Parvicardium pinnulatum		1	3			2					3	3
Abra alba	1		1					1		3		1
Chamelea striatula			2									
Timoclea ovata	2			1								
Mya truncata		1		1								
Mya truncata juv.	7	7	5	10	1	3	1		2	1	2	1
Hiatella arctica	8	5	12	10	4	7	4	6	4	8	10	4
Thracia spp. juv/indet					3							
Thracia villosiuscula	6	3	3				1	1				
Crinoidea sp indet									1			
Asteroidea sp. juv/indet.								1	1			
Ascophora sp.												+
Fenestrulina malusii											+	
Escharella sp.												+
Escharella immersa	+	+	+	+					+	+	+	+
Escharella ventricosa									+	+	+	
Porella concinna		+	+	+								
Chorizopora brongniartii											+	+
Microporella ciliata	+	+	+	+					+	+	+	+

Table 4.4 continued

	Clumps											
	HM01				HM02				HM03			
Taxon	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Cribrilina annulata											+	
Callopora dumerilii	+			+	+		+		+	+	+	+
Tegella unicornis			+	+								
Amphiblestrum auritum					+	+		+				
Amphiblestrum flemingii	+	+	+	+						+	+	+
Membraniporella nitida	+	+	+									
Scrupocellaria scruposa									+	+		
Electra pilosa	+	+			+	+	+	+		+	+	
Crisia eburnea									+	+	+	+
Cyclostomatida sp.	+			+								
Tubulipora sp.						+						
Tubulipora liliacea?									+	+		+
Entalophoroecia deflexa?			+						+			
Eurystrotos compacta?	+								+	+	+	+
Plagioecia patina	+	+	+	+						+		+
Diplosolen obelia	+	+	+	+					+	+	+	+
Disporella hispida	+	+	+	+					+	+	+	+
Bowerbankia gracilis	+	+	+	+	+	+	+	+	+	+	+	+
Alcyonidium mamillatum	+	+							+	+		
Alcyonidioides mytili		+	+									
Alcyonidium sp.										+		
Crinoidea sp. indet.									1			
Asteroidea sp. juv/indet.								1	1			
Crossaster papposus							1					
Henricia perforata?					1							
Asterias rubens	3	1		3		1					2	1
Ophiurida spp. juv/indet.	6		3								1	
Ophiothrix fragilis	3	2	1	1								
Amphipholis squamata	3	9	5	1	1	2		1	1	4		
Psammechinus miliaris	2	1	1	2		1	2					
Labidoplax media										1		
Didemnidae sp.				+					+			
Diplosoma listerianum	+	+	+									
Botryllus schlosseri												+
Ciona intestinalis	1	1										
Ascidiacea spp.					5			3		1		+
Ascidia sp.			1			6	5	2				
Ascidia mentula			2									
Ascidiella aspersa	1								1			
Pyura tessellata			2							+		
Molgula sp.	4											
Acrochaetium sp.					+		+	+				
Plocamium cartilagineum									+	+		+
Bonnemaisonia hamifera (Trailliella)				+						+		
Phyllophora sp.?							+					
Peyssonnelia sp.					+	+	+	+				
Rhodophyta spp. red encrusting											+	

Table 4.4 continued

	Clumps											
	HM01				HM02				HM03			
Taxon	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Corallinaceae spp. pink encrusting						+	+	+	+	+	+	
Delesseriaceae sp.										+	+	+
Pterothamnion plumula					+	+	+	+				
Phycodrys rubens					+	+	+	+				
Heterosiphonia japonica				+								
Polysiphonia sp.							+					
No. taxa	124	118	128	97	89	98	91	96	137	137	135	133

Appendix 5 Blue mussel bed survey data

Table 5.1 Track mapping data around the boundary of Mytilus edulis *beds in Dunstaffnage Bay, Loch Etive and on Lochy Flats, Fort William*

Bed	Location	Latitude	Longitude
B1	Dunstaffnage	56.44960	-5.43658
B1	Dunstaffnage	56.44968	-5.43668
B1	Dunstaffnage	56.44972	-5.43687
B1	Dunstaffnage	56.44965	-5.43692
B1	Dunstaffnage	56.44958	-5.43682
B1	Dunstaffnage	56.44958	-5.43672
B1	Dunstaffnage	56.44957	-5.43667
B2	Dunstaffnage	56.44948	-5.43612
B2	Dunstaffnage	56.44953	-5.43618
B2	Dunstaffnage	56.44948	-5.43623
B2	Dunstaffnage	56.44950	-5.43628
B2	Dunstaffnage	56.44945	-5.43630
B2	Dunstaffnage	56.44945	-5.43618
B2	Dunstaffnage	56.44947	-5.43613
B3	Lochy Flats	56.83015	-5.11157
B3	Lochy Flats	56.83000	-5.11168
B3	Lochy Flats	56.82980	-5.11173
B3	Lochy Flats	56.82960	-5.11183
B3	Lochy Flats	56.82948	-5.11190
B3	Lochy Flats	56.82938	-5.11185
B3	Lochy Flats	56.82930	-5.11163
B3	Lochy Flats	56.82925	-5.11170
B3	Lochy Flats	56.82920	-5.11188
B3	Lochy Flats	56.82910	-5.11207
B3	Lochy Flats	56.82908	-5.11202

Bed	Location	Latitude	Longitude
B3	Lochy Flats	56.82903	-5.11198
B3	Lochy Flats	56.82895	-5.11193
B3	Lochy Flats	56.82887	-5.11210
B3	Lochy Flats	56.82882	-5.11212
B3	Lochy Flats	56.82870	-5.11212
B3	Lochy Flats	56.82873	-5.11225
B3	Lochy Flats	56.82877	-5.11225
B3	Lochy Flats	56.82885	-5.11217
B3	Lochy Flats	56.82893	-5.11222
B3	Lochy Flats	56.82902	-5.11227
B3	Lochy Flats	56.82912	-5.11225
B3	Lochy Flats	56.82920	-5.11207
B3	Lochy Flats	56.82927	-5.11202
B3	Lochy Flats	56.82932	-5.11213
B3	Lochy Flats	56.82928	-5.11230
B3	Lochy Flats	56.82943	-5.11227
B3	Lochy Flats	56.82955	-5.11220
B3	Lochy Flats	56.82965	-5.11208
B3	Lochy Flats	56.82977	-5.11203
B3	Lochy Flats	56.82990	-5.11198
B3	Lochy Flats	56.83002	-5.11207
B3	Lochy Flats	56.83015	-5.11202
B3	Lochy Flats	56.83028	-5.11195
B3	Lochy Flats	56.83038	-5.11172
B3	Lochy Flats	56.83032	-5.11160
B3	Lochy Flats	56.83023	-5.11165

Table 5.2 Cover (%) and density (SACFOR) of Mytilus edulis *and habitat notes at stations located within beds in Dunstaffnage Bay (B1-B2) and Lochy Flats (B3). The SACFOR estimate employs numerical estimates of mussels, not cover*

Bed	Station	Latitude	Longitude	% cover	SACFOR abund-ance	Substrate	Comments	Photo
B1	A	56.44962	-5.43678	20	C	Very slightly muddy fine sand with broken shell, pebbles and sparse cobbles	No fucoid algae	IMGP0026
B1	B	56.44970	-5.43683	10	C	Very slightly muddy fine sand with broken shell and pebbles	No fucoid algae	IMGP0027
B1	C	56.44962	-5.43667	15	C	Very slightly muddy fine sand with broken shell and pebbles	No fucoid algae	IMGP0028
B1	D	56.44967	-5.43672	20	C	Very slightly muddy fine sand with broken shell and pebbles	No fucoid algae	IMGP0029
B1	E	56.44965	-5.43687	10	C	Very slightly muddy fine sand with broken shell and pebbles	No fucoid algae	IMGP0030
B2	F	56.44947	-5.43627	10	C	Very slightly muddy fine sand with broken shell and pebbles	No fucoid algae	IMGP0034
B2	G	56.44948	-5.43617	10	C	Very slightly muddy fine sand with broken shell and pebbles	No fucoid algae	IMGP0035
B3	A	56.83025	-5.11175	30	A	Gravel and pebbles	*Fucus serratus* 20% cover	IMGP0048
B3	B	56.83010	-5.11187	95	A	Gravel and pebbles on muddy sand	*Fucus serratus* 15% cover	IMGP0049-50
B3	C	56.82987	-5.11188	30	A	Muddy sand with gravel and pebbles	*Fucus serratus* 10% cover	IMGP0051
B3	D	56.82965	-5.11198	25	A	Muddy sand with gravel and pebbles	*Fucus serratus* 10% cover	IMGP0052
B3	E	56.82943	-5.11215	30	A	Muddy sand with gravel and pebbles	*Fucus serratus* 15% cover	IMGP0053
B3	F	56.82923	-5.11198	10	C	Muddy sand with gravel, pebbles and cobbles	Fucus serratus 40% cover	IMGP0054
B3	G	56.82903	-5.11215	15	C	Muddy sand with gravel, pebbles and cobbles	*Fucus serratus* 30% cover	IMGP0055

Appendix 6 Sea loch egg wrack bed survey data

Table 6.1 Track mapping data around boundaries of Ascophyllum nodosum *ecad* mackaii *beds in Bishop's Bay and at Carness, Loch Leven*

Bed	Location	Latitude	Longitude
W1	Bishop's Bay	56.69248	-5.17145
W1	Bishop's Bay	56.69248	-5.17160
W1	Bishop's Bay	56.69248	-5.17175
W1	Bishop's Bay	56.69253	-5.17182
W1	Bishop's Bay	56.69250	-5.17202
W1	Bishop's Bay	56.69248	-5.17217
W1	Bishop's Bay	56.69243	-5.17200
W1	Bishop's Bay	56.69235	-5.17205
W1	Bishop's Bay	56.69237	-5.17222
W1	Bishop's Bay	56.69235	-5.17227
W1	Bishop's Bay	56.69230	-5.17217
W1	Bishop's Bay	56.69233	-5.17212
W1	Bishop's Bay	56.69235	-5.17198
W1	Bishop's Bay	56.69237	-5.17187
W1	Bishop's Bay	56.69237	-5.17172
W1	Bishop's Bay	56.69238	-5.17163
W1	Bishop's Bay	56.69242	-5.17145
W2	Bishop's Bay	56.69220	-5.17242
W2	Bishop's Bay	56.69223	-5.17258
W2	Bishop's Bay	56.69212	-5.17270
W2	Bishop's Bay	56.69215	-5.17258
W2	Bishop's Bay	56.69217	-5.17243
W3	Bishop's Bay	56.69202	-5.17285
W3	Bishop's Bay	56.69182	-5.17313
W3	Bishop's Bay	56.69172	-5.17315
W3	Bishop's Bay	56.69170	-5.17308
W3	Bishop's Bay	56.69178	-5.17305
W3	Bishop's Bay	56.69185	-5.17303
W3	Bishop's Bay	56.69193	-5.17295
W3	Bishop's Bay	56.69197	-5.17290
W4	Bishop's Bay	56.69115	-5.17298
W4	Bishop's Bay	56.69120	-5.17290
W4	Bishop's Bay	56.69127	-5.17295
W4	Bishop's Bay	56.69127	-5.17298
W4	Bishop's Bay	56.69128	-5.17303
W4	Bishop's Bay	56.69122	-5.17302
W4	Bishop's Bay	56.69117	-5.17302
W4	Bishop's Bay	56.69115	-5.17303
W5	Bishop's Bay	56.69253	-5.16737
W5	Bishop's Bay	56.69262	-5.16748
W5	Bishop's Bay	56.69260	-5.16758
W5	Bishop's Bay	56.69252	-5.16763
W5	Bishop's Bay	56.69245	-5.16757

Bed	Location	Latitude	Longitude
W5	Bishop's Bay	56.69237	-5.16755
W5	Bishop's Bay	56.69230	-5.16740
W5	Bishop's Bay	56.69230	-5.16733
W5	Bishop's Bay	56.69235	-5.16728
W5	Bishop's Bay	56.69228	-5.16715
W5	Bishop's Bay	56.69233	-5.16703
W5	Bishop's Bay	56.69242	-5.16715
W5	Bishop's Bay	56.69240	-5.16730
W5	Bishop's Bay	56.69240	-5.16745
W5	Bishop's Bay	56.69243	-5.16753
W5	Bishop's Bay	56.69248	-5.16747
W5	Bishop's Bay	56.69248	-5.16735
W6	Bishop's Bay	56.69230	-5.16753
W6	Bishop's Bay	56.69235	-5.16773
W6	Bishop's Bay	56.69235	-5.16785
W6	Bishop's Bay	56.69230	-5.16782
W6	Bishop's Bay	56.69227	-5.16770
W6	Bishop's Bay	56.69218	-5.16762
W6	Bishop's Bay	56.69222	-5.16748
W6	Bishop's Bay	56.69225	-5.16757
W6	Bishop's Bay	56.69228	-5.16752
W7	Bishop's Bay	56.69210	-5.16747
W7	Bishop's Bay	56.69212	-5.16728
W7	Bishop's Bay	56.69208	-5.16713
W7	Bishop's Bay	56.69205	-5.16717
W7	Bishop's Bay	56.69200	-5.16730
W7	Bishop's Bay	56.69195	-5.16720
W7	Bishop's Bay	56.69183	-5.16722
W7	Bishop's Bay	56.69175	-5.16722
W7	Bishop's Bay	56.69175	-5.16730
W7	Bishop's Bay	56.69187	-5.16732
W7	Bishop's Bay	56.69195	-5.16730
W7	Bishop's Bay	56.69195	-5.16753
W7	Bishop's Bay	56.69203	-5.16745
W8	Bishop's Bay	56.69145	-5.16703
W8	Bishop's Bay	56.69147	-5.16715
W8	Bishop's Bay	56.69152	-5.16712
W8	Bishop's Bay	56.69157	-5.16713
W8	Bishop's Bay	56.69163	-5.16715
W8	Bishop's Bay	56.69162	-5.16710
W8	Bishop's Bay	56.69160	-5.16712
W8	Bishop's Bay	56.69158	-5.16705
W8	Bishop's Bay	56.69155	-5.16705
W8	Bishop's Bay	56.69150	-5.16698

Table 6.1 continued

Bed	Location	Latitude	Longitude		Bed	Location	Latitude	Longitude
W9	Carness	56.68848	-5.15627		W9	Carness	56.68842	-5.15750
W9	Carness	56.68847	-5.15640		W9	Carness	56.68842	-5.15735
W9	Carness	56.68847	-5.15653		W9	Carness	56.68842	-5.15723
W9	Carness	56.68842	-5.15668		W9	Carness	56.68833	-5.15710
W9	Carness	56.68835	-5.15683		W9	Carness	56.68837	-5.15702
W9	Carness	56.68828	-5.15693		W9	Carness	56.68843	-5.15693
W9	Carness	56.68822	-5.15695		W9	Carness	56.68843	-5.15688
W9	Carness	56.68822	-5.15690		W9	Carness	56.68847	-5.15685
W9	Carness	56.68813	-5.15687		W9	Carness	56.68847	-5.15678
W9	Carness	56.68812	-5.15695		W9	Carness	56.68852	-5.15668
W9	Carness	56.68813	-5.15705		W9	Carness	56.68855	-5.15662
W9	Carness	56.68820	-5.15712		W9	Carness	56.68858	-5.15648
W9	Carness	56.68822	-5.15722		W9	Carness	56.68858	-5.15643
W9	Carness	56.68823	-5.15737		W9	Carness	56.68858	-5.15633
W9	Carness	56.68830	-5.15747		W9	Carness	56.68855	-5.15637
W9	Carness	56.68833	-5.15767		W9	Carness	56.68853	-5.15627
W9	Carness	56.68830	-5.15785		W9	Carness	56.68853	-5.15618
W9	Carness	56.68830	-5.15793		W10	Carness	56.68823	-5.15822
W9	Carness	56.68832	-5.15802		W10	Carness	56.68815	-5.15822
W9	Carness	56.68833	-5.15810		W10	Carness	56.68818	-5.15828
W9	Carness	56.68835	-5.15807		W10	Carness	56.68820	-5.15843
W9	Carness	56.68833	-5.15797		W10	Carness	56.68820	-5.15857
W9	Carness	56.68835	-5.15783		W10	Carness	56.68825	-5.15850
W9	Carness	56.68840	-5.15775		W10	Carness	56.68825	-5.15838
W9	Carness	56.68842	-5.15768					

Table 6.2 Percentage cover and mean thickness of Ascophyllum nodosum *ecad* mackaii *and habitat notes at stations within beds in Bishop's Bay (W1-W8) and at Carness (W9-W10), Loch Leven*

Bed	Station	Latitude	Longitude	% cover	Thick-ness (cm)	Substrate	Comments	Photo
W1	A	56.69245	-5.17152	95	11.5	Muddy sand with dense gravel, pebbles and cobbles	*Fucus vesiculosus* 15%, loose *F. serratus* 5%	IMGP0071-72
W1	B	56.69243	-5.17170	85	12.0	Gravel, very muddy sand with pebbles and cobbles	*Fucus vesiculosus* 30%	IMGP0073-74
W1	C	56.69247	-5.17187	95	15.0	Very muddy sand	*Fucus vesiculosus* 70%	IMGP0075-76
W1	D	56.69248	-5.17202	100	12.0	Very muddy sand with dense gravel, pebbles and some cobbles	dead drift *Fucus vesiculosus* 50%	IMGP0077-78
W1	E	56.69238	-5.17190	65	12.5	Slightly muddy fine sand with dense gravel	*Fucus vesiculosus* 45%	IMGP0079-80
W2	F	56.69220	-5.17253	50	9.0	Muddy sand with scattered gravel	*Ascophyllum nodosum* attached 5%, *Fucus vesiculosus* 15%, *F. ceranoides* 10%	IMGP0082-83
W3	G	56.69180	-5.17308	50	11.0	Gravelly fine sand with dense gravel and scattered pebbles	*Fucus vesiculosus* 45%	IMGP0085-86
W4	H	56.69122	-5.17297	80	13.0	Dense cobbles and pebbles on muddy sand	*Ascophyllum nodosum* attached 10%, *Fucus vesiculosus* 25%	IMGP0088-89
W5	I	56.69253	-5.16748	100	11.0	Gravelly muddy sand with dense cobbles and pebbles	*Fucus vesiculosus* 5%	IMGP0097-98
W5	J	56.69237	-5.16747	100	15.0	Gravelly muddy sand	*Fucus vesiculosus* 20%, *Vertebrata lanosa* 70%	IMGP0099-100
W5	K	56.69235	-5.16720	80	8.0	Very muddy sand with pebbles and patch of dense cobbles	*Ascophyllum nodosum* attached 3%, *Fucus vesiculosus* 15%	IMGP0101-102
W6	L	56.69228	-5.16763	100	12.0	Gravelly muddy sand	*Fucus vesiculosus* 20%	IMGP0103-104
W7	M	56.69205	-5.16733	100	12.0	Muddy sand with dense gravel, pebbles and sparse cobbles	*Ascophyllum nodosum* attached 5-10%, *Fucus vesiculosus* 40%	IMGP0106-107

Table 6.2 continued

Bed	Station	Latitude	Longitude	% cover	Thick-ness (cm)	Substrate	Comments	Photo
W8	N	56.69150	-5.16707	75	12.0	Cobbles and pebbles on muddy sand with scattered boulders	*Ascophyllum nodosum* attached 10%, *Fucus vesiculosus* 45%	IMGP0110-111
W9	A	56.68853	-5.15648	90	15.0	Dense pebbles and cobbles on muddy sand	*Ascophyllum nodosum* attached 5%, *Fucus vesiculosus* 45%	IMGP0116-117
W9	B	56.68845	-5.15668	100	15.0	Very muddy sand with pebbles	*Fucus vesiculosus* 5%, loose *F. serratus* 30%	IMGP0118-119
W9	C	56.68837	-5.15688	100	15.0	Dense pebbles on muddy sand	loose *F. serratus* 30%	IMGP0120-121
W9	D	56.68825	-5.15700	90	15.0	Muddy sand with pebbles and dense littorinid shells	loose *F. serratus* 15%	IMGP0122-123
W9	E	56.68828	-5.15723	95	14.0	Muddy sand with gravel and occasional pebbles	*Fucus vesiculosus* 15%	IMGP0124-125
W9	F	56.68835	-5.15745	50	14.0	Muddy sand with scattered cobbles and pebbles	*Fucus vesiculosus* 20%, loose *F. serratus* 30%	IMGP0126-127
W9	G	56.68837	-5.15768	95	15.0	Muddy sand with pebbles, cobbles and occasional boulders	*Fucus vesiculosus* 10%, loose *F. serratus* 30%	IMGP0128-129
W10	H	56.68820	-5.15825	60	15.0	Muddy sand with scattered cobbles and boulders	*Ascophyllum nodosum* attached 40%, *Fucus vesiculosus* 20%	IMGP0130-131
W10	I	56.68823	-5.15845	80	14.0	Muddy sand with pebbles and scattered cobbles	*Fucus vesiculosus* 20%	IMGP0132-133

Appendix 7 MPA search feature, PMF and non-PMF biotope inventories

Table 7.1 MPA search features and other PMFs recorded during the current survey with illustrative photograph or video frame grab. Italicised sites indicate provenance of image

PMF and Sites	Photograph
BLUE MUSSEL BEDS (*Mytilus edulis* beds on littoral sediment) **LS.LBR.LMus.Myt.Mx** B1, B2, *B3*, ME01, ME02	
FLAME SHELL BEDS (*Limaria hians* beds in tide-swept sublittoral muddy mixed sediment) **SS.SMx.IMx.Lim** S31, S39, S40, D4.1, D4.3, D5.1, D5.3, D6, D20, *FS01*	
HORSE MUSSEL BEDS (*Modiolus modiolus* beds with hydroids and red seaweeds on tide-swept circalittoral mixed substrata) **SS.SBR.SMus.ModT** S5, S7, S25, S42, D11.1, D11.2, D21.1, D21.2, D21.3, D23.1, D23.2, D23.3, D24, D25, D29, D30, D31, D32, D33.1, D34, D35.2, D38, D39.2, *HM01*, HM02, HM03	

Table 7.1 continued

PMF and Sites	Photograph
KELP AND SEAWEED COMMUNITIES ON SUBLITTORAL SEDIMENT (*Laminaria saccharina* with red and brown seaweeds on lower infralittoral muddy mixed sediment) **SS.SMp.KSwSS.LsacR.Mu** S1, *S2*	
KELP AND SEAWEED COMMUNITIES ON SUBLITTORAL SEDIMENT (*Laminaria saccharina* and filamentous red algae on infralittoral sand) **SS.SMp.KSwSS.LsacR.Sa** S29, *S37*	
NORTHERN SEA FAN AND SPONGE COMMUNITIES (Mixed turf of hydroids and large ascidians with *Swiftia pallida* and *Caryophyllia smithii* on weakly tide-swept circalittoral rock) **CR.HCR.XFa.SwiLgAs** *NS01*	
SWIFTIA PALLIDA (Component species of above biotope) *NS01*	

Table 7.1 continued

PMF and Sites	Photograph
SEA LOCH EGG WRACK BEDS (*Ascophyllum nodosum* ecad *mackaii* beds on extremely sheltered mid eulittoral mixed substrata) **LR.LLR.FVS.Ascmac** W1, W2, W3, W4, W5, W6, W7, W8, *W9*, W10, SL01, SL02	
TIDE-SWEPT ALGAL COMMUNITIES (*Ascophyllum nodosum*, sponges and ascidians on tide-swept mid eulittoral rock) **LR.HLR.FT.AscT** TS01, *TS02*	
TIDE-SWEPT ALGAL COMMUNITIES (*Fucus serratus*, sponges and ascidians on tide-swept lower eulittoral rock) **LR.HLR.FT.FserT** TS01	

Table 7.1 continued

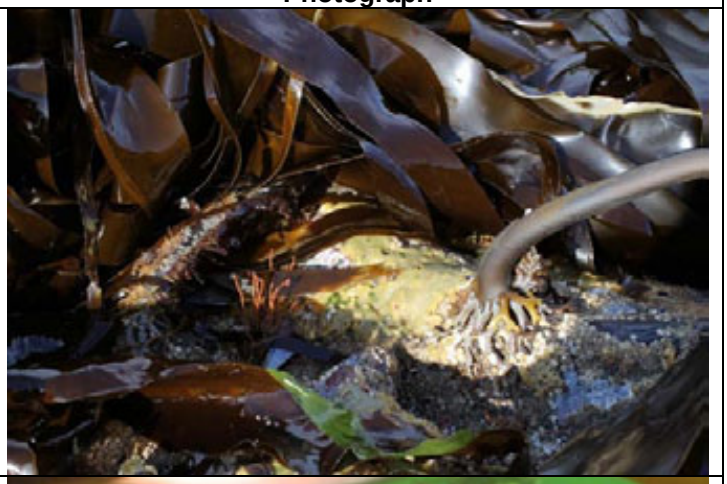
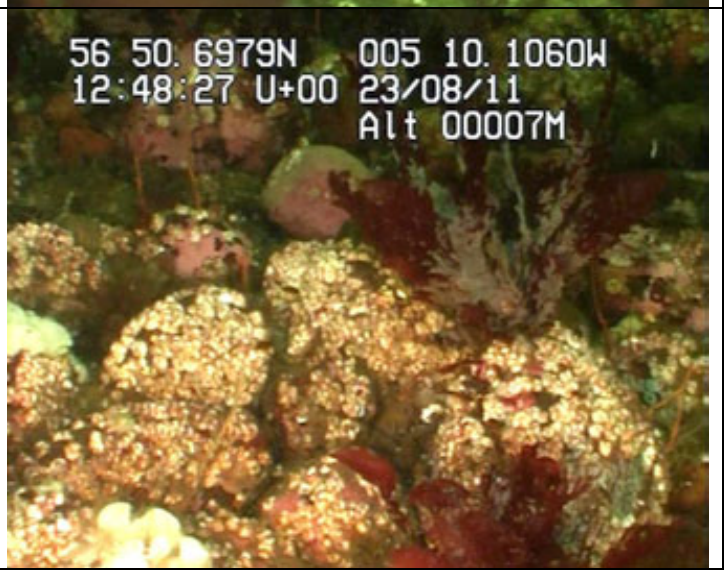
PMF and Sites	Photograph
TIDE-SWEPT ALGAL COMMUNITIES (*Laminaria digitata*, ascidians and bryozoans on tide-swept sublittoral fringe rock) **IR.MIR.KT.LdigT** TS01	
TIDE-SWEPT ALGAL COMMUNITIES **(**Mixed kelp with foliose red seaweeds, sponges and ascidians on sheltered, tide-swept, infralittoral rock) **IR.MIR.KT.XKT** *S26*	
TIDE-SWEPT ALGAL COMMUNITIES (Mixed kelp and red seaweeds on infralittoral boulders, cobbles and gravel in tidal rapids) **IR.MIR.KT.XKTX** *S8*, S9, S10, S17, S18, S26, D28, D30	

Table 7.1 continued

PMF and Sites	Photograph
TIDE-SWEPT ALGAL COMMUNITIES (*Laminaria hyperborea* forest and foliose red seaweeds on tide-swept, upper infralittoral mixed substrata) **IR.MIR.KR.LhypTX.Ft** S23, *S32*, S33, S34, S35, S36, S40	
TIDE-SWEPT ALGAL COMMUNITIES (*Laminaria hyperborea* park and foliose red seaweeds on tide-swept, lower infralittoral mixed substrata) **IR.MIR.KR.LhypTX.Pk** *S28*, S38, S41, S42	
ARCTICA ISLANDICA (Ocean quahog) D32, D37 Photo not from survey area	

Table 7.1 continued

PMF and Sites	Photograph
LEPTOMETRA CELTICA (Northern feather star) *NS01*, D13	

Table 7.2 Non PMF biotopes recorded during the current survey with illustrative photograph or video frame grab. Italicised sites indicate provenance of image

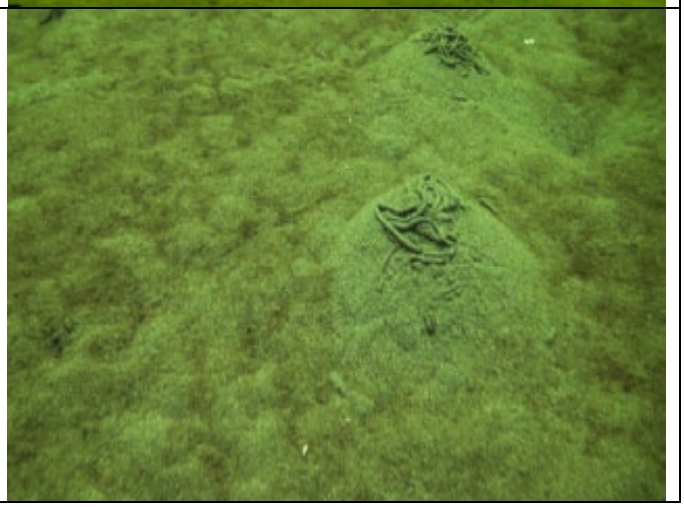
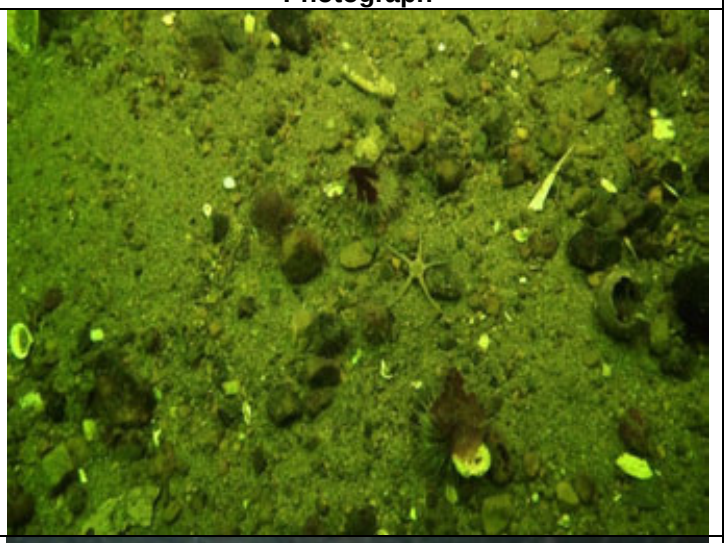
Biotope and Sites	Photograph
CR.MCR. EcCr.FaAlCr Faunal and algal crusts on exposed to moderately wave-exposed circalittoral rock *S25*	
SS.SSa.IMuSa Infralittoral muddy sand *S15*	
SS.SSa.IMuSa.AreISa *Arenicola* marina in infralittoral fine sand or muddy sand S3, *D26*	

Table 7.2 continued

Biotope and Sites	Photograph
SS.SMx.CMx Circalittoral mixed sediment S4, S6, S18, S19, S20, S21, S25, S30, S44, *D27*, D34, D37	
SS.SMx.CMx.OphMx *Ophiothrix fragilis* and/or *Ophiocomina nigra* brittlestar beds on sublittoral mixed sediment *S24*, S27, S43	

Appendix 8 Image logs

Table 8.1 Digital still photographic log showing details of photographs taken during the 2011 survey and lodged with Scottish Natural Heritage. Files are jpegs or tiffs with the extensions 'jpg' or 'tif'. All filenames are preceded by the trunk 'SNH_LL_2011_'. Photographers (Phot) are Colin Moore (CM) and Graham Saunders (GS)

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4333	20/08/2011	FS01	56.55413	-5.42640	*Necora puber* and *Plocamium cartilagineum* turf	GS
DSC_4334	20/08/2011	FS01	56.55413	-5.42640	*Necora puber* and *Plocamium cartilagineum* turf	GS
DSC_4335	20/08/2011	FS01	56.55413	-5.42640	*Laminaria hyperborea* holdfast fauna & flora including *Modiolus*(mantle visible)	GS
DSC_4336	20/08/2011	FS01	56.55413	-5.42640	*Pecten maximus*, *Plocamium cartilagineum* and unidentified crustacean	GS
DSC_4337	20/08/2011	FS01	56.55413	-5.42640	*Modiolus* (mantle visible) in *Plocamium cartilagineum* turf	GS
DSC_4338	20/08/2011	FS01	56.55413	-5.42640	*Modiolus* (mantle visible) in *Plocamium cartilagineum* turf	GS
DSC_4339	20/08/2011	FS01	56.55413	-5.42640	*Necora puber* and *Plocamium cartilagineum* turf with *L. hyperborea* frond visible	GS
DSC_4340	20/08/2011	FS01	56.55413	-5.42640	Hermit crab	GS
DSC_4341	20/08/2011	FS01	56.55413	-5.42640	Juvenile *Galathea* in *Plocamium cartilagineum* turf	GS
DSC_4342	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4343	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4344	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4345	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4346	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4347	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4348	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4349	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4350	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4351	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4352	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4353	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4354	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4355	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4356	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4357	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf (close-up)	GS
DSC_4358	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4359	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4360	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4361	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4362	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4363	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4364	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4365	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4366	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4367	20/08/2011	FS01	56.55413	-5.42640	Exposed *Limaria hians* in *Plocamium cartilagineum* turf	GS
DSC_4368	20/08/2011	FS01	56.55413	-5.42640	Buried *Cancer pagurus*	GS
DSC_4369	20/08/2011	FS01	56.55413	-5.42640	Buried *Cancer pagurus*	GS
DSC_4370	20/08/2011	FS01	56.55413	-5.42640	Buried *Cancer pagurus* (close-up)	GS
DSC_4371	20/08/2011	FS01	56.55413	-5.42640	Buried *Cancer pagurus* (close-up)	GS
DSC_4372	20/08/2011	FS01	56.55413	-5.42640	Buried *Cancer pagurus* (close-up)	GS
DSC_4373	20/08/2011	FS01	56.55413	-5.42640	*Necora puber* mating	GS
DSC_4374	20/08/2011	FS01	56.55413	-5.42640	*Necora puber* mating	GS
DSC_4375	20/08/2011	FS01	56.55413	-5.42640	*Hias* sp.	GS
DSC_4376	20/08/2011	FS01	56.55413	-5.42640	*Hias* sp.	GS
DSC_4377	20/08/2011	FS01	56.55413	-5.42640	*Hias* sp.	GS
DSC_4378	20/08/2011	FS01	56.55413	-5.42640	Goby on *Plocamium cartilagineum* eating a polychaete	GS
DSC_4379	20/08/2011	FS01	56.55413	-5.42640	Goby on *Plocamium cartilagineum* eating a polychaete	GS
DSC_4380	20/08/2011	FS01	56.55413	-5.42640	Goby on *Plocamium cartilagineum* eating a polychaete	GS
DSC_4381	20/08/2011	FS01	56.55413	-5.42640	Goby on *Plocamium cartilagineum* eating a polychaete	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4382	20/08/2011	FS01	56.55413	-5.42640	Goby on *Plocamium cartilagineum* eating a polychaete	GS
DSC_4383	20/08/2011	FS01	56.55413	-5.42640	Polychaete on *Plocamium cartilagineum* after being rejected by goby	GS
DSC_4384	20/08/2011	FS01	56.55413	-5.42640	*Plocamium cartilagineum* and grazed *Delessaria sanguinea*	GS
DSC_4385	20/08/2011	FS01	56.55413	-5.42640	*Sabella* and *Plocamium cartilagineum* on *L. hyperborea* holdfast	GS
DSC_4386	20/08/2011	FS01	56.55413	-5.42640	*Sabella* and *Plocamium cartilagineum* on *L. hyperborea* holdfast	GS
DSC_4387	20/08/2011	FS01	56.55413	-5.42640	*Sabella* and *Plocamium cartilagineum* on *L. hyperborea* holdfast	GS
DSC_4389	20/08/2011	FS01	56.55413	-5.42640	Goby on *Delessaria sanguinea*	GS
DSC_4390	20/08/2011	FS01	56.55413	-5.42640	Goby on *Delessaria sanguinea*	GS
DSC_4391	20/08/2011	FS01	56.55413	-5.42640	*Macropodia* sp.	GS
DSC_4392	20/08/2011	FS01	56.55413	-5.42640	*Macropodia* sp.	GS
DSC_4393	20/08/2011	FS01	56.55413	-5.42640	*Macropodia* sp.	GS
DSC_4394	20/08/2011	FS01	56.55413	-5.42640	Hermit crab	GS
DSC_4395	20/08/2011	FS01	56.55413	-5.42640	Hermit crab (close-up)	GS
DSC_4396	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4397	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4398	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4399	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4400	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4401	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4402	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4403	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4404	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4405	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4406	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4407	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4408	20/08/2011	FS01	56.55413	-5.42640	*Galathea* and *Plocamium cartilagineum*	GS
DSC_4409	20/08/2011	FS01	56.55413	-5.42640	Surface of *L. hyperborea* frond	GS
DSC_4410	20/08/2011	FS01	56.55413	-5.42640	*Eupolymnia nebulosa* tentacles	GS
DSC_4411	20/08/2011	FS01	56.55413	-5.42640	*Necora puber*	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4412	20/08/2011	FS01	56.55413	-5.42640	*Echinus esculentus*	GS
IMG_4080	20/08/2011	FS01	56.55413	-5.42640	*Necora puber* and *Plocamium cartilagineum* on *Limaria* bed. Transect tape visible	GS
IMG_4082	20/08/2011	FS01	56.55413	-5.42640	*Plocamium cartilagineum* and *Laminaria* on *Limaria* bed	GS
IMG_4084	20/08/2011	FS01	56.55413	-5.42640	*Pecten maximus, Plocamium cartilagineum* and *Laminaria* on *Limaria* bed	GS
IMG_4085	20/08/2011	FS01	56.55413	-5.42640	Survey diver	GS
IMG_4086	20/08/2011	FS01	56.55413	-5.42640	Survey diver	GS
IMG_4087	20/08/2011	FS01	56.55413	-5.42640	Survey diver	GS
IMG_4088	20/08/2011	FS01	56.55413	-5.42640	Survey diver	GS
IMG_4089	20/08/2011	FS01	56.55413	-5.42640	Survey diver	GS
IMG_4090	20/08/2011	FS01	56.55413	-5.42640	Survey diver	GS
IMG_4091	20/08/2011	FS01	56.55413	-5.42640	Survey diver	GS
IMG_4092	20/08/2011	FS01	56.55413	-5.42640	*Pecten maximus, Plocamium cartilagineum* and *Laminaria* on *Limaria* bed	GS
IMG_4093	20/08/2011	FS01	56.55413	-5.42640	*Pecten maximus, Plocamium cartilagineum* and *Laminaria* on *Limaria* bed	GS
IMG_4095	20/08/2011	FS01	56.55413	-5.42640	*Pecten maximus, Plocamium cartilagineum* and *Laminaria* on *Limaria* bed	GS
IMG_4096	20/08/2011	FS01	56.55413	-5.42640	*Laminaria* holdfast on *Limaria* bed	GS
IMG_4097	20/08/2011	FS01	56.55413	-5.42640	*Laminaria* holdfast and *Plocamium cartilagineumon* on *Limaria* bed	GS
IMG_4098	20/08/2011	FS01	56.55413	-5.42640	Echinus esculentus and *Plocamium cartilagineum* on *Limaria* bed	GS
IMG_4099	20/08/2011	FS01	56.55413	-5.42640	Echinus esculentus and *Plocamium cartilagineum* on *Limaria* bed	GS
IMG_4100	20/08/2011	FS01	56.55413	-5.42640	Video diver	GS
IMG_4101	20/08/2011	FS01	56.55413	-5.42640	Video diver	GS
IMG_4102	20/08/2011	FS01	56.55413	-5.42640	Video diver	GS
IMG_4103	20/08/2011	FS01	56.55413	-5.42640	Video diver	GS
IMG_4104	20/08/2011	FS01	56.55413	-5.42640	Video diver	GS
IMG_4105	20/08/2011	FS01	56.55413	-5.42640	Video diver	GS
IMG_4106	20/08/2011	FS01	56.55413	-5.42640	Video diver	GS
DSC_4415	21/08/2011	NS01	56.49578	-5.58567	*Suberites carnosus, Caryophyllia smithii, Polymastia penicillus, Ciona intestinalis*	GS
DSC_4416	21/08/2011	NS01	56.49578	-5.58567	*Axinella infundibuliformis*	GS
DSC_4417	21/08/2011	NS01	56.49578	-5.58567	*Diazona violacea, Suberites carnosus, Amphilectus fucorum*	GS
DSC_4418	21/08/2011	NS01	56.49578	-5.58567	*Axinella infundibuliformis*, *Diphasia margareta*	GS
DSC_4419	21/08/2011	NS01	56.49578	-5.58567	*Diphasia margareta, Suberites carnosus*	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4420	21/08/2011	NS01	56.49578	-5.58567	*Diazona violacea*	GS
DSC_4421	21/08/2011	NS01	56.49578	-5.58567	*Myxilla sp., Amphilectus fucorum, Hymedesmia paupertas*	GS
DSC_4422	21/08/2011	NS01	56.49578	-5.58567	*Polycarpa pomaria?, Amphilectus fucorum,* Crinoidea sp.	GS
DSC_4423	21/08/2011	NS01	56.49578	-5.58567	*Swiftia pallida, Amphilectus fucorum*	GS
DSC_4424	21/08/2011	NS01	56.49578	-5.58567	*Swiftia pallida, Amphilectus fucorum*	GS
DSC_4425	21/08/2011	NS01	56.49578	-5.58567	*Swiftia pallida, Amphilectus fucorum*	GS
DSC_4426	21/08/2011	NS01	56.49578	-5.58567	*Swiftia pallida* close-up	GS
DSC_4427	21/08/2011	NS01	56.49578	-5.58567	*Diazona violacea* close-up	GS
DSC_4428	21/08/2011	NS01	56.49578	-5.58567	*Munida rugosa*	GS
DSC_4429	21/08/2011	NS01	56.49578	-5.58567	*Swiftia pallida, Amphilectus fucorum,Polymastia penicillus*	GS
DSC_4430	21/08/2011	NS01	56.49578	-5.58567	*Amphilectus fucorum*, hydroids	GS
DSC_4431	21/08/2011	NS01	56.49578	-5.58567	*Swiftia pallida, Amphilectus fucorum*	GS
DSC_4432	21/08/2011	NS01	56.49578	-5.58567	*Amphilectus fucorum, hydroids, Sabella sp.*	GS
DSC_4433	21/08/2011	NS01	56.49578	-5.58567	*Myxilla incrustans, Polycarpa pomaria,* hydroids	GS
DSC_4434	21/08/2011	NS01	56.49578	-5.58567	*Ascidia virginea*, *Polycarpa pomaria* and sponges	GS
DSC_4435	21/08/2011	NS01	56.49578	-5.58567	*Ascidia virginea*, *Polycarpa pomaria* and sponges	GS
DSC_4436	21/08/2011	NS01	56.49578	-5.58567	*Munida rugosa*	GS
DSC_4437	21/08/2011	NS01	56.49578	-5.58567	Hydroids and *Delessaria* (OUTSIDE SURVEY AREA)	GS
DSC_4438	21/08/2011	NS01	56.49578	-5.58567	*Pachymatisma* (OUTSIDE SURVEY AREA)	GS
IMG_4110	21/08/2011	NS01	56.49578	-5.58567	Sediment-dusted rock slope with *Diazona violacea, Ascidia sp.*, *Pachymatisma johnstonia, Suberites carnosus*, *Axinella infundibuliformis, Securiflustra securifrons, Caryophyllia smithii,* hydroids, *Amphilectus fucorum*	GS
IMG_4111	21/08/2011	NS01	56.49578	-5.58567	Sediment-dusted rock slope with *Diazona violacea, Ascidia sp.*, *Pachymatisma johnstonia, Suberites carnosus*, *Axinella infundibuliformis, Securiflustra securifrons, Caryophyllia smithii,* hydroids, *Amphilectus fucorum*	GS
IMG_4112	21/08/2011	NS01	56.49578	-5.58567	Sediment-dusted rock slope with *Cancer pagurus, Pachymatisma johnstonia,* hydroids, *Amphilectus fucorum*	GS
IMG_4113	21/08/2011	NS01	56.49578	-5.58567	Rock slope with dense hydroid turf, *Pachymatisma johnstonia, Suberites carnosus*, *Amphilectus fucorum, Leptometra celtica*	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMG_4114	21/08/2011	NS01	56.49578	-5.58567	Rock slope with dense hydroid turf, *Leptometra celtica, Ascidia virginea, Ascidia sp.*, *Myxilla spp., Amphilectus fucorum, Pachymatisma johnstonia*	GS
IMG_4116	21/08/2011	NS01	56.49578	-5.58567	Steep rock slope with dense hydroid turf (including *Diphasia margareta*), *Securiflustra securifrons, Axinella infundibuliformis, Amphilectus fucorum, Caryophyllia smithii, Swiftia pallida, Diazona violacea*	GS
IMG_4118	21/08/2011	NS01	56.49578	-5.58567	Steep rock slope with dense hydroid turf (including *Diphasia margareta*), *Securiflustra securifrons, Axinella infundibuliformis, Amphilectus fucorum, Caryophyllia smithii, Swiftia pallida, Diazona violacea*	GS
IMG_4119	21/08/2011	NS01	56.49578	-5.58567	Steep rock slope with dense hydroid turf (including *Diphasia margareta*), *Securiflustra securifrons, Axinella infundibuliformis, Amphilectus fucorum, Caryophyllia smithii, Swiftia pallida, Diazona violacea*	GS
IMG_4120	21/08/2011	NS01	56.49578	-5.58567	Near-vertical rock face with *Securiflustra securifrons, Axinella infundibuliformis, Amphilectus fucorum, Swiftia pallida, Terebratulina retusa*, hydroids, *Diazona violacea*	GS
IMG_4121	21/08/2011	NS01	56.49578	-5.58567	Near-vertical rock face with *Securiflustra securifrons, Axinella infundibuliformis, Amphilectus fucorum, Swiftia pallida,* hydroids	GS
IMG_4122	21/08/2011	NS01	56.49578	-5.58567	Steep rock slope with *Diazona violacea, Securiflustra securifrons, Axinella infundibuliformis, Myxilla incrustans, Amphilectus fucorum, Suberites carnosus, Raspailia ramosa?, Swiftia pallida,* hydroids including *Diphasia margareta*	GS
IMG_4123	21/08/2011	NS01	56.49578	-5.58567	Silted rock ledge with dense *Diphasia margareta, Caryophyllia smithii, Amphilectus fucorum, Ascidia* sp., *Securiflustra securifrons*	GS
IMG_4124	21/08/2011	NS01	56.49578	-5.58567	Silted rock slope with *Diazona violacea, Pachymatisma johnstonia, Nemertesia antennina, Swiftia pallida, Ascidia virginea, Caryophyllia smithii*,	GS
IMG_4126	21/08/2011	NS01	56.49578	-5.58567	Survey diver with video	GS
IMG_4127	21/08/2011	NS01	56.49578	-5.58567	Survey diver with video	GS
IMG_4128	21/08/2011	NS01	56.49578	-5.58567	Survey diver with video	GS
IMG_4129	21/08/2011	NS01	56.49578	-5.58567	Survey diver with video	GS
IMG_4130	21/08/2011	NS01	56.49578	-5.58567	Survey diver with video	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4439	22/08/2011	HM01	56.69002	-5.17163	*Alcyonium digitatum, Ophiothrix fragilis, Galathea* sp.	GS
DSC_4440	22/08/2011	HM01	56.69002	-5.17163	hydroids	GS
DSC_4441	22/08/2011	HM01	56.69002	-5.17163	*Modiolus modiolus, Alcyonium digitatum* (partial)	GS
DSC_4442	22/08/2011	HM01	56.69002	-5.17163	*Alcyonium digitatum* on *Modiolus*	GS
DSC_4443	22/08/2011	HM01	56.69002	-5.17163	*Alcyonium digitatum, Necora puber,* barnacles	GS
DSC_4444	22/08/2011	HM01	56.69002	-5.17163	*Alcyonium digitatum, Necora puber,* barnacles	GS
DSC_4445	22/08/2011	HM01	56.69002	-5.17163	*Modiolus modiolus, Alcyonium digitatum, Galathea* sp. Barnacles	GS
DSC_4446	22/08/2011	HM01	56.69002	-5.17163	*Modiolus modiolus, Crossaster papposus, Alcyonium digitatum*	GS
DSC_4447	22/08/2011	HM01	56.69002	-5.17163	*Alcyonium digitatum,* hydroids, *?Amphilectus fucorum*	GS
DSC_4448	22/08/2011	HM01	56.69002	-5.17163	*Liocarcinus*sp., *Alcyonium digitatum*, hydroids, barnacles	GS
DSC_4449	22/08/2011	HM01	56.69002	-5.17163	*Liocarcinus*sp., *Alcyonium digitatum*, hydroids, barnacles	GS
DSC_4450	22/08/2011	HM01	56.69002	-5.17163	*Liocarcinus*sp., hydroids, barnacles	GS
DSC_4451	22/08/2011	HM01	56.69002	-5.17163	*Crossaster papposus* attacking a *Modiolus*	GS
DSC_4452	22/08/2011	HM01	56.69002	-5.17163	*Crossaster papposus* attacking a *Modiolus*	GS
DSC_4453	22/08/2011	HM01	56.69002	-5.17163	*Modiolus modiolus, Galathea* sp. Barnacles	GS
DSC_4454	22/08/2011	HM01	56.69002	-5.17163	*Alcyonium digitatum, Galathea* sp. barnacles, hydroids	GS
DSC_4455	22/08/2011	HM01	56.69002	-5.17163	*Alcyonium digitatum, Modiolus modiolus,* hydroids	GS
DSC_4456	22/08/2011	HM01	56.69002	-5.17163	*Alcyonium digitatum, Modiolus modiolus, hydroids, ?Ascidia mentula*	GS
DSC_4457	22/08/2011	HM01	56.69002	-5.17163	Hydroids on *Modiolus modiolus*	GS
DSC_4458	22/08/2011	HM01	56.69002	-5.17163	Carcinus maenas, Alcyonium digitatum	GS
DSC_4459	22/08/2011	HM01	56.69002	-5.17163	Carcinus maenas, Alcyonium digitatum	GS
DSC_4460	22/08/2011	HM01	56.69002	-5.17163	*Modiolus modiolus, Galathea* sp. barnacles	GS
DSC_4463	22/08/2011	HM01	56.69002	-5.17163	Hydroids, *Alcyonium digitatum, Galathea* sp.	GS
DSC_4464	22/08/2011	HM01	56.69002	-5.17163	*Crossaster papposus* close-up	GS
DSC_4465	22/08/2011	HM01	56.69002	-5.17163	*Crossaster papposus* close-up	GS
DSC_4466	22/08/2011	HM01	56.69002	-5.17163	*Crossaster papposus* close-up	GS
IMG_4131	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, *Crossaster papposus, Alcyonium digitatum,* and transect tape	GS
IMG_4132	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum*, *Liocarcinus* sp.	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMG_4133	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum*	GS
IMG_4134	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum*	GS
IMG_4135	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Asterias rubens, Galathea* sp. and transect tape	GS
IMG_4136	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Asterias rubens, Galathea* sp. and transect tape	GS
IMG_4137	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Hyas* sp, *Echinus esculentus*	GS
IMG_4138	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Asterias rubens, Pagurus* sp., *Echinus esculentus*	GS
IMG_4139	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Asterias rubens, Cancer pagurus*	GS
IMG_4140	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Asterias rubens, Pagurus* sp., *Echinus esculentus*	GS
IMG_4141	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Asterias rubens, Pagurus* sp., *Echinus esculentus*	GS
IMG_4142	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Asterias rubens, Pagurus* sp., *Echinus esculentus*	GS
IMG_4143	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Asterias rubens, Pagurus* sp., *Echinus esculentus*	GS
IMG_4144	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Echinus esculentus, Liocarcinus* sp.	GS
IMG_4145	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Echinus esculentus, Liocarcinus* sp.	GS
IMG_4146	22/08/2011	HM01	56.69002	-5.17163	*Modiolus* bed, hydroids, *Alcyonium digitatum, Liocarcinus* sp.	GS
IMG_4147	22/08/2011	HM01	56.69002	-5.17163	Video diver	GS
IMG_4148	22/08/2011	HM01	56.69002	-5.17163	Video diver	GS
DSC_4467	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Cerialthus lloydii, Psammechinus miliaris, Protanthea simplex*	GS
DSC_4468	24/08/2011	HM02	56.83660	-5.13210	*Psammechinus miliaris* in *Ascophyllum nodosum* (drift)	GS
DSC_4469	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus*	GS
DSC_4470	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Cerialthus lloydii*	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4471	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Cerialthus lloydii*	GS
DSC_4472	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Cerialthus lloydii, Psammechinus miliaris, Protanthea simplex*	GS
DSC_4473	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Cerialthus lloydii, Psammechinus miliaris*	GS
DSC_4474	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Cerialthus lloydii,* chiton, *Modiolus modiolus*	GS
DSC_4475	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Cerialthus lloydii, Psammechinus miliaris,* hydroids	GS
DSC_4476	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus*	GS
DSC_4477	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus,* hydroids	GS
DSC_4478	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Psammechinus miliaris*	GS
DSC_4479	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Protanthea simplex, Spirobranchus* sp.	GS
DSC_4480	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp.	GS
DSC_4481	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp.	GS
DSC_4482	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Protanthea simplex*	GS
DSC_4483	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Protanthea simplex*	GS
DSC_4484	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Protanthea simplex*	GS
DSC_4485	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Protanthea simplex*	GS
DSC_4486	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Protanthea simplex*	GS
DSC_4487	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Protanthea simplex*	GS
DSC_4488	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp.	GS
DSC_4489	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp.	GS
DSC_4490	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp.	GS
DSC_4491	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp.	GS
DSC_4492	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Protanthea simplex*	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4493	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Protanthea simplex, Laminaria hyperborea* holdfast	GS
DSC_4494	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp.	GS
DSC_4495	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Cerialthus lloydii, Protanthea simplex, Spirobranchus sp.*	GS
DSC_4496	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus*, *Pagurus* sp. *Protanthea simplex,*	GS
DSC_4497	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: Modiolus modiolus, *Protanthea simplex,*	GS
DSC_4498	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Psammechinus miliaris, Crossaster papposus*	GS
DSC_4499	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: juvenile gadoid	GS
DSC_4500	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus*, foliose red algae, *Pagurus* sp., *Spirobranchus* sp.	GS
DSC_4501	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus*, foliose red algae, *Pagurus* sp., *Spirobranchus* sp.	GS
DSC_4502	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Protanthea simplex, Spirobranchus* sp. coralline red algae	GS
DSC_4503	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Protanthea simplex*	GS
DSC_4504	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus*, foliose red algae, *Spirobranchus* sp.	GS
DSC_4505	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus*, foliose red algae, *Spirobranchus* sp.	GS
DSC_4506	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus*, foliose red algae, *Spirobranchus* sp.	GS
DSC_4507	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus*, foliose red algae, *Spirobranchus* sp.	GS
DSC_4508	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Protanthea simplex*, coralline red algae	GS
DSC_4509	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Protanthea simplex*	GS
DSC_4511	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Protanthea simplex*	GS
DSC_4512	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Protanthea simplex*	GS
DSC_4513	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Protanthea simplex, Spirobranchus* sp.	GS
DSC_4514	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Psammechinus miliaris, Protanthea simplex*	GS
DSC_4515	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Protanthea simplex, Spirobranchus sp.*	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4516	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: shell debris, *Psammechinus miliaris,*	GS
DSC_4517	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: *Pagurus* sp. *Modiolus modiolus*	GS
DSC_4518	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: *Pagurus* sp. *Modiolus modiolus,* foliose red algae	GS
DSC_4519	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: *Pagurus* sp. *Modiolus modiolus,* foliose red algae	GS
DSC_4520	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: *Pagurus* sp. *Modiolus modiolus,* foliose red algae	GS
DSC_4521	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: *Pagurus* sp. *Modiolus modiolus,* foliose red algae	GS
DSC_4522	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: *Pagurus* sp. *Modiolus modiolus,* foliose red algae	GS
DSC_4523	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: *Pagurus* sp. *Modiolus modiolus,* foliose red algae, Cerianthus lloydii	GS
DSC_4524	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: *Pagurus* sp. *Modiolus modiolus,* foliose red algae	GS
DSC_4525	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: *Pagurus* sp. *Modiolus modiolus,* foliose red algae	GS
DSC_4526	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: *Pagurus* sp. *Modiolus modiolus,* foliose red algae, Cerianthus lloydii	GS
DSC_4527	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Protanthea simplex, f*oliose red algae	GS
DSC_4528	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Laminaria hyperborea.* holdfast, *Protanthea simplex*	GS
DSC_4529	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Henricea* sp.	GS
DSC_4530	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Henricea* sp.	GS
DSC_4531	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Laminaria hyperborea* stipes, *Carcinus maenas*	GS
DSC_4532	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Laminaria hyperborea* stipes, *Carcinus maenas*	GS
DSC_4533	24/08/2011	HM02	56.83660	-5.13210	Modiolus bed: *Modiolus modiolus*	GS
DSC_4534	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Laminaria hyperborea* stipe, *Pagurus* sp.	GS
DSC_4535	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Laminaria hyperborea* stipe, *Pagurus* sp.	GS
DSC_4536	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Psammechinus miliaris, Ciona intestinalis*	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4537	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Psammechinus miliaris, Ciona intestinalis*	GS
DSC_4538	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Psammechinus miliaris, Ciona intestinalis, Ophiopholis* sp.	GS
DSC_4539	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp., *Psammechinus miliaris, Ciona intestinalis, Ophiopholis* sp.	GS
DSC_4540	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Cerialthus lloydii*	GS
DSC_4541	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Cerialthus lloydii*	GS
DSC_4542	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Crossaster papposus, Modiolus modiolus*	GS
DSC_4543	24/08/2011	HM02	56.83660	-5.13210	*Modiolus bed: Crossaster papposus, Modiolus modiolus*	GS
DSC_4544	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Protula* sp., *Protanthea simplex*	GS
DSC_4545	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Protula* sp., *Protanthea simplex*	GS
DSC_4546	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Crossaster papposus, Modiolus modiolus, Protanthea simplex*	GS
DSC_4547	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Crossaster papposus, Modiolus modiolus*	GS
IMG_4150	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Laminaria hyperborea*	GS
IMG_4151	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Laminaria hyperborea*	GS
IMG_4152	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Laminaria hyperborea,* foliose red algae, P*rotanthea simplex*	GS
IMG_4153	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Laminaria hyperborea,* foliose red algae, P*rotanthea simplex*	GS
IMG_4154	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Laminaria hyperborea,* foliose red algae, P*rotanthea simplex*	GS
IMG_4155	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea,* foliose red algae, P*rotanthea simplex, Ceriantus lloydii, Psammechinus miliaris*	GS
IMG_4156	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea,* foliose red algae, P*rotanthea simplex, Ceriantus lloydii, Psammechinus miliaris, Pagurus* sp.	GS
IMG_4157	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea,* foliose red algae, P*rotanthea simplex, Ceriantus lloydii, Psammechinus miliaris, Pagurus* sp.	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMG_4158	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea,* foliose red algae, P*rotanthea simplex, Ceriantus lloydii, Asterias rubens, Pagurus* sp.	GS
IMG_4159	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea, Psammechinus miliaris, Protanthea simplex*, survey transect tape	GS
IMG_4160	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea, Psammechinus miliaris, Protanthea simplex*, foliose red algae	GS
IMG_4161	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea,* survey transect tape	GS
IMG_4162	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea,* survey transect tape	GS
IMG_4163	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea,* survey transect tape	GS
IMG_4164	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea, Protanthea simplex*, foliose red algae	GS
IMG_4165	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Psammechinus miliaris, Protanthea simplex*, foliose red algae	GS
IMG_4166	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea, Psammechinus miliaris, Protanthea simplex*, foliose red algae	GS
IMG_4167	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea, Psammechinus miliaris, Protanthea simplex*, foliose red algae	GS
IMG_4168	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea* holdfast, P*rotanthea simplex*	GS
IMG_4169	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea* holdfast, P*rotanthea simplex, Psammechinus miliari, Pagurus* sp.	GS
IMG_4170	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea* holdfast, P*rotanthea simplex, Psammechinus miliari, Pagurus* sp.	GS
IMG_4171	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Laminaria hyperborea* holdfast, P*rotanthea simplex, Psammechinus miliari, Pagurus* sp.	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMG_4172	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Protanthea simplex*, foliose red algae, *Crossaster papposus*	GS
IMG_4173	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Protanthea simplex*, foliose red algae, *Crossaster papposus*	GS
IMG_4174	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Protanthea simplex*, foliose red algae, *Crossaster papposus*	GS
IMG_4175	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Protanthea simplex*, foliose red algae, *Cerianthus lloydii*	GS
IMG_4176	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Protanthea simplex*, foliose red algae, *Cerianthus lloydii*	GS
IMG_4177	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Psammechinus miliaris,* foliose red algae	GS
IMG_4178	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Psammechinus miliaris, Protanthea simplex, Ciona intestinalis,* foliose red algae	GS
IMG_4179	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Psammechinus miliaris, Protanthea simplex, Ciona intestinalis, foliose red algae*	GS
IMG_4180	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Psammechinus miliaris, Protanthea simplex, Ciona intestinalis, foliose red algae*	GS
IMG_4181	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Psammechinus miliaris, Cerianthus lloydii,* foliose red algae, *Buccinum undatum, Tubularia* sp.	GS
IMG_4182	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Cerianthus lloydii*, foliose red algae, *Crossaster papposus, Pagurus* sp., *Spirobranchus* sp.	GS
IMG_4183	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Psammechinus miliaris, Laminaria hyperborea, Spirobranchus* sp.	GS
IMG_4184	24/08/2011	HM02	56.83660	-5.13210	*Modiolus* bed: *Modiolus modiolus, Psammechinus miliaris, Laminaria hyperborea, Spirobranchus* sp.	GS
IMG_4185	24/08/2011	HM02	56.83660	-5.13210	Video diver	GS
IMG_4187	24/08/2011	HM02	56.83660	-5.13210	Video diver	GS
IMG_4188	24/08/2011	HM02	56.83660	-5.13210	Video diver	GS
IMG_4189	24/08/2011	HM02	56.83660	-5.13210	Video diver	GS
IMG_4193	24/08/2011	HM02	56.83660	-5.13210	Video diver	GS
DSC_4551	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Henricea* sp., hydroids	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4552	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Necora puber, Calliostoma zizyphinum, Plocamium cartilagineum,* hydroids	GS
DSC_4553	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: hydroid turf	GS
DSC_4554	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Munida rugosa,* hydroids	GS
DSC_4555	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Galathea* sp.	GS
DSC_4556	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Munida rugosa,* hydroids	GS
DSC_4557	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Urticina felina,* hydroids, *Galathea* sp.	GS
DSC_4558	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Galathea* sp., *Urticina felina,* hydroids,	GS
DSC_4559	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Galathea* sp., *Spirobranchus* sp., hydroids,	GS
DSC_4560	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Galathea* sp., *Spirobranchus* sp., hydroids,	GS
DSC_4561	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Galathea* sp., *Spirobranchus* sp., hydroids,	GS
DSC_4562	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus, ?Neocrania,* hydroids, *Spirobranchus* sp. barnacles	GS
DSC_4563	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: hydroids	GS
DSC_4564	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: hydroids	GS
DSC_4565	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: hydroids	GS
DSC_4566	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Calliostoma zizyphinum*, hydroids	GS
DSC_4567	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Calliostoma zizyphinum*, hydroids	GS
DSC_4568	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp. *Galathea* sp.	GS
DSC_4569	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus, Spirobranchus* sp. *Galathea* sp.	GS
DSC_4570	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: hydroids, *Galathea* sp.	GS
DSC_4571	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: Munida rugosa, hydroids, *Liocarcinus* sp. (part)	GS
DSC_4572	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: Munida rugosa, hydroids, *Liocarcinus* sp. (part)	GS
DSC_4573	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4574	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4575	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4576	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4577	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4578	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4579	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4580	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4581	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4582	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4583	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4584	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4585	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Taurulus bubalis*, hydroids	GS
DSC_4586	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Galathea* sp., terebellid tentacles	GS
DSC_4587	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Galathea* sp., terebellid tentacles	GS
DSC_4588	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus, Alcyonium digitatum, Palaemon* sp.*Asterias rubens,* hydroids	GS
DSC_4589	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus, Alcyonium digitatum, Palaemon* sp*, Asterias rubens,* hydroids	GS
DSC_4590	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus, Alcyonium digitatum, Palaemon* sp*, Asterias rubens, Munida rugosa,* hydroids	GS
DSC_4591	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus, Alcyonium digitatum, Palaemon* sp*, Asterias rubens, Munida rugosa,* hydroids	GS
DSC_4592	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus,* hydroids	GS
DSC_4593	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Liocarcinus* sp.	GS
DSC_4594	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus,* Echinus esculentus	GS
DSC_4595	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Necora puber*	GS
DSC_4596	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Calliostoma zizyphinum*, hydroids	GS
DSC_4597	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Calliostoma zizyphinum*, hydroids	GS
DSC_4598	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: hydroids	GS
DSC_4599	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus,* hydroids	GS
DSC_4600	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus,* hydroids	GS
DSC_4601	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: *Modiolus modiolus,* hydroids	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
DSC_4602	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris	GS
IMG_4196	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Echinus esculentus, Crossaster papposus, Liocarcinus* sp. *Alcyonium digitatum, Munida rugosa*, *Galathea* sp. survey transect tape	GS
IMG_4197	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Modiolus modiolus, Alcyonium digitatum, Henricea* sp., *Galathea* sp., survey transect tape	GS
IMG_4198	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Modiolus modiolus, Alcyonium digitatum, Henricea* sp., *Galathea* sp., *Echinus esculentus,* survey transect tape	GS
IMG_4199	25/08/2011	HM03	56.55050	-5.42407	Survey diver and transct tape	GS
IMG_4200	25/08/2011	HM03	56.55050	-5.42407	Survey diver and transct tape	GS
IMG_4201	25/08/2011	HM03	56.55050	-5.42407	Survey diver and transct tape	GS
IMG_4202	25/08/2011	HM03	56.55050	-5.42407	Survey diver and transct tape	GS
IMG_4203	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Modiolus modiolus, Munida rugosa, Liocarcinus* sp., hydroids	GS
IMG_4204	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Modiolus modiolus, Munida rugosa, Liocarcinus* sp., hydroids	GS
IMG_4205	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Munida rugosa, Galathea* sp	GS
IMG_4206	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Munida rugosa, Galathea* sp, transect tape	GS
IMG_4207	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Modiolus modiolus, Alcyonium digitatum, Liocarcinus* sp., *Munida rugosa*, *Galathea* sp., *Calliostoma zizyphinum*, hydroids	GS
IMG_4208	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Alcyonium digitatum, Echinus esculentus,* hydroids, transect tape	GS
IMG_4209	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Modiolus modiolus, Alcyonium digitatum, Liocarcinus* sp., *Munida rugosa*, hydroids	GS
IMG_4210	25/08/2011	HM03	56.55050	-5.42407	Survey diver	GS
IMG_4211	25/08/2011	HM03	56.55050	-5.42407	Survey diver	GS
IMG_4212	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Alcyonium digitatum, Crossaster paposus, Calliostoma zizyphinum, Munida rugosa, Liocarcinus* sp. hydroids	GS
IMG_4213	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Modiolus modiolus*	GS
IMG_4214	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Necora puber, Plocamium cartilagineum*	GS

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMG_4215	25/08/2011	HM03	56.55050	-5.42407	*Modiolus* bed: shell debris, *Necora puber, Plocamium cartilagineum, Munida rugosa*	GS
IMG_1754	03/08/2011	TS01	56.84242	-5.16423	Bands of tide-swept *Laminaria digitata*, *Fucus serratus* and *Ascophylum nodosum* on steep bedrock shore, looking northeast	CM
IMG_1755	03/08/2011	TS01	56.84242	-5.16423	Bands of tide-swept *Laminaria digitata*, *Fucus serratus* and *Ascophylum nodosum* on steep bedrock shore, looking northeast	CM
IMG_1756	03/08/2011	TS01	56.84242	-5.16423	Bands of tide-swept *Laminaria digitata*, *Fucus serratus* and *Ascophylum nodosum* on steep bedrock shore, looking northeast	CM
IMG_1757	03/08/2011	TS01.1	56.8425	-5.16405	Tide-swept *Laminaria digitata*	CM
IMG_1758	03/08/2011	TS01.1	56.8425	-5.16405	Tide-swept *Laminaria digitata* and *Fucus serratus*	CM
IMG_1759	03/08/2011	TS01.1	56.8425	-5.16405	Tide-swept *Laminaria digitata*	CM
IMG_1760	03/08/2011	TS01.1	56.8425	-5.16405	Tide-swept *Laminaria digitata*	CM
IMG_1761	03/08/2011	TS01.1	56.8425	-5.16405	Tide-swept *Laminaria digitata*	CM
IMG_1762	03/08/2011	TS01.1	56.8425	-5.16405	Tide-swept *Laminaria digitata* with understorey of *Halichondria panicea, Tubularia indivisa* and *Balanus crenatus*	CM
IMG_1763	03/08/2011	TS01.1	56.8425	-5.16405	*Halichondria panicea* and *Tubularia indivisa*	CM
IMG_1764	03/08/2011	TS01.1	56.8425	-5.16405	*Halichondria panicea* and *Tubularia indivisa*	CM
IMG_1765	03/08/2011	TS01.1	56.8425	-5.16405	*Halichondria panicea* and *Tubularia indivisa*	CM
IMG_1766	03/08/2011	TS01.1	56.8425	-5.16405	*Halichondria panicea* and *Tubularia indivisa*	CM
IMG_1767	03/08/2011	TS01.1	56.8425	-5.16405	*Halichondria panicea* and *Tubularia indivisa*	CM
IMG_1768	03/08/2011	TS01.1	56.8425	-5.16405	Tide-swept *Laminaria digitata* with understorey of *Membranoptera alata* and *Alcyonidium diaphanum*	CM
IMG_1769	03/08/2011	TS01.1	56.8425	-5.16405	Tide-swept *Laminaria digitata* with understorey of *Membranoptera alata* and *Alcyonidium diaphanum*	CM
IMG_1770	03/08/2011	TS01.1	56.8425	-5.16405	*Alcyonidium diaphanum*	CM
IMG_1771	03/08/2011	TS01.2	56.8425	-5.16407	Tide-swept *Fucus serratus* band	CM
IMG_1772	03/08/2011	TS01.2	56.8425	-5.16407	*Fucus serratus, F. vesiculosus, Cladophora rupestris* and *Mastocarpus stellatus*	CM
IMG_1773	03/08/2011	TS01.2	56.8425	-5.16407	*Cladophora rupestris* and *Mastocarpus stellatus*	CM
IMG_1774	03/08/2011	TS01.2	56.8425	-5.16407	Band of *Mytilus edulis*	CM
IMG_1775	03/08/2011	TS01.2	56.8425	-5.16407	Dense *Dynamena pumila* on *Fucus serratus*	CM

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMG_1776	03/08/2011	TS01.2	56.8425	-5.16407	Dense *Dynamena pumila* on *Fucus serratus*	CM
IMG_1777	03/08/2011	TS01.2	56.8425	-5.16407	Dense *Dynamena pumila* on *Fucus serratus*	CM
IMG_1778	03/08/2011	TS01.2	56.8425	-5.16407	Dense *Dynamena pumila* and *Alcyonidium diaphanum,* on *Fucus serratus*	CM
IMG_1779	03/08/2011	TS01.2	56.8425	-5.16407	Dense *Dynamena pumila* and *Alcyonidium diaphanum,* on *Fucus serratus*	CM
IMG_1780	03/08/2011	TS01.2	56.8425	-5.16407	Dense *Dynamena pumila* and *Alcyonidium diaphanum,* on *Fucus serratus*	CM
IMG_1781	03/08/2011	TS01.2	56.8425	-5.16407	*Halichondria panicea* and *Semibalanus balanoides* beneath *Fucus serratus*	CM
IMG_1782	03/08/2011	TS01.2	56.8425	-5.16407	Dense *Dynamena pumila* on *Fucus serratus*	CM
IMG_1783	03/08/2011	TS01.2	56.8425	-5.16407	*Cladophora rupestris* and *Mastocarpus stellatus*	CM
IMG_1784	03/08/2011	TS01.3	56.8424	-5.16402	Band of tide-swept *Ascophylum nodosum* on steep bedrock	CM
IMG_1785	03/08/2011	TS01.3	56.8424	-5.16402	Band of tide-swept *Ascophylum nodosum* on steep bedrock	CM
IMG_1786	03/08/2011	TS01.3	56.8424	-5.16402	Dense *Ascophyllum nodosum* with *Cladophora rupestris* turf	CM
IMG_1787	03/08/2011	TS01.3	56.8424	-5.16402	Dense *Ascophyllum nodosum* epiphyised by *Dynamena pumila* and *Vertebrata lanosa*	CM
IMG_1788	03/08/2011	TS01.3	56.8424	-5.16402	*Semibalanus balanoides* and *Hildenbrandia* spp. beneath *Ascophyllum nodosum*	CM
IMG_1789	03/08/2011	TS01.3	56.8424	-5.16402	*Ascophyllum nodosum* and *Fucus vesiculosus*	CM
IMG_1790	03/08/2011	TS01.3	56.8424	-5.16402	*Ascophyllum nodosum* with *Cladophora rupestris* turf	CM
IMGP0019	29/08/2011	Dunstaffnage Bay	56.44962	-5.43475	Scattered boulders and cobbles on sand at the bottom of the shore, suppporting clumps of *Fucus serratus*	CM
IMGP0020	29/08/2011	Dunstaffnage Bay	56.44962	-5.43475	Close-up of small boulder with dense *Semibalanus balanoides*, as well as *Fucus serratus*, *Littorina littorea* and a small clump of *Mytilus edulis*	CM
IMGP0021	29/08/2011	Dunstaffnage Bay	56.44962	-5.43475	Scattered boulders and cobbles on sand at the bottom of the shore, suppporting clumps of *Fucus serratus*	CM
IMGP0022	29/08/2011	Dunstaffnage Bay	56.44887	-5.43638	*Mytilus edulis* clumps on small boulder on lower shore	CM

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMGP0023	29/08/2011	Dunstaffnage Bay	56.44887	-5.43638	Lower sandy shore with *Mytilus edulis* clumps on isolated small boulder	CM
IMGP0024	29/08/2011	Dunstaffnage Bay	56.44877	-5.43685	*Mytilus edulis* clump and dense *Semibalanus balanoides* on small boulder on lower shore	CM
IMGP0025	29/08/2011	Dunstaffnage Bay	56.44877	-5.43685	Sparse small boulders and cobbles on lower sandy shore	CM
IMGP0026	29/08/2011	B1.A	56.44962	-5.43678	Sparse *Mytilus edulis* bed on mixed sandy substrate	CM
IMGP0027	29/08/2011	B1.B	56.44970	-5.43683	Sparse *Mytilus edulis* bed on mixed sandy substrate	CM
IMGP0028	29/08/2011	B1.C	56.44962	-5.43667	Sparse *Mytilus edulis* bed on mixed sandy substrate	CM
IMGP0029	29/08/2011	B1.D	56.44967	-5.43672	Sparse *Mytilus edulis* bed on mixed sandy substrate	CM
IMGP0030	29/08/2011	B1.E	56.44965	-5.43687	Sparse *Mytilus edulis* bed on mixed sandy substrate	CM
IMGP0031	29/08/2011	B1	56.44963	-5.43715	View looking east of sparse *Mytilus edulis* bed B1 in centre, with bed B2 just behind and on the right	CM
IMGP0032	29/08/2011	B1	56.44963	-5.43715	View looking east of sparse *Mytilus edulis* bed B1 in foreground on left, with bed B2 just behind in centre	CM
IMGP0033	29/08/2011	B2	56.44947	-5.43663	View looking northeast of sparse *Mytilus edulis* bed B2	CM
IMGP0034	29/08/2011	B2.F	56.44947	-5.43627	Sparse *Mytilus edulis* bed on mixed sandy substrate	CM
IMGP0035	29/08/2011	B2.G	56.44948	-5.43617	Sparse *Mytilus edulis* bed on mixed sandy substrate	CM
IMGP0036	29/08/2011	B1	56.44948	-5.43658	View looking northwest of sparse *Mytilus edulis* bed B1	CM
IMGP0037	29/08/2011	ME01	56.44963	-5.43675	Sparse *Mytilus edulis* bed on mixed sandy substrate	CM
IMGP0038	29/08/2011	ME01	56.44963	-5.43675	Sparse *Mytilus edulis* bed on mixed sandy substrate, showing *mussels, Semibalanus balanoides* and *Littorina littorea*	CM
IMGP0039	29/08/2011	ME01	56.44963	-5.43675	Sparse *Mytilus edulis* bed on mixed sandy substrate, showing *mussels, Semibalanus balanoides* and *Littorina littorea*	CM
IMGP0040	29/08/2011	ME01	56.44963	-5.43675	Sparse *Mytilus edulis* bed on mixed sandy substrate, showing *mussels, Semibalanus balanoides* and *Littorina littorea*	CM
IMGP0041	29/08/2011	ME01	56.44963	-5.43675	Sparse *Mytilus edulis* bed on mixed sandy substrate, showing *mussels and Semibalanus balanoides*	CM

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMGP0042	29/08/2011	ME01	56.44963	-5.43675	Sparse *Mytilus edulis* bed on mixed sandy substrate, showing *Patella vulgata, Semibalanus balanoides* and *Littorina littorea*	CM
IMGP0043	29/08/2011	ME01	56.44963	-5.43675	Sparse *Mytilus edulis* bed on mixed sandy substrate, showing *Patella vulgata, Semibalanus balanoides* and *Littorina littorea*	CM
IMGP0044	29/08/2011	ME01	56.44963	-5.43675	Sparse *Mytilus edulis* bed on mixed sandy substrate, showing *Patella vulgata, Semibalanus balanoides* and *Littorina littorea*	CM
IMGP0045	29/08/2011	ME01	56.44963	-5.43675	Sparse *Mytilus edulis* bed on mixed sandy substrate, showing mussels and *Cerastoderma edule*	CM
IMGP0046	29/08/2011	ME01	56.44963	-5.43675	Sparse *Mytilus edulis* bed on mixed sandy substrate	CM
IMGP0047	29/08/2011	ME01	56.44963	-5.43675	Sparse *Mytilus edulis* bed on mixed sandy substrate	CM
IMGP0048	30/08/2011	B3.A	56.83025	-5.11175	*Mytilus edulis* bed on mixed pebbly substrate	CM
IMGP0049	30/08/2011	B3.B	56.83010	-5.11187	*Mytilus edulis* bed on mixed pebbly substrate	CM
IMGP0050	30/08/2011	B3.B	56.83010	-5.11187	*Mytilus edulis* bed on mixed pebbly substrate	CM
IMGP0051	30/08/2011	B3.C	56.82987	-5.11188	*Mytilus edulis* bed on mixed pebbly substrate	CM
IMGP0052	30/08/2011	B3.D	56.82965	-5.11198	*Mytilus edulis* bed on mixed pebbly substrate	CM
IMGP0053	30/08/2011	B3.E	56.82943	-5.11215	*Mytilus edulis* bed on mixed pebbly substrate	CM
IMGP0054	30/08/2011	B3.F	56.82923	-5.11198	*Mytilus edulis* bed on mixed pebbly substrate with *Fucus serratus* and red algae	CM
IMGP0055	30/08/2011	B3.G	56.82907	-5.11215	*Mytilus edulis* bed on mixed pebbly substrate with *Fucus serratus* and *Mastocarpus stellatus*	CM
IMGP0056	30/08/2011	B3	56.82882	-5.11223	*Mytilus edulis* bed on mixed pebbly substrate with *Fucus serratus* and *Mastocarpus stellatus*	CM
IMGP0057	30/08/2011	ME02	56.82942	-5.11208	Overview of dense *Mytilus edulis* bed on mixed pebbly substrate	CM
IMGP0058	30/08/2011	ME02	56.82942	-5.11208	Close-up of dense *Mytilus edulis*	CM
IMGP0059	30/08/2011	ME02	56.82942	-5.11208	Close-up of dense *Mytilus edulis*	CM
IMGP0060	30/08/2011	ME02	56.82942	-5.11208	Close-up of dense *Mytilus edulis*	CM
IMGP0061	30/08/2011	ME02	56.82942	-5.11208	Close-up of dense *Mytilus edulis*	CM
IMGP0062	30/08/2011	ME02	56.82942	-5.11208	*Mytilus edulis* bed on mixed pebbly substrate with *Fucus serratus* and *Littorina littorea*	CM
IMGP0063	30/08/2011	ME02	56.82942	-5.11208	*Saccharina latissima* in *Mytilus edulis* bed	CM

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMGP0064	30/08/2011	ME02	56.82942	-5.11208	*Mastocarpus stellatus* in *Mytilus edulis* bed	CM
IMGP0065	30/08/2011	ME02	56.82942	-5.11208	Close-up of *Mytilus edulis* and *Littorina littorea*	CM
IMGP0066	30/08/2011	ME02	56.82942	-5.11208	Close-up of *Mytilus edulis* and *Littorina littorea*	CM
IMGP0067	30/08/2011	ME02	56.82942	-5.11208	Close-up of *Mytilus edulis* and *Littorina littorea*	CM
IMGP0068	30/08/2011	ME02	56.82942	-5.11208	Close-up of *Mytilus edulis, Semibalanus balanoides* and *Littorina littorea*	CM
IMGP0069	30/08/2011	ME02	56.82942	-5.11208	*Mytilus edulis* bed on mixed pebbly substrate with *Fucus serratus*	CM
IMGP0070	30/08/2011	B3	56.82935	-5.11202	View of *Mytilus edulis* bed on mixed substrate, looking northwest	CM
IMGP0071	31/08/2011	W1.A	56.69245	-5.17152	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0072	31/08/2011	W1.A	56.69245	-5.17152	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0073	31/08/2011	W1.B	56.69243	-5.17170	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0074	31/08/2011	W1.B	56.69243	-5.17170	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0075	31/08/2011	W1.C	56.69247	-5.17187	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0076	31/08/2011	W1.C	56.69247	-5.17187	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0077	31/08/2011	W1.D	56.69248	-5.17202	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0078	31/08/2011	W1.D	56.69248	-5.17202	Upper margin of *Ascophyllum nodosum* ecad *mackaii* bed, showing *Fucus spiralis* and *Pelvetia canaliculata* zones	CM
IMGP0079	31/08/2011	W1.E	56.69238	-5.17190	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0080	31/08/2011	W1.E	56.69238	-5.17190	Close-up of *Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0081	31/08/2011	W1	56.69247	-5.17143	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0082	31/08/2011	W2.F	56.69220	-5.17253	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0083	31/08/2011	W2.F	56.69220	-5.17253	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus* and *F. ceranoides*	CM
IMGP0084	31/08/2011	W2	56.69220	-5.17247	*Ascophyllum nodosum* ecad *mackaii* bed	CM

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMGP0085	31/08/2011	W3.G	56.69180	-5.17308	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0086	31/08/2011	W3.G	56.69180	-5.17308	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0087	31/08/2011	W3	56.69198	-5.17287	Upper margin of *Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0088	31/08/2011	W4.H	56.69127	-5.17297	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus* and attached *A. nodosum*	CM
IMGP0089	31/08/2011	W4.H	56.69127	-5.17297	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0090	31/08/2011	W4	56.69115	-5.17300	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0091	31/08/2011	SL01	56.69243	-5.17168	*Ascophyllum nodosum* ecad *mackaii* bed - looking up bed from MNCR survey site	CM
IMGP0092	31/08/2011	SL01	56.69243	-5.17168	*Ascophyllum nodosum* ecad *mackaii* bed - MNCR survey site	CM
IMGP0093	31/08/2011	SL01	56.69243	-5.17168	*Ascophyllum nodosum* ecad *mackaii* bed - MNCR survey site	CM
IMGP0094	31/08/2011	SL01	56.69243	-5.17168	*Ascophyllum nodosum* ecad *mackaii* bed - MNCR survey site	CM
IMGP0095	31/08/2011	SL01	56.69243	-5.17168	*Ascophyllum nodosum* ecad *mackaii* bed - MNCR survey site, showing underlying substrate	CM
IMGP0096	31/08/2011	W5	56.69252	-5.16727	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0097	31/08/2011	W5.I	56.69253	-5.16748	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0098	31/08/2011	W5.I	56.69253	-5.16748	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0099	31/08/2011	W5.J	56.69237	-5.16747	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus* and attached *A. nodosum*	CM
IMGP0100	31/08/2011	W5.J	56.69237	-5.16747	Close-up of *Ascophyllum nodosum* ecad *mackaii* bed with dense *Vertebrata lanosa*	CM
IMGP0101	31/08/2011	W5.K	56.69235	-5.16720	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0102	31/08/2011	W5.K	56.69235	-5.16720	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0103	31/08/2011	W6.L	56.69228	-5.16763	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0104	31/08/2011	W6.L	56.69228	-5.16763	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0105	31/08/2011	W6	56.69223	-5.16758	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMGP0106	31/08/2011	W7.M	56.69205	-5.16733	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0107	31/08/2011	W7.M	56.69205	-5.16733	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0108	31/08/2011	W7	56.69205	-5.16745	*Ascophyllum nodosum* ecad *mackaii* bed with dense *mackaii* in foreground	CM
IMGP0109	31/08/2011	W8	56.69143	-5.16700	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0110	31/08/2011	W8.N	56.69150	-5.16707	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus* and attached *A. nodosum*	CM
IMGP0111	31/08/2011	W8.N	56.69150	-5.16707	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus* and attached *A. nodosum*	CM
IMGP0112	31/08/2011	Bishop's Bay	56.69143	-5.16695	View of east of bay, looking west, showing patch of *Ascophyllum nodosum* ecad *mackaii*	CM
IMGP0113	31/08/2011	Bishop's Bay	56.69137	-5.17338	View of west of bay, looking east	CM
IMGP0114	31/08/2011	Bishop's Bay	56.69137	-5.17338	View of west of bay, looking southeast	CM
IMGP0115	01/09/2011	Carness	56.68843	-5.15533	View of bay looking southwest	CM
IMGP0116	01/09/2011	W9.A	56.68853	-5.15648	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0117	01/09/2011	W9.A	56.68853	-5.15648	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0118	01/09/2011	W9.B	56.68845	-5.15668	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0119	01/09/2011	W9.B	56.68845	-5.15668	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus serratus*	CM
IMGP0120	01/09/2011	W9.C	56.68837	-5.15688	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus serratus*	CM
IMGP0121	01/09/2011	W9.C	56.68837	-5.15688	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus serratus*	CM
IMGP0122	01/09/2011	W9.D	56.68825	-5.15700	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus serratus*	CM
IMGP0123	01/09/2011	W9.D	56.68825	-5.15700	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus* spp.	CM
IMGP0124	01/09/2011	W9.E	56.68828	-5.15723	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0125	01/09/2011	W9.E	56.68828	-5.15723	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0126	01/09/2011	W9.F	56.68835	-5.15745	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus* and *F. serratus*	CM

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMGP0127	01/09/2011	W9.F	56.68835	-5.15745	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus* and *F. serratus*	CM
IMGP0128	01/09/2011	W9.G	56.68837	-5.15768	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus* spp. and attached *A. nodosum*	CM
IMGP0129	01/09/2011	W9.G	56.68837	-5.15768	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus* and *F. serratus*	CM
IMGP0130	01/09/2011	W10.H	56.68820	-5.15825	*Ascophyllum nodosum* ecad *mackaii* bed with attached *A. nodosum*	CM
IMGP0131	01/09/2011	W10.H	56.68820	-5.15825	*Ascophyllum nodosum* ecad *mackaii* bed with attached *A. nodosum*	CM
IMGP0132	01/09/2011	W10I	56.68823	-5.15845	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0133	01/09/2011	W10I	56.68823	-5.15845	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0134	01/09/2011	W10	56.68825	-5.15860	*View down small Ascophyllum nodosum* ecad *mackaii* bed, looking southeast	CM
IMGP0135	01/09/2011	W10	56.68825	-5.15860	View east at Carness with *Ascophyllum nodosum* ecad *mackaii* beds in midground and background	CM
IMGP0136	01/09/2011	W9	56.68823	-5.15738	East end of *Ascophyllum nodosum* ecad *mackaii* bed, looking east	CM
IMGP0137	01/09/2011	W9	56.68822	-5.15712	West end of *Ascophyllum nodosum* ecad *mackaii* bed, looking east	CM
IMGP0138	01/09/2011	SL02	56.68838	-5.15690	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0139	01/09/2011	SL02	56.68838	-5.15690	Close-up of *Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus* and *F. serratus*	CM
IMGP0140	01/09/2011	SL02	56.68838	-5.15690	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus*	CM
IMGP0141	01/09/2011	SL02	56.68838	-5.15690	*Ascophyllum nodosum* ecad *mackaii* bed	CM
IMGP0142	01/09/2011	SL02	56.68838	-5.15690	*Ascophyllum nodosum* ecad *mackaii* bed with *Fucus vesiculosus* and *F. serratus*	CM
IMGP0143	01/09/2011	SL02	56.68838	-5.15690	Close-up of *Ascophyllum nodosum* ecad *mackaii*	CM
IMGP0144	01/09/2011	SL02	56.68838	-5.15690	*Ascophyllum nodosum* ecad *mackaii* bed - MNCR survey site, showing underlying substrate	CM
IMGP0145	01/09/2011	W9	56.68828	-5.15705	View of *Ascophyllum nodosum* ecad *mackaii* bed, looking east	CM
IMGP0146	01/09/2011	W9	56.68828	-5.15705	View of *Ascophyllum nodosum* ecad *mackaii* bed, looking west	CM

Table 8.1 continued

Filename	Date	Site	Latitude	Longitude	Description	Phot
IMGP0147	01/09/2011	W9	56.68813	-5.15708	View of *Ascophyllum nodosum* ecad *mackaii* bed, looking north	CM
IMG_1792	14/09/2011	TS02	56.45467	-5.36807	View of tide-swept *Ascophyllum nodosum* on steep bedrock, looking east	CM
IMG_1793	14/09/2011	TS02	56.45467	-5.36807	View of tide-swept *Ascophyllum nodosum* on steep bedrock, looking east	CM
IMG_1794	14/09/2011	TS02	56.45467	-5.36807	View of tide-swept *Ascophyllum nodosum* on steep bedrock, looking east	CM
IMG_1795	14/09/2011	TS02	56.45468	-5.36795	View of tide-swept *Ascophyllum nodosum* on steep bedrock, looking east	CM
IMG_1796	14/09/2011	TS02	56.45468	-5.36795	View of tide-swept *Ascophyllum nodosum* on steep bedrock, looking east	CM
IMG_1797	14/09/2011	TS02	56.45468	-5.36795	Dense *Ascophyllum nodosum* with *Cladophora rupestris* turf beneath	CM
IMG_1798	14/09/2011	TS02	56.45468	-5.36795	Dense *Ascophyllum nodosum* with *Cladophora rupestris* turf beneath	CM
IMG_1799	14/09/2011	TS02	56.45468	-5.36795	*Ascophyllum nodosum* and *Fucus serratus* zones	CM
IMG_1800	14/09/2011	TS02	56.45468	-5.36795	Turfs of *Rhodochorton purpureum* and *Cladophora rupestris*	CM
IMG_1801	14/09/2011	TS02	56.45468	-5.36795	*Dynamena pumila* on *Ascophyllum nodosum*	CM
IMG_1802	14/09/2011	TS02	56.45468	-5.36795	Turfs of *Rhodochorton purpureum* and *Cladophora rupestris*	CM
IMG_1803	14/09/2011	TS02	56.45468	-5.36795	*Cladophora rupestris* turf	CM
IMG_1804	14/09/2011	TS02	56.45470	-5.36783	*Dynamena pumila* on *Ascophyllum nodosum*	CM
IMG_1805	14/09/2011	TS02	56.45470	-5.36783	*Dynamena pumila* on *Ascophyllum nodosum*	CM
IMG_1806	14/09/2011	TS02	56.45470	-5.36783	*Claava multicornis* on *Ascophyllum nodosum*	CM

Table 8.2 Details of video recorded during the drop-down and diver video surveys. Drop-down footage was stored on miniDV, diver video on computer file. Positional data for each run and location of footage on the media are provided in Appendix 2. Surveyors are CM (Colin Moore), CT (Colin Trigg), DH (Dan Harries), GS (Graham Saunders), MC (Morven Carruthers), RC (Rob Cook)

Media identifier (tape no. or original filename)	**Date**	**Video method**	**Sites**	**Surveyors**
D-LINNHE-0811-1	19/08/2011	Drop-down	S31-39	CM, DH, TW
D-LINNHE-0811-2	19/08/2011	Drop-down	S40-42, S29, S30, S28	CM, DH, TW
D-LINNHE-0811-3	22/08/2011	Drop-down	S23-27, S43, S17-21, S44	CM, DH, RC
D-LINNHE-0811-4	23/08/2011	Drop-down	S15, S3, S5, S4, S6-10	CM, DH, RC
D-LINNHE-0811-5	23/08/2011	Drop-down	S1, S2	CM, DH, RC
20110823121339.m2ts	23/08/2011	Diver-held	D26	GS
20110823131110.m2ts	23/08/2011	Diver-held	D27	MC
20110823134513.m2ts	23/08/2011	Diver-held	D28	CT
20110823144541.m2ts	23/08/2011	Diver-held	D29	GS
20110823152351.m2ts	23/08/2011	Diver-held	D30	MC
20110823152351.m2ts	23/08/2011	Diver-held	D30	MC
20110823160434.m2ts	23/08/2011	Diver-held	D31	CT
20110823164955.m2ts	23/08/2011	Diver-held	D32	GS
20110824134120.m2ts	24/08/2011	Diver-held	D34	DH
20110824134120.m2ts	24/08/2011	Diver-held	D34	DH
20110824152024.m2ts	24/08/2011	Diver-held	D37	GS
20110824160237.m2ts	24/08/2011	Diver-held	D38	MC
20110820095430.m2ts	20/08/2011	Diver-held	FS01	CT
20110821112629.m2ts	21/08/2011	Diver-held	NS01	CT
20110822172546.m2ts	22/08/2011	Diver-held	HM01	CT
20110824113022.m2ts	24/08/2011	Diver-held	HM02	CT
20110825104013.m2ts	25/08/2011	Diver-held	HM03	CT

Appendix 9 Log of specimens collected

Table 9.1 MCS code = Marine Conservation Society taxonomic code; identifiers include Susan Hamilton (SH), Colin Moore (CM), Dan Harries (DH), Peter Garwood (PG) and Roger Bamber (RB); location of material includes National Museums of Scotland (NMS) and Heriot-Watt University (HWU)

MCS code	Taxon	Sample	Identifier	Location
C3000	*Cliona caledoniae*?	HM01.4	CM	NMS
C3020	*Cliona celata*	HM03.2	CM	NMS
C3060	*Pione vastifica*	HM02.4	CM	NMS
C5960	*Amphilectus fucorum*	HM03.1	CM	NMS
C6450	*Myxilla (Myxilla) incrustans*	NS01	CM	NMS
C6470	*Myxilla (Myxilla) rosacea*	NS01	CM	NMS
C6780	*Iophon nigricans*	NS01	CM	NMS
D2290	*Eudendrium* sp.	HM02.3	CM	NMS
D2370	*Eudendrium rameum*	HM01.3	CM	NMS
D3000	*Bougainvillia* sp	HM01.3	CM	NMS
D3060	*Bougainvillia muscus*	HM03.4	CM	NMS
D4420	*Calycella syringa*	HM03.4	CM	NMS
D4456	*Campanulina pumila*	HM01.1	CM	NMS
D5250	*Halecium beanii*?	HM01.2	CM	NMS
D5260	*Halecium halecinum*	HM01.3	CM	NMS
D5780	*Halopteris catharina*	NS01	CM	NMS
D6420	*Diphasia margareta*	NS01	CM	NMS
D6640	*Sertularella gayi/polyzonias*	HM03.1	CM	NMS
D6670	*Sertularella gayi*	NS01	CM	NMS
D6760	*Sertularia argentea*	HM03.4	CM	NMS
D7020	*Clytia gracilis*	HM03.4	CM	NMS
D7030	*Clytia hemisphaerica*	HM03.4	CM	NMS
D7100	*Gonothyraea loveni*?	HM03.4	CM	NMS
D7100	*Gonothyraea loveni*?	HM03.1	CM	NMS
D7300	*Obelia dichotoma*	HM01.1	CM	NMS
D7430	*Rhizocaulus verticillatus*	HM01.3	CM	NMS
D10240	*Alcyonium digitatum*	HM01.1	CM	NMS
D10750	*Cerianthus lloydii*	HM02.1	SH	NMS
D11310	Actiniaria sp. juv	HM02.3	CM	NMS
D11310	Actiniaria sp. juv	HM02.4	CM	NMS
D11310	Actiniaria sp. juv	HM03.1	CM	NMS
D13410	*Edwardsia claparedii*	HM02.1	SH	NMS
F00001	Platyhelminthes spp.	HM02.1	SH	NMS
G00460	*Tubulanus polymorphus*	HM02.3	SH	NMS
G00610	Lineidae spp.	HM02.4	SH	NMS
HD00001	Nematoda spp.	HM02.1	SH	NMS
J00080	*Priapulus caudatus*	HM02.3	SH	NMS
K470	*Barentsia gracilis*	HM03.4	CM	NMS
K470	*Barentsia gracilis*	HM01.2	CM	NMS
K540	*Pedicellina cernua*	HM01.1	CM	NMS
K540	*Pedicellina cernua*	HM01.2	CM	NMS
L00001	Chaetognatha sp.	HM03.2	SH	NMS
N00090	*Golfingia elongata*	HM01.3	SH	NMS

Table 9.1 continued

MCS code	Taxon	Sample	Identifier	Location
N00109	*Golfingia (Golfingia) vulgaris vulgaris*	HM03.1	SH	NMS
N00109	*Golfingia (Golfingia) vulgaris vulgaris*	HM03.2	SH	NMS
P00550	*Subadyte pellucida*	HM03.2	SH	NMS
P00600	*Alentia gelatinosa*	HM03.3	SH	NMS
P01020	*Harmothoe extenuata*	HM03.1	SH	NMS
P01030	*Harmothoe fragilis*	HM03.1	SH	NMS
P01060	*Harmothoe imbricata*	HM01.1	SH	NMS
P01070	*Harmothoe impar*	HM02.2	SH	NMS
P01100	*Malmgreniella mcintoshi*	HM01.3	SH	NMS
P01230	*Malmgreniella arenicolae*	HM02.1	SH	NMS
P01231	*Harmothoe pagenstecheri*	HM02.4	PG	NMS
	Malmgreniella darbouxi?	HM01.1	SH	NMS
P01330	*Lepidonotus squamatus*	HM02.1	SH	NMS
P01690	*Pholoe inornata*	HM02.2	SH	NMS
P01730	*Pholoe baltica*	HM02.1	SH	NMS
P01870	*Sthenelais boa*	HM03.2	SH	NMS
P02050	*Eteone longa*	HM02.2	SH	NMS
P02700	*Eulalia bilineata*	HM03.1	SH	NMS
P02850	*Eumida sanguinea*	HM02.1	SH	NMS
P02950	*Nereiphylla paretti*	HM03.1	SH	NMS
P03210	*Pirakia punctifera*	HM01.3	SH	NMS
P04720	*Glycera alba*	HM02.1	SH	NMS
P04760	*Glycera lapidum*	HM02.1	SH	NMS
P05270	*Sphaerodorum gracilis*	HM02.4	SH	NMS
P05405	*Amphiduros fuscescens*	HM03.3	SH	NMS
P05470	*Hesiospina similis*	HM03.1	SH	NMS
P05520	*Kefersteinia cirrata*	HM02.2	SH	NMS
P05630	*Nereimyra punctata*	HM02.1	SH	NMS
P06380	*Eurysyllis tuberculata*	HM03.4	SH	NMS
P06540	*Syllis* sp. 1	HM02.1	PG	NMS
P06610	*Trypanosyllis (Trypanosyllis) coeliaca*	HM03.2	SH	NMS
P06670	*Syllis armillaris*	HM02.1	SH	NMS
P06860	*Eusyllis blomstrandi*	HM02.1	SH	NMS
P07280	*Syllides benedicti*	HM03.4	SH	NMS
P07291	*Syllides japonicus*	HM03.2	SH	NMS
P07440	*Exogone (Parexogone) hebes*	HM03.2	SH	NMS
P07450	*Exogone (Exogone) naidina*	HM03.1	SH	NMS
P07460	*Exogone verugera*	HM01.1	SH	NMS
P07510	*Sphaerosyllis bulbosa*	HM01.1	SH	NMS
P07555	*Sphaerosyllis taylori*	HM03.1	SH	NMS
P07560	*Prosphaerosyllis tetralix*	HM01.3	SH	NMS
P07600	Autolytinae stolons	HM02.2	SH	NMS
P07790	Myrianida spp	HM02.1	SH	NMS
P07840	Proceraea spp	HM02.1	SH	NMS
P07920	*Procerastea halleziana*	HM03.1	SH	NMS
P08340	*Eunereis longissima*	HM03.3	SH	NMS
P08350	*Nereis pelagica*	HM02.3	SH	NMS
P08370	*Nereis zonata*	HM01.2	SH	NMS
P08720	*Nephtys kersivalensis*	HM03.2	SH	NMS

Table 9.1 continued

MCS code	Taxon	Sample	Identifier	Location
P09720	*Eunice pennata*	HM02.1	SH	NMS
P09910	*Nematonereis hebes*	HM03.2	SH	NMS
P10080	*Lumbrineris gracilis*	HM03.1	SH	NMS
P10660	*Ophryotrocha* sp	HM01.2	SH	NMS
P10810	*Ougia macilenta*	HM02.3	SH	NMS
P11040	*Protodorvillea kefersteini*	HM02.1	SH	NMS
P11150	*Schistomeringos rudolphii*	HM03.3	SH	NMS
P11730	*Cirrophorus branchiatus*	HM03.1	SH	NMS
P11850	*Paradoneis lyra*	HM02.1	SH	NMS
P12251	Spionidae sp ? juv	HM02.2	PG	NMS
P12270	*Aonides oxycephala*	HM02.1	SH	NMS
P12280	*Aonides paucibranchiata*	HM01.2	SH	NMS
P12500	*Laonice bahusiensis*	HM03.1	SH	NMS
P12590	*Malacoceros fuliginosus*	HM02.1	SH	NMS
P12690	*Minuspio cirrifera*	HM02.3	SH	NMS
P12760	*Dipolydora coeca*	HM02.1	SH	NMS
P12770	*Dipolydora caulleryi*	HM02.2	SH	NMS
P12790	*Dipolydora flava*	HM02.3	SH	NMS
P13010	*Prionospio sp.*	HM03.2	PG	NMS
P13440	*Spiophanes kroyeri*	HM02.1	SH	NMS
P13940	*Caulleriella alata*	HM03.2	SH	NMS
P13980	*Caulleriella zetlandica*	HM02.1	SH	NMS
P14070	*Cirratulus* spp.	HM02.1	SH	NMS
P14140	*Cirriformia tentaculata*	HM02.1	SH	NMS
P14180	*Dodecaceria* spp	HM02.1	SH	NMS
P14730	*Brada inhabilis*	HM02.4	SH	NMS
P14840	*Flabelligera affinis*	HM02.4	SH	NMS
P14900	*Pherusa flabellata*	HM02.4	SH	NMS
P14910	*Pherusa plumosa*	HM02.1	SH	NMS
P15630	*Notomastus* sp. juv	HM03.4	PG	NMS
P15530	*Heteromastus filiformis*	HM03.1	SH	NMS
P15580	*Mediomastus fragilis*	HM02.1	SH	NMS
P15630	*Notomastus latericeus*	HM03.3	SH	NMS
P15760	*Arenicola marina* juv	HM02.3	SH	NMS
P17380	*Polyphysia crassa*	HM02.1	SH	NMS
P17425	*Scalibregma celticum*	HM02.1	SH	NMS
P17430	*Scalibregma inflatum*	HM02.1	SH	NMS
P18080	*Protodrilus* sp	HM01.3	SH	NMS
P19900	*Terebellides stroemii*	HM03.4	SH	NMS
P19950	*Trichobranchus glacialis*	HM03.2	SH	NMS
P20010	Terebellinae spp juv/indet	HM02.1	SH	NMS
P20030	*Amphitrite cirrata*	HM03.1	SH	NMS
P20200	*Eupolymnia nesidensis*	HM03.3	SH	NMS
P20510	*Amphitrite affinis*	HM02.3	SH	NMS
P20530	*Neoamphitrite figulus*	HM02.2	SH	NMS
P20700	*Phisidia aurea*	HM02.1	SH	NMS
P20760	*Pista bansei*	HM02.4	SH	NMS
P20761	*Pista malmgreni*	HM01.2	SH	NMS
P21190	*Polycirrus aurantiacus*	HM02.1	SH	NMS

Table 9.1 continued

MCS code	Taxon	Sample	Identifier	Location
P21240	*Polycirrus medusa*	HM02.1	SH	NMS
P21250	*Polycirrus norvegicus*	HM02.2	SH	NMS
P21620	*Branchiomma bombyx*	HM02.4	SH	NMS
P21690	*Chone duneri*	HM03.3	SH	NMS
P21710	*Paradialychone filicaudata*	HM02.1	SH	NMS
P21930	*Fabricia sabella*	HM01.1	SH	NMS
P22550	*Pseudopotamilla reniformis*	HM03.1	SH	NMS
P22720	Serpulidae sp A	HM01.1	SH	NMS
P22880	*Hydroides norvegicus*	HM02.1	SH	NMS
P22880	*Hydroides norvegicus*	HM01.1	CM	NMS
P23030	*Spirobranchus lamarcki*	HM02.1	SH	NMS
P23040	*Spirobranchus triqueter*	HM02.1	SH	NMS
P23040	*Spirobranchus triqueter*	HM01.1	CM	NMS
P23090	*Serpula vermicularis*	HM03.3	SH	NMS
P23210	*Apomatus similis*	HM03.1	SH	NMS
P23660	*Janua (Dexiospira) pagenstecheri*	HM01.3	CM	NMS
P23740	*Jugaria granulata*	HM01.1	CM	NMS
P23800	*Paradexiospira (Spirorbides) vitrea*	HM01.1	CM	NMS
P24070	*Spirorbis (Spirorbis) tridentatus*	HM01.1	CM	NMS
P24860	*Tubificoides amplivasatus*	HM03.1	SH	NMS
P25000	*Limnodriloides* sp	HM02.2	SH	NMS
P25000	*Limnodriloides* sp	HM01.4	SH	NMS
P25760	Enchytraeidae sp	HM03.2	SH	NMS
Q00170	*Achelia echinata* juv	HM03.1	RB	NMS
Q00170	*Achelia echinata*	HM03.1	SH	NMS
Q00390	*Endeis spinosa*	HM03.2	RB	NMS
Q00480	*Callipallene spectrum*	HM03.2	RB	NMS
Q00450	*Callipallene brevirostris*	HM03.3	SH	NMS
R640	*Verruca stroemia*	HM02.1	CM	NMS
R1090	*Balanus balanus*	HM02.2	CM	NMS
R1100	*Balanus crenatus*	HM03.4	CM	NMS
R1100	*Balanus crenatus*	HM01.2	CM	NMS
S00080	*Nebalia herbstii*	HM03.4	SH	NMS
S01550	*Heteromysis (Heteromysis) formosa*	HM03.2	SH	NMS
S01710	*Apherusa bispinosa*	HM02.2	SH	NMS
S01870	*Gammarellus homari*	HM02.1	SH	NMS
S02220	*Deflexilodes subnudus*	HM03.1	SH	NMS
S02540	*Parapleustes bicuspis*	HM03.3	SH	NMS
S02790	*Amphilochus manudens*	HM03.1	SH	NMS
S02880	*Gitana sarsi*	HM03.3	SH	NMS
S03280	*Cressa dubia*	HM03.1	SH	NMS
S03700	*Stenothoe marina*	HM03.1	SH	NMS
S03710	*Stenothoe monoculoides*	HM03.1	SH	NMS
S04290	*Urothoe elegans*	HM03.2	SH	NMS
S04390	*Harpinia crenulata*	HM03.1	SH	NMS
S04470	*Metaphoxus fultoni*	HM03.1	SH	NMS
S05090	*Lysianassa ceratina*	HM03.1	SH	NMS
S05110	*Lysianassa plumosa*	HM03.1	SH	NMS
S05740	*Tryphosella sarsi*	HM03.1	SH	NMS

Table 9.1 continued

MCS code	Taxon	Sample	Identifier	Location
S06260	*Iphimedia minuta*	HM03.3	SH	NMS
S06280	*Iphimedia obesa*	HM03.1	SH	NMS
S06590	*Liljeborgia kinahani*	HM02.2	SH	NMS
S06900	*Dexamine spinosa*	HM03.2	SH	NMS
S06910	*Dexamine thea*	HM03.1	SH	NMS
S08180	*Animoceradocus semiserratus*	HM03.1	SH	NMS
S08220	*Cheirocratus* sp ♀	HM01.1	SH	NMS
S08530	*Othomaera othonis*	HM01.4	SH	NMS
S08980	*Gammaropsis maculata*	HM03.3	SH	NMS
S09630	*Microjassa cumbrensis*	HM03.1	SH	NMS
S09820	*Lembos websteri*	HM01.4	SH	NMS
S10010	*Microdeutopus versiculatus*	HM03.1	SH	NMS
S10220	*Crassicorophium bonellii*	HM02.1	SH	NMS
S10270	*Corophium volutator*	HM02.1	SH	NMS
S10960	*Phtisica marina*	HM03.3	SH	NMS
S11010	*Pseudoprotella phasma*	HM03.1	SH	NMS
S13190	*Gnathia* sp (praniza)	HM03.2	SH	NMS
S13230	*Gnathia vorax*	HM03.2	SH	NMS
S13350	*Anthura gracilis*	HM03.2	SH	NMS
S14840	*Janira maculosa*	HM02.1	SH	NMS
S15250	*Pleurogonium rubicundum*	HM02.4	RB	NMS
S15090	*Munna boeckii*	HM03.3	RB	NMS
S15110	*Munna* sp.	HM03.2	SH	NMS
S15660	*Idotea neglecta*	HM03.1	SH	NMS
S19310	*Tanaopsis graciloides*	HM02.2	SH	NMS
S19940	*Vaunthompsonia cristata*	HM03.3	SH	NMS
S22620	*Eualus occultus*	HM03.2	SH	NMS
S22630	*Eualus pusiolus*	HM03.1	SH	NMS
S24860	*Galathea intermedia*	HM03.2	SH	NMS
S24880	*Galathea nexa*	HM03.2	SH	NMS
S25020	*Pisidia longicornis*	HM03.1	SH	NMS
S25600	*Hyas coarctatus*	HM02.2	SH	NMS
S25820	*Macropodia* sp juv	HM01.1	SH	NMS
S25920	*Eurynome aspera*	HM01.2	SH	NMS
W00550	*Leptochiton asellus*	HM02.1	SH	NMS
W00690	*Stenosemus albus*	HM02.1&2	SH	NMS
W00830	*Callochiton septemvalvis*	HM02.1	SH	NMS
W01110	*Emarginula fissura*	HM02.1	SH	NMS
W01250	*Testudinalia testudinalis*	HM02.1	SH	NMS
W01630	*Margarites groenlandicus*	HM02.1	SH	NMS
W01910	Gibbula tumida	HM02.1	SH	NMS
W02000	*Calliostoma zizyphinum*	HM03.2	SH	NMS
W03400	*Onoba semicostata*	HM02.3	SH	NMS
W07070	*Capulus ungaricus*	HM03.3	SH	NMS
W08130	*Boreotrophon truncatus*	HM03.3	SH	NMS
W08440	*Buccinum undatum*	HM02.1	SH	NMS
W10940	*Akera bullata*	HM01.3	SH	NMS
W13580	*Limacia clavigera*	HM02.2	DH	NMS
W14030	*Onchidoris muricata?*	HM02.2	DH	NMS

Table 9.1 continued

MCS code	Taxon	Sample	Identifier	Location
W15770	*Otina ovata*	HM02.2	SH	NMS
W16190	*Nucula nucleus*	HM02.1	SH	NMS
W16500	*Mytilus edulis*	HM01.1	SH	NMS
W16500	*Mytilus edulis*	HM01.3	SH	NMS
W16640	*Musculus discors*	HM03.3	SH	NMS
W16750	*Modiolus modiolus*	HM02.1	SH	NMS
W16750	*Modiolus modiolus*	HM03.3	SH	NMS
W17390	*Limaria hians*	HM01.1	SH	NMS
W17820	*Similipecten similis*	HM03.2	SH	NMS
W17960	*Talochlamys pusio*	HM01.1	SH	NMS
W18050	*Aequipecten opercularis*	HM03.2	SH	NMS
W18200	*Monia patelliformis*	HM02.1	SH	NMS
W18200	*Monia patelliformis*	HM01.2	CM	NMS
W18200	*Monia patelliformis*	HM01.3	CM	NMS
W18220	*Heteranomia squamula*	HM03.1	SH	NMS
W18380	*Myrtea spinifera*	HM02.3	SH	NMS
W18420	*Lucinoma borealis*	HM02.4	SH	NMS
W18520	*Thyasira flexuosa/gouldi*	HM02.4	SH	NMS
W18850	*Kellia suborbicularis*	HM01.2	SH	NMS
W19050	*Kurtiella bidentata*	HM02.1	SH	NMS
W19450	*Astarte sulcata*	HM02.3	SH	NMS
W19770	*Parvicardium pinnulatum*	HM02.2	SH	NMS
W19780	*Parvicardium scabrum*	HM02.2	SH	NMS
W21020	*Abra alba*	HM03.2	SH	NMS
W21890	*Chamelea striatula*	HM01.3	SH	NMS
W22010	*Timoclea ovata*	HM01.1	SH	NMS
W22270	*Mya truncata*	HM02.1	SH	NMS
W22510	*Hiatella arctica*	HM02.1	SH	NMS
W22510	*Hiatella arctica*	HM01.1	CM	NMS
W23510	*Thracia phaseolina*	HM02.3	SH	NMS
W23510	*Thracia phaseolina*	HM02.4	SH	NMS
W23530	*Thracia villosiuscula*	HM01.3	SH	NMS
W12370	Nudibranchia sp 1	HM02.4	DH	NMS
W12370	Nudibranchia sp 2	HM03.3	DH	NMS
W12370	Nudibranchia sp 3	HM03.2	DH	NMS
W12670	*Dendronotus frondosus*	HM03.4	SH	NMS
W13310	*Onchidoris* sp	HM03.4	DH	NMS
W13610	*Polycera* sp	HM02.2	DH	NMS
W14480	*Coryphella* sp	HM03.3	DH	NMS
W15100	*Eubranchus* sp	HM03.4	DH	NMS
W15140	*Eubranchus pallidus*?	HM02.3	DH	NMS
Y280	*Crisia eburnea*	HM03.4	CM	NMS
Y490	*Tubulipora liliacea*?	HM03.4	CM	NMS
Y690	*Plagioecia patina*	HM03.2	CM	NMS
Y690	*Plagioecia patina*	HM03.4	CM	NMS
Y750	*Diplosolen obelia*	HM03.2	CM	NMS
Y750	*Diplosolen obelia*	HM03.4	CM	NMS
Y750	*Diplosolen obelia*	HM03.4	CM	NMS
Y970	*Entalophoroecia deflexa*?	HM03.1	CM	NMS

Table 9.1 continued

MCS code	Taxon	Sample	Identifier	Location
Y1210	*Disporella hispida*	HM03.4	CM	NMS
Y1210	*Disporella hispida*	HM03.2	CM	NMS
Y1210	*Disporella hispida*	HM03.4	CM	NMS
Y1340	*Alcyonidium* sp.	HM01	CM	NMS
Y1340	*Alcyonidium* sp.	HM03.2	CM	NMS
Y1340	*Alcyonidium* sp.	HM03.2	CM	NMS
Y1400	*Alcyonidium mamillatum*	HM03.1	CM	NMS
Y1410	*Alcyonidioides mytili*	HM01.2	CM	NMS
Y1620	*Nolella dilatata*	NS01	CM	NMS
Y2510	*Bowerbankia gracilis*	HM03.4	CM	NMS
Y3840	*Porella concinna*	HM01.2	CM	NMS
Y4060	*Escharella immersa*	HM03.4	CM	NMS
Y4060	*Escharella immersa*	HM03.2	CM	NMS
Y4060	*Escharella immersa*	HM03.2	CM	NMS
Y4120	*Escharella ventricosa*	HM03.2	CM	NMS
Y5170	*Microporella ciliata*	HM03.2	CM	NMS
Y5170	*Microporella ciliata*	HM03.2	CM	NMS
Y5170	*Microporella ciliata*	HM01.2	CM	NMS
Y5430	*Chorizopora brongniartii*	HM03.4	CM	NMS
Y6780	*Electra pilosa*	HM02.1	CM	NMS
Y7240	*Callopora dumerilii*	HM03.4	CM	NMS
Y7610	*Amphiblestrum flemingii*	HM03.2	CM	NMS
Y7830	*Membraniporella nitida*	HM01.2	CM	NMS
Y7830	*Membraniporella nitida*	HM01.3	CM	NMS
ZB1490	*Crossaster papposus*	HM02.3	SH	NMS
ZB1642	*Henricia perforata*?	HM02.1	SH	NMS
ZB1900	*Asterias rubens*	HM02.2	SH	NMS
ZB2350	*Ophiothrix fragilis*	HM01.1	SH	NMS
ZB3000	*Amphipholis squamata*	HM02.1	SH	NMS
ZB3550	*Psammechinus miliaris*	HM02.1	SH	NMS
ZB5340	*Labidoplax media*	HM03.2	SH	NMS
ZD860	*Didemnum maculosum*	NS01	CM	NMS
ZD1170	*Ciona intestinalis*	HM01.2	CM	NMS
ZD1500	*Ascidia mentula*	HM01.3	CM	NMS
ZD2420	*Pyura tessellata*	HM01.3	CM	NMS
ZD2520	*Molgula* sp	HM01.1	CM	NMS
ZM7950	*Aglaothamnion hookeri*	TS02	CM	HWU
ZM8880	*Pterothamnion plumula*	HM02.1	CM	HWU
ZM9900	*Membranoptera alata*	FS01	CM	HWU
ZM10120	*Phycodrys rubens*	HM02.1	CM	HWU
ZM10380	*Heterosiphonia japonica*	HM01	CM	HWU
ZM10380	*Heterosiphonia japonica*	FS01	CM	HWU

Appendix 10 Historical PMF/MPA search feature and habitat records for the survey area

Table 10.1 Marine biological surveys carried out in the survey area and other sources of records for PMF habitats and species. The Marine Recorder survey code is given where applicable

Year of survey	Organ-isation	Survey type	Reference	MR survey code
1972 - 1975	SMBA	Scottish *Palinurus elephas* survey	Ansell & Robb, 1977	MRMLN0010000012A
1975 - 1976	SMBA	Study of 2 *Modiolus* beds in the Firth of Lorn and Loch Linnhe	Comely, 1978	Not in MR nor PMF database
1975 - 1977	SMBA/MBA	Littoral records of biota from 6 sites in Loch Linnhe and 3 sites in Loch Leven	Harvey et al., 1980	JNCCMNCR10000265
1978	Sheila Smith	Records of epibiota, especially molluscs, at 5 littoral sites in Loch Linnhe	Smith, 1978	JNCCMNCR10000084
1983	MCS	Mull sublittoral survey includes epibiota records for 1 site in lower Loch Linnhe	Bishop, 1984	JNCCMNCR60000048
1983	Sheila Smith	Littoral records of epibiota at 1 site and infauna at 1 site in Loch Don	Smith & Gault, 1983	JNCCMNCR60000048
1988	NCC	A collection of site details from different individual visits by NCC to the Firth of Lorn area.	Unpublished; data in Marine Recorder	JNCCMNCR10000043
1988 - 1989	NCC	MNCR phase 2 surveys at 58 sublittoral sites and 10 littoral sites throughout Loch Lhinne, Loch a' Choire and Loch Eil	Connor, 1990	JNCCMNCR10000006
1990	UMBSM	MNCR phase 2 surveys at 32 sublittoral sites and 11 littoral sites in Loch Etive	Holt, 1991	JNCCMNCR10000032
1990	NCC	MNCR phase 2 surveys at 27 sublittoral and 13 littoral sites in Loch Leven	Davies, 1991	JNCCMNCR10000005
1995	JNCC	MNCR Firth and Lynn of Lorn training survey. 3 sites surveyed by standard MNCR sublittoral recording techniques	Unpublished; data in Marine Recorder	JNCCMNCR10000624
1995	JNCC	Survey of the lagoon Leth-fhonn at the head of Loch Don	Covey et al., 1998	JNCCMNCR10000450
1996	SMBA	Infaunal analysis of cores along transects from the littoral to sublittoral at 4 sites in Loch Etive and 1 site in Lochnell Bay. Littoral samples translated to biotopes in Marine Recorder	Gage, 1974	JNCCMNCR10000296
1996	FRS/SNH	Seabed video survey of Loch Linnhe with records of *Funiculina* and *Pachycerianthus*	Unpublished	Not in MR but in PMF database
1996-1998	SeaMap/SNH	Broadscale mapping of the Firth of Lorn, although predictive mapping encroaches very slightly into the Linnhe survey area up to Bach Island	Davies, 1999	JNCCMNCR30000812
2003	HWU	Study of age and growth of *Limaria hians* at 1 site off Port Appin	O'Malley, 2004	Not in MR nor PMF database

Table 10.1 continued

Year of survey	Organ-isation	Survey type	Reference	MR survey code
2004 - 2005	HWU	Study of reproductive biology of *Funiculina quadrangularis*	Edwards & Moore, 2009	Not in MR nor PMF database
2004 - 2005	HWU	Study of age and growth of *Limaria hians* at 2 sites off Port Appin	Forrest, 2005	Not in MR nor PMF database
2006	HWU	Experimental study of recovery of *Limaria* bed off Port Appin from simulated dredging	Trigg & Moore, 2009	Not in MR nor PMF database
2006	HWU	Infaunal survey of *Limaria* bed off Port Appin	Trigg et al., 2011	Not in MR nor PMF database
2010	MCS	Seasearch surveys at 3 sublittoral locations around Lismore	Unpublished	Not in MR nor PMF database

Table 10.2 Records of PMF habitats within the survey area extracted from Marine Recorder (MR). The ID is the number used in the text and figures of this report. The MR code is the Marine Recorder sample code, with the first number string identifying the survey (see the last three digits of the survey code in Table 10.1), the second string the site, and the third the habitat

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
1	006.015.003	Lochy Flats, Fort William (Upper Loch Linnhe)	21/06/1989	56.83060	-5.11089	Lower shore slightly muddy sand with patchy bed of Mytilus edulis. Fucus serratus abundant. Barnacles (*Semibalanus balanoides and Balanus crenatus*) on mussels and stones. Few littorids and little or no infauna found. Shore very wet.	LS.LBR.LMus.Myt	ME
2	006.053.002	N of Dunbeg, Dunstaffnage Bay (Lower Loch Linnhe)	01/05/1988	56.44868	-5.43655	Clumps of *Mytilus* overlying poorly sorted muddy fine sand and shell gravel with black layer <1 cm. Sub-surface very coarse sand and fine gravel.	LS.LBR.LMus.Myt	ME
3	085.007.001	Loch Don (Loch Don, Mull)	09/06/1983	56.43319	-5.67272	Flat-lying soft mud with some gravel and boulder areas. There appeared to be a patch of *Zostera sp.* near low water (not investigated due to the softness of the mud). The mud contained numerous A. marina and sparse *C. edule, M. balthica* and *S. plana*. There were N. diversicolor amongst the boulders where there was more gravel. The boulders supported *A. nodosum* and *M. edulis*. The upper shore had *Hydrobia ulvae* and the *Sacoglossan mollusc Limapontia depressa* amongst *Vaucheria sp*., and the stones at high water sheltered numerous Ligia oceanica rather than gammarids. NOTE*:* Substratum % data are converted from the original substratum 1-3 scoring system.	LS.LBR.LMus.Myt	ME
4	032.022.001	Airds Bay (Loch Etive)	17/09/1990	56.43937	-5.23769	*Mytilis* bed with abundant *Fucus serratus* on pebbles and shells. Clumps of *Polysiphonia sp.* with large numbers of small *Musculus* or *Mytilus* (?) spat inside the clumps. Abundant small *Asterias.*	LS.LBR.LMus.Myt.Mx	ME
5	032.023.002	S of Eilean Duirinnis. (Loch Etive)	16/09/1990	56.44575	-5.23124	Bed of live and empty *Mytilus edulis,* little else colonizing, behind bedrock ridge, so sheltered from main current.	IR.LIR.IFaVS.MytRS	ME
6	032.025.001	Eilean nan Meann (Loch Etive)	17/09/1990	56.44863	-5.21983	Dense *Mytilus* bed starting at 2.7m bsl, with Fucus serratus occasional at 2.7m, becoming abundant at 1.5m bsl. Clumps of *Polysiphonia* sp. with large numbers of *Musculus/*juvenile *Mytilus* spat inside the clumps.	IR.LIR.IFaVS.MytRS	ME

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
7	006.060.003	E of Pladda Island, Lismore (Lower Loch Linnhe)	18/06/1989	56.47748	-5.50644	Soft shelly mud with *Virgularia* and *Cerianthus*. Occasional *Pennatula* and *Lanice, Liocarcinus* depurator was frequent.	SS.SMu.CFiMu.SpnMeg	BM
8	006.060.004	E of Pladda Island, Lismore (Lower Loch Linnhe)	18/06/1989	56.47748	-5.50644	Very soft silty mud covered by dead shells, some shell gravel and small pebbles. Amphiura filiformis and *Pennatula phosphorea* dominant species on/within the sediment. The 'hard' substrata had many hydroids: *Halecium, Nemertesia* and *Tubularia.*	SS.SMu.CFiMu.SpnMeg	BM
9	006.062.002	ESE Port Kilcheran, Lismore (Lower Loch Linnhe)	18/06/1989	56.48906	-5.53035	Gradual slope of clayey mud with some pebbles on surface and embedded throughout the mud. *Amphiura spp*. abundant. *Virgularia mirabilis* extremely abundant in narrow band (14-19m) and occasional or frequent elsewhere. One *Anseropoda placenta* and one *Pennatula phosphorea.*	SS.SMu.CFiMu.SpnMeg	BM
10	005.001.003	Off Onich Pier (Loch Leven)	23/04/1990	56.70176	-5.21776	Flat plain of soft sandy mud. *Turritella* were present in some abundance. Other species present were typical of muddy places everywhere, including *Virgularia mirabilis*, *Aporrhais pespelecani* and *Amphiura spp*. Lots of burrows which looked like *Nephrops* burrows, but only *Munida* found in them. Also, vertical finger-sized burrows c 6/m2.	SS.SMu.CFiMu.SpnMeg	BM
11	005.021.003	S of Callert House (Loch Leven)	22/04/1990	56.69263	-5.11733	Plain of soft mud with frequent *Pennatula*, fewer *Virgularia* and burrows of Nephrops and Callocaris - No Amphiura seen. *Turritella* common on surface.	SS.SMu.CFiMu.SpnMeg	BM
12	005.034.001	S of mouth of Allt Nathrach Bay (Loch Leven)	24/04/1990	56.71177	-4.99445	Flat mud with leaf litter on indicated depth of 22m. Anchor dredge sample: bivalves and polychaetes common.	SS.SMu.CFiMu.SpnMeg	BM
13	006.002.001	NW of South Garvan (Loch Eil)	22/06/1989	56.85152	-5.30707	Soft smooth mud with large *Cerianthus lloydii, Nephrops norvegicus, Virgularia mirabilis, Pennatula phosphorea* and *Glossus.*	SS.SMu.CFiMu.SpnMeg	BM
14	006.003.001	N of Duisky (Loch Eil)	22/06/1989	56.84646	-5.25285	Very gently sloping muddy seabed with lots of Ophiura on the surface. *Virgularia* and *Pennatula* were dotted about. The mud was reasonably firm and dark grey beneath the surface brown layer. Two *Pachycerianthus*. *Nephrops* burrows, and burrows about 2cm. diameter, straight down	SS.SMu.CFiMu.SpnMeg	BM

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
						vertically for about 15-20cm.		
15	006.005.004	N shore, W of Outward Bound centre (Loch Eil)	21/06/1989	56.85319	-5.20861	Soft mud with *Nephrops* burrows and *Ophiura affinis* and *O.ophiura* common. Numerous *Cerianthus* and many *Pagurus bernhardus* on the surface.	SS.SMu.CFiMu.SpnMeg	BM
16	006.018.003	N of Callas na Dallaig (Upper Loch Linnhe)	22/06/1989	56.77985	-5.16960	Soft mud extensively burrowed with large *Nephrops norvegicus* burrows and many other unidentified ones. Tall *Virgularia mirabilis* and *Pennatula phosphorea* abundant. Amphiurids abundant - *chiajei* and *filiformis*. *Edwardsia claparedii* frequent particularly around burrow entrances. Several *Trachythyone elongata*.	SS.SMu.CFiMu.SpnMeg	BM
17	006.019.002	Victorious Rock (Upper Loch Linnhe)	21/06/1989	56.76533	-5.20684	*Amphiura chiajei/filiformis* has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Quite firm mud with *Pennatula* and *Virgularia*. *Munida rugosa* occupied most of the burrows; other spp. were present (*Lesueurigobius*) and there were occasional worm casts. *Amphiura* arms and *Arctica islandica* were very dense.	SS.SMu.CFiMu.SpnMeg	BM
18	006.035.001	S of Kingairloch, Loch a'Choire (Lower Loch Linnhe)	14/06/1989	56.61331	-5.51160	Holothurioidea has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. *Amphiura chiajei/filiformis* has been given a nominal abundance value of Present for this record. Gently sloping mud plain with *Virgularia*, *Pennatula*, *Cerianthus* and *Pachycerianthus* (R). Abundant *Amphiura* sp. *Nephrops* burrows frequent. *Trachythyone elongata* frequent.	SS.SMu.CFiMu.SpnMeg	BM
19	032.013.001	SE of Ardchattan Point. (Loch Etive)	16/09/1990	56.45960	-5.28242	Mud slope with considerable amounts of shell debris and small bedrock outcrops. *Halichondria bowerbanki*, *Corella parallelogramma*, *Suberites carnosus* and *Ascidiella aspersa* attached to shells and pebbles. *Sabella pavonina* and barnacles on bedrock with *Bougainvillia ramosa*. *Pagurus bernhardus* on sediment with rare *Virgularia*	SS.SMu.CFiMu.SpnMeg	BM

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
						mirabilis and *Cerianthus lloydii*. 23 to 27m.		
20	032.013.002	SE of Ardchattan Point. (Loch Etive)	16/09/1990	56.45960	-5.28242	Mud slope with very dense bed of *Virgularia mirabilis* and *Amphiura* spp. but little else. This habitat graded into the ones above and below, with no clear boundary. 27 to 30m.	SS.SMu.CFiMu.SpnMeg	BM
21	032.013.003	SE of Ardchattan Point. (Loch Etive)	16/09/1990	56.45960	-5.28242	Plain of soft mud, heavily burrowed and excavated with many mounds, and all appearing very undisturbed. Many *Nephrops norvegicus* about on the surface and in burrows. Other burrows not identified - some possibly *Callianassa subterranea*. 30 to 35m.	SS.SMu.CFiMu.SpnMeg	BM
22	032.017.003	SE of Kennacraig (Loch Etive)	17/09/1990	56.45786	-5.24953	Soft mud plain with *Virgularia* and *Nephrops* in burrows.	SS.SMu.CFiMu.SpnMeg	BM
23	032.018.003	SSE of Airds Point. (Loch Etive)	21/09/1990	56.44985	-5.25696	Mud with burrows and abundant *Amphiura filiformis*. Occasional *Virgularia mirabilis*.	SS.SMu.CFiMu.SpnMeg	BM
24	032.019.004	Bonawe School (Loch Etive)	17/09/1990	56.45235	-5.23919	Gently sloping soft mud plain with sparse bed of *Virgularia mirabilis*.	SS.SMu.CFiMu.SpnMeg	BM
25	032.020.001	W of Eilean Duirinnis (Loch Etive)	21/09/1990	56.44821	-5.24042	About 5 litres of mud sampled and sieved through 1mm sieve. Species identified from sample include *Virgularia mirabilis*, *Pennatula phosphorea*, *Nucula sulcata*, *Lucinoma borealis*, *Corbula gibba*, *Lagis koreni*, *Nephtys hombergii* and *Glycera* sp. Large quantities of decaying terrestrial vegetable matter in the mud.	SS.SMu.CFiMu.SpnMeg	BM
26	032.029.002	Off Gleann Rudha Alltan. (Loch Etive)	18/09/1990	56.45614	-5.17597	Gently sloping mud plain in the circalittoral with *Virgularia mirabilis*, *Pennatula phosphorea*, *Pachycerianthus multiplicatus*, *Ascidia virginea* and tubes of *Chaetopterus variopedatus*. One boulder in the mud had a number of *Caryophyllia smithii* attached.	SS.SMu.CFiMu.SpnMeg	BM
27	032.035.003	Rubha Bharr (Loch Etive)	20/09/1990	56.50258	-5.13258	Soft mud slope with burrows of *Nephrops norvegicus*, possible thalassinid shrimp burrows and *Virgularia mirabilis*. Empty *Arctica* shells with ascidians and hydroids. One *Pachycerianthus*	SS.SMu.CFiMu.SpnMeg	BM

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
						multiplicatus found. Depth range from 15 to 27m BSL. Water much clearer at depth; less fresh.		
28	032.038.005	N Ru-inbhir ghuithasan (Loch Etive)	20/09/1990	56.53324	-5.09282	Steep slope with some burrows and frequent *Virgularia mirabilis*. Many *Chaetopterus* tubes projecting from the sediment as well as other small polychaete tubes. Some *Pseudamussium septemradiata*. *Corella parallelogramma* on polychaete tubes. One *Pachycerianthus multiplicatus* seen.	SS.SMu.CFiMu.SpnMeg	BM
29	032.038.006	N Ru-inbhir ghuithasan (Loch Etive)	20/09/1990	56.53324	-5.09282	Plain of soft, very burrowed mud with mounds as well as burrows. Some *Nephrops norvegicus*, others not identified. Mud very well worked with lots of small polychaete tubes.	SS.SMu.CFiMu.SpnMeg	BM
30	032.039.002	Ru aird Trileadhan. (Loch Etive)	20/09/1990	56.54237	-5.08706	Gently sloping soft mud with considerable terrestrial debris (branches and leaves) and drift *Fucus* on surface. Few mounds of *Arenicola* and single *Nephrops* burrows seen with a *Gobius niger* in it. Many *Chaetopterus* tubes and *Ophiura albida*, with a few solitary ascidians attached to surface debris. Pale *Suberites carnosus* frequent.	SS.SMu.CFiMu.SpnMeg	BM
31	032.040.001	NE of Ru aird Trileadhan (Loch Etive)	21/09/1990	56.54331	-5.08551	Very soft mud with terrestrial vegetable matter. Species recorded from sample include Lucinoma *borealis*, *Corbula gibba*, *Cerianthus lloydii* (one, very large), and *Nucula sulcata*. About 15 litres of mud taken by dredge and sieved through 1mm sieve.	SS.SMu.CFiMu.SpnMeg	BM
32	624.003.002	S side of Pladda Island	14/05/1995	56.47555	-5.51094	Steep slope of shelly mud with fairly dense *Pennatula*, tall *Virgularia* and scattered *Nephrops*. A few scattered pebbles with *Kirkenpaueria*.	SS.SMu.CFiMu.SpnMeg	BM
33	624.003.005	S side of Pladda Island	14/05/1995	56.47555	-5.51094	Circalittoral soft mud with *Pennatula phosphorea*, *Cerianthus lloydii* and *Nephrops norvegicus* burrows. Occasional pebbles and gravel provided a refuge for small *Munida rugosa*. *Virgularia mirabilis* also present.	SS.SMu.CFiMu.SpnMeg	BM
34	624.003.006	S side of Pladda Island	14/05/1995	56.47555	-5.51094	Fine soft mud at 28 m with the seapens *Virgularia mirabilis* and *Pennatula phosphorea* and the anemone *Cerianthus lloydii*. Occasional *Anseropoda placenta* and small *Munida rugosa* with *Turitella*.	SS.SMu.CFiMu.SpnMeg	BM

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
35	624.003.007	S side of Pladda Island	14/05/1995	56.47555	-5.51094	Sandy mud slope with *Nephrops* burrows (and possibly *Calocaris* burrows), *Pennatula phosphorea* and *Virgularia mirabilis*. *Amphiura chiajei* common (more in deeper water) and *Cerianthus lloydii* and *Turitella communis* common.	SS.SMu.CFiMu.SpnMeg	BM
36	006.063.001	S of Achnacroish, Lismore (Lower Loch Linnhe)	18/06/1989	56.50908	-5.49194	Plains of very soft mud with many large megafaunal burrows. *Virgularia* fairly dense and lots of tiny *Pennatula*. Couple of *Funiculina* also present. *Nephrops* present with many burrows. Single ?snake blenny seen.	SS.SMu.CFiMu.SpnMeg.Fun	BM
37	006.017.001	W of Achadh an Todhair Hill (Upper Loch Linnhe)	22/06/1989	56.79818	-5.15951	Soft mud from 14-19m bcd with lots of burrows (*Nephrops* and 2cm diameter straight down for 20cm then horizontal for 20cm). *Virgularia*, *Funiculina*, *Amphiura*, *Arctica*, *Ophiura albida*, large *Pachycerianthus*, *Turritella*, *Pennatula* (large), *Trachythyone*. Very rich in species, with quite high densities, over a large area.	SS.SMu.CFiMu.SpnMeg.Fun	BM
38	006.023.001	Cuil-Cheanna Spit (Lower Loch Linnhe)	20/06/1989	56.68898	-5.25277	Very soft mud dominated by anthozoans *Funiculina* and *Virgularia*. Some *Pennatula* and *Sagartiogeton*. There were many *Nephrops* burrows but only a few animals observed. On the surface there were abundant *Turritella* with occasional *Aporrhais*. Within the sediment there was *Brissopsis* and *Amphiura*.	SS.SMu.CFiMu.SpnMeg.Fun	BM
39	006.027.001	NE Cuil Bay (Lower Loch Linnhe)	20/06/1989	56.64321	-5.30120	Soft mud with many burrows, particularly *Nephrops norvegicus*. Others not identified. Many very tall *Virgularia mirabilis* and some *Funiculina quadrangularis*. *Amphiura* spp. (not collected) abundant, and *Brissopsia lyrifera* present.	SS.SMu.CFiMu.SpnMeg.Fun	BM
40	006.034.002	SW of Camasnacroise, Loch a'Choire (Lower Loch Linnhe)	14/06/1988	56.61239	-5.49773	Plain of muddy fine sand adjoining area of small boulders at 25m bcd, with *Funiculina* and *Pennatula*, and changing to area of fairly dense *Thyone* and *Psolus*. *Beggiatoa* present in patches and with *Amphiura filiformis* and small burrowing anemone (?*Edwardsia*) in sediment. Frequent large vertical holes amongst *Funiculina* (no indication of what), with numerous polychaete tubes in the sediment. Fairly rich in species.	SS.SMu.CFiMu.SpnMeg.Fun	BM
41	006.036.002	W of Beinn Sgluich (Lower Loch Linnhe)	20/06/1989	56.61149	-5.35032	Soft mud with some holes/burrows and mounds. Not much surface fauna visible. Did see a few	SS.SMu.CFiMu.SpnMeg.Fun	BM

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
						Funiculina quadrangularis.		
42	006.044.003	E of Dubh Sgeir, Lismore (Lower Loch Linnhe)	28/06/1989	56.54699	-5.48323	Steeply sloping soft shelly mud from 30 - 43m (rock above 30m) with *Funiculina*, *Virgularia* and *Pennatula*. Occasional tall *Tubularia* on sediment and boulders.	SS.SMu.CFiMu.SpnMeg.Fun	BM
43	006.045.001	Port an Dreadhain, Lismore (Lower Loch Linnhe)	28/06/1989	56.50985	-5.53445	*Amphiura chiajei/filiformis* has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Mud plain with many burrows, including *Nephrops norvegicus*. *Funiculina* common, *Amphiura* spp. abundant. Area with considerable dead kelp and other organis debris - many *Asterias rubens*. Small clumps of *Tubularia indivisa*.	SS.SMu.CFiMu.SpnMeg.Fun	BM
44	006.049.001	Bernera Bay, Lismore (Lower Loch Linnhe)	28/06/1989	56.49072	-5.57785	Soft mud plain from 25 - 21m bcd with lots of burrows, (some *Nephrops*, some unidentified). *Sagartiogeton* abundant, *Pennatula* and *Funiculina* common, and *Virgularia* occasional. *Turritella* frequent, *Nephrops* occasional.	SS.SMu.CFiMu.SpnMeg.Fun	BM
45	005.023.001	S Callert Cottage (Loch Leven)	23/04/1990	56.69654	-5.10115	Polychaeta has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. An anchor dredge sample: soft mud with polychaetes and *Amphiura chiajei* and *Virgularia mirabilis*.	SS.SMu.CFiMu.MegMax	BM
46	005.030.001	N of mouth of Allt Gleann a Chaolais (Loch Leven)	24/04/1990	56.70818	-5.02628	Flat mud with leaf litter, at an indicated depth of 42 m bcd. Large burrowing prawns and polychaetes present. Anchor dredge sample: bivalves and Terebellids common.	SS.SMu.CFiMu.MegMax	BM
47	032.030.002	SE of Eilean Uisneachan (Loch Etive)	18/09/1990	56.48288	-5.16507	Mud plain with burrows - possibly *Callianassa* and inhabited by *Gobius niger*, and mounds probably *Maxmuelleria* (Echiuran). Occasional large *Virgularia*.	SS.SMu.CFiMu.MegMax	BM
48	006.037.004	Creag an Fhithich, Shuna Island (Lower Loch Linnhe)	20/06/1989	56.59066	-5.40464	Area of muddy shell gravel supporting bed of *Limaria hians*.	SS.SMx.IMx.Lim	FS
49	006.048.002	Rubha an Ridire, Lynn of Morven (Lower Loch Linnhe)	28/06/1989	56.49650	-5.68277	*Nemertesia* has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Small area of almost horizontal	SS.SMx.IMx.Lim	FS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
						substratum covered by *Nemetesia* spp with *Limaria hians* beneath. Did not spend much time here.		
50	006.067.002	Narrows N of Appin Rocks, Lynn of Lorn (Lower Loch Linnhe)	18/06/1989	56.55334	-5.42325	Dense bed of *Limaria hians* with areas of abundant red algae, particularly *Plocamium cartilagineum*, other areas with no epiphytes and others with abundant *Ophiothrix fragilis*.	SS.SMx.IMx.Lim	FS
51	006.067.001	Narrows N of Appin Rocks, Lynn of Lorn (Lower Loch Linnhe)	18/06/1989	56.55100	-5.42491	Tideswept channel with dense bed of *Modiolus modiolus*, 100% cover apart from occasional cobbles and boulders. *Modiolus* covered with dense hydroids, particularly *Rhizocaulus verticillatus*, *Halecium halecinum* and *Halecium muricatum*. Several very large *Asterias rubens*.	SS.SBR.SMus.ModCvar	HM
52	005.025.001	W of Camas na h-Eirghe (Loch Leven)	22/04/1990	56.69984	-5.08035	Scattered *Modiolus* on a pebbly surface with a few small boulders. Fauna poor with *Pomatoceros* and *Pagurus bernhardus* the most common animals. A few pieces of kelp and *Phycodrys*.	SS.SBR.SMus.ModHAs	HM
53	006.024.002	WSW of Ardsheal House (Lower Loch Linnhe)	23/06/1989	56.66402	-5.29290	Steep slope of cobbles on muddy sand with some *Modiolus modiolus* scattered amongst them. Occasional large plants of *Laminaria saccharina*. *Phycodys rubens* and other foliose algae frequent. A large angler fish eyed us up.	SS.SBR.SMus.ModHAs	HM
54	005.005.001	E Ballchulish Narrows (Loch Leven)	26/04/1990	56.68834	-5.17343	Hydrozoa has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Dense *Modiolus modiolus* bed at 14-17 m bcd. *Modiolus* shells covered with dense hydroid growth and *Pomatoceros* tubes.Very clean habitat but diversity limited.	SS.SBR.SMus.ModT	HM
55	005.012.001	NE of Rubha Poll an t-Sailisdeire (Loch Leven)	22/04/1990	56.68242	-5.15964	A gradually sloping plain of cobbles and patchy but dense *Modiolus modiolus* colonised by *Phycodrys rubens* and with a few fairly small variety of species on and amongst the *Modiolus* including *Psammechinus miliaris* and *Buccinum undatum*.	SS.SBR.SMus.ModT	HM
56	005.012.003	NE of Rubha Poll an t-Sailisdeire (Loch Leven)	22/04/1990	56.68183	-5.15710	*Alcyonium digitatum* has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. A gradually sloping plain of cobbles and patchy but dense *Modiolus modiolus* with a small variety of species	SS.SBR.SMus.ModT	HM

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
						including *Alcyonium digitatum*.		
57	006.008.002	NW of Annat Narrows (Loch Eil)	22/06/1989	56.84779	-5.17255	Habitat similar to habitat 3. Mixture of pebbles and small cobbles with patches of muddy shell gravel (patches larger than habitat 3). Characterised by *Modiolus* and foliose red algae particularly *Delesseria*.	SS.SBR.SMus.ModT	HM
58	006.011.001	NW of Rubha Dearg (Upper Loch Linnhe)	21/06/1989	56.83616	-5.12886	A site in the rapids with substratum of cobbles/*Modiolus modiolus*, covered by a low diversity but high abundance of red algae.	SS.SBR.SMus.ModT	HM
59	006.011.003	NW of Rubha Dearg (Upper Loch Linnhe)	21/06/1989	56.83708	-5.13549	*Modiolus modiolus* on bedrock. Red algae and *Tubularia indivisa* all over it.	SS.SBR.SMus.ModT	HM
60	005.015.001	W of Rubha na Glas-lice (Loch Leven)	23/04/1990	56.68322	-5.14121	Ophiuroidea, Polychaeta has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. An anchor dredge sample: coarse muddy sand with bivalves, polychaetes (*Owenia fusiformis*), brittlestars (*Amphuira chiajei*), *Ophiopholis* and *Ophiothrix*.	SS.SMu.CFiMu.BlyrAchi	DM
61	006.001.003	Kinlocheil (Loch Eil)	22/06/1989	56.85646	-5.31367	A gradual, very soft, mud slope. Community dominated by *Arctica* and *Amphiura*. *Asterias* and *Pagurus bernhardus* with Hydractinia were common. Occasional *Buccinum* and *Aporrhais*.	SS.SMu.CFiMu.BlyrAchi	DM
62	006.038.003	Pinnacle W of Shuna Island (Lower Loch Linnhe)	23/06/1989	56.59154	-5.41368	Mud plain with *Funiculina* and *Amphiura* at 46m	SS.SMu.CFiMu.BlyrAchi	DM
63	032.016.003	SW of Kennacraig. (Loch Etive)	16/09/1990	56.46250	-5.26231	*Amphiura* has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Steep mud slope with occasional large *Virgularia mirabilis* and abundant *Amphiura*.	SS.SMu.CFiMu.BlyrAchi	DM
64	084.011.001	Manse Hole, Loch Linnhe (Loch Linnhe)	28/07/1978	56.72820	-5.23457	A discreet mud-filled hole on a sheltered pebble shore. See also site description.	LS.LMu	IM

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
65	085.008.001	Eilean nan Caorach (Loch Don, Mull)	09/06/1983	56.42321	-5.65440	Irregular, fairly steep-sided, rocky ridges with some boulders and gravel. The area around this site was heavily blanketed by fucoids - rotting weed permanent feature? Beneath the fucoids on the lower shore and into the Laminaria zone was a RHODOPHYACEAE community. Mollusca and Arthropoda were particularly numerous. Near high water at Camas Low there were patches of mud with *Hydrobia ulvae*, *Limapontia depressa* and *Vaucheria* sp. NOTE: Substratum % data are converted from the original substratum 1-3 scoring system.	LS.LMu	IM
66	296.005.003	Head of Loch Etive (Loch Etive)	04/03/1969	56.55533	-5.07184		LS.LMu	IM
67	296.001.002	W of Ardchattan Priory (Loch Etive)	04/03/1969	56.46135	-5.30130		LS.LMu.MEst.HedMac	IM
68	296.001.003	W of Ardchattan Priory (Loch Etive)	04/03/1969	56.46135	-5.30130		LS.LMu.MEst.HedMac	IM
69	296.004.002	Ardmaddy Bay (Loch Etive)	04/03/1969	56.49190	-5.12845		LS.LMu.MEst.HedMac	IM
70	296.004.003	Ardmaddy Bay (Loch Etive)	04/03/1969	56.49190	-5.12845		LS.LMu.MEst.HedMac	IM
71	296.005.002	Head of Loch Etive (Loch Etive)	04/03/1969	56.55533	-5.07184		LS.LMu.MEst.HedMac	IM
72	085.007.001	Loch Don (Loch Don, Mull)	09/06/1983	56.43319	-5.67272	Flat-lying soft mud with some gravel and boulder areas. There appeared to be a patch of *Zostera* sp. near low water (not investigated due to the softness of the mud). The mud contained numerous *A. marina* and sparse *C. edule*, *M. balthic*a and *S. plana*. There were *N. diversicolor* amongst the boulders where there was more gravel. The boulders supported *A. nodosum* and *M. edulis*. The upper shore had *Hydrobia ulvae* and the Sacoglossan mollusc *Limapontia depressa* amongst *Vaucheria* sp., and the stones at high water sheltered numerous *Ligia oceanica* rather than gammarids. NOTE: Substratum % data are converted from the original substratum 1-3 scoring system.	LS.LMu.MEst.HedMacScr	IM

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
73	296.003.001	E of Airds Bay (Loch Etive)	04/03/1969	56.44059	-5.23620		LS.LMu.UEst.Hed	IM
74	296.005.001	Head of Loch Etive (Loch Etive)	04/03/1969	56.55533	-5.07184		LS.LMu.UEst.Hed	IM
75	006.001.001	Kinlocheil (Loch Eil)	22/06/1989	56.85646	-5.31367	Shallow mud with subsurface clay with occasional stones. *L. saccharina* attached to stones. Fronds had *Membranipora*, *Dendrodoa* and *Balanus crenatus.* Abundant *Chorda filum*. Terebellidae indet. common in mud, *Arctica islandica* frequent.	SS.SMp.KSwSS.LsacCho	KS
76	005.009.002	SW of Rubha Charnuis (Loch Leven)	26/04/1990	56.68772	-5.16740	A mosaic of substratum types with patches of small pebbles, patches of larger pebbles and small areas of sand/shell gravel. *Mya truncata* was found throughout the area, while kelp plants were only occasionally observed forming the kelp park. Tiny weeds were attached to pebbles and the siphons of *Mya*. A variety of species were recorded but none in great abundance.	SS.SMp.KSwSS.LsacMxVS	KS
77	006.005.001	N shore, W of Outward Bound centre (Loch Eil)	21/06/1989	56.85319	-5.20861	Upper infralittoral area of cobbles on muddy sand with abundant cover of *Laminaria saccharina*. Some *Chorda filum*. Many foliose algae on cobbles with *Polyides rotundus* and *Phyllophora pseudoceranoides*.	SS.SMp.KSwSS.LsacMxVS	KS
78	006.007.001	Dorathy Stone (Loch Eil)	22/06/1989	56.84703	-5.18161	A gentle mud slope with abundant *Chorda filum* and frequent *L.saccharina*. *Arenicola marina* within the sediment. Chumps of *Polysiphonia elongata* abundant.	SS.SMp.KSwSS.LsacMxVS	KS
79	006.018.001	N of Callas na Dallaig (Upper Loch Linnhe)	22/06/1989	56.77985	-5.16960	Muddy sand and cobble with dense cover of *Chorda filum*, *Laminaria saccharina* and Ectocarpaceae. Red algae frequent on stones, particularly *Polysiphonia* spp.	SS.SMp.KSwSS.LsacMxVS	KS
80	006.061.001	Sgeir Sgoraig, Lismore (Lower Loch Linnhe)	18/06/1989	56.47264	-5.55661	Filamentous red algae, Foliose red algae has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Gentle slope of scattered boulders on muddy gravel with pebble patches. Siphons (presumed to be *Mya truncata* - several dead shells etc on surface) occurred in groups around the edges of boulders.	SS.SMp.KSwSS.LsacR.Mu	KS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
81	006.056.004	SE of St Margaret's Tower, Ardmucknish Bay (Lower Loch Linnhe)	17/06/1989	56.48523	-5.42524	Slope of muddy sand with cobbles, pebbles and dead shells in upper circalittoral -8 to -11m. *Phycodrys* and *Polysiphonia urceolata* frequent, with tall, branching *Obelia* sp. on cobbles, *Gibbula magus* frequent on sediment.	SS.SMp.KSwSS.LsacR.Mu	KS
82	006.058.001	W Camas Nathais, Lynn of Lorn (Lower Loch Linnhe)	17/06/1989	56.48239	-5.46244	Plain of tiny pebbles and gravel on a muddy gravel bed. Rare small cobbles or boulders. 80 - 90% cover of algae with *L.saccharina* (F) and *L.hyperborea* (O) and masses of foliose reds and browns. Small bare patches of sediment (1 - 2 m squared) with *Amphitrite* sp. in deeper water and *Mya truncata* and *Ensis arcuatus* and *Lanice* in shallower water. Epifauna rather sparse, but algae rich.	SS.SMp.KSwSS.LsacR.Mu	KS
83	624.002.003	Dunstaffnage (Lynn of Lorn)	14/05/1995	56.45563	-5.44530	Gravel and pebbles with occasional larger cobbles with cape form *Laminaria saccharina*, *Phycodrys* and *Trailiella*. *Mya arenaria* and *Cerianthus lloydii* in the sediment.	SS.SMp.KSwSS.LsacR.Mu	KS
84	624.002.004	Dunstaffnage (Lynn of Lorn)	14/05/1995	56.45563	-5.44530	Mud with pebbles and attached kelp with terrebellids and burrowing anemones in mud with *Lanice conchilega*.	SS.SMp.KSwSS.LsacR.Mu	KS
85	624.002.005	Dunstaffnage (Lynn of Lorn)	14/05/1995	56.45563	-5.44530	Scattered *Laminaria saccharina* attached to pebbles on a muddy gravel slope. Small *Delessaria* and a few other algae attached to pebbles but many of hydroids present in deeper water absent. *Ensis* common in sediment along with terebellids.	SS.SMp.KSwSS.LsacR.Mu	KS
86	624.002.007	Dunstaffnage (Lynn of Lorn)	14/05/1995	56.45563	-5.44530	*Laminaria saccharina* park on muddy pebbles with sparse hydroids and filamentous and foliose red algae.	SS.SMp.KSwSS.LsacR.Mu	KS
87	624.002.008	Dunstaffnage (Lynn of Lorn)	14/05/1995	56.45563	-5.44530	Lower infralittoral muddy cobbles, pebbles and gravel with *Laminaria saccharina* park and *Ensis* sp. siphons. Among the kelp was *Desmarestia*, *Porphyra miniata* and *Polysiphonia* sp. Small *Munida rugosa* were also found among the pebbles.	SS.SMp.KSwSS.LsacR.Mu	KS
88	006.016.001	Rubha M¢r, Trislaig (Upper Loch Linnhe)	21/06/1989	56.82131	-5.12626	Pebbles and cobbles on sand subject to surface tidal streams and lower salinity. Abundant *L.saccharina* and *Chorda filum* common. Numerous small tufts of red algae, particularly *Pterothamnion plumula* and *Polysiphonia*	SS.SMp.KSwSS.LsacR.Sa	KS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
						urceolata.		
89	006.036.001	W of Beinn Sgluich (Lower Loch Linnhe)	20/06/1989	56.61149	-5.35032	Substratum fairly uniform - No species were particularly abundant except *Arctica*. Various hydroids were attached to shells and small stones. There was a distinct zone of filamentous red/green algae between 8 and 14 m bcd, growing on shells, small stones and pebbles.	SS.SMp.KSwSS.LsacR.Sa	KS
90	006.042.008	Rocks W of Port Ramsay, Lismore (Lower Loch Linnhe)	23/06/1989	56.55688	-5.45643	*Arenicola marina* has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Plain of sheltered muddy sand with occasional boulders. Scattered foliose algae, all very bleached. Enormous plants of *Nitophyllum punctatum*, all green! Algae on boulders very silty. Sediment and epifauna very poor.	SS.SMp.KSwSS.LsacR.Sa	KS
91	006.046.001	Camas Eigneig, Lynn of Morvern (Lower Loch Linnhe)	28/06/1989	56.53377	-5.58261	Predominantly coarse sand or fine gravel or a mixture of the two! Piles of empty shells occurred in the lower part of the zone. The deepest *Laminaria saccharina* occurred at 6.8m bcd. *Ensis* and *Dosinia* characterised the sediment while *Ophiocomina nigra* was found over the debris of empty shells mixed with filamentous weeds.	SS.SMp.KSwSS.LsacR.Sa	KS
92	006.056.002	SE of St Margaret's Tower, Ardmucknish Bay (Lower Loch Linnhe)	17/06/1989	56.48523	-5.42524	Level plain of find sand with shell fragements, cobbles and pebbles in upper infralittoral at -5m. *Laminaria saccharina* confined to larger cobbles, majority of habitat was fine sand with *Mya truncata* and *Echinocardium cordatum* both frequent. Smaller algal species included frequent *Pterothamnion plumula* and *Desmarestia viridis*.	SS.SMp.KSwSS.LsacR.Sa	KS
93	005.036.002	Kinlochleven (Loch Leven)	25/04/1990	56.71276	-4.98219	A pebble bank with *Modiolus modiolus* subject to freshwater influence. Few other fauna/flora, - impoverished habitat.	IR.LIR.IFaVS	LS
94	005.028.001	E of Caolas nan Con (Loch Leven)	25/04/1990	56.70738	-5.03700	Scattered small boulders and cobbles on a plain of pebble and stone gravel. Isolated plants of *Laminaria saccharina* and other tatty pieces of algae on the larger stones. Otherwise virtually devoid of life. *Modiolus* and *Balanus crenatus* shells appeared to have died recently (probably	IR.LIR.KVS.LsacPhyVS	LS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
						killed by freshwater). *Laminaria saccharina* to 5 m bcd and *Phycodrys* to 8 m bcd.		
95	032.006.001	W of Eilean Traighe (Loch Etive)	21/09/1990	56.45589	-5.33819	Foliose red algae has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Gentle slope of small boulders and cobbles on muddy seabed. Sparse park of *L.saccharina* with *Electra*, *Bowerbankia* and spirorbids on fronds. Understorey of quite dense very silty algae, including *Phyllophora* spp., *Odonthalia*, filamentous green algae and *Chorda filum* (lying horizontal).	IR.LIR.KVS.LsacPhyVS	LS
96	032.006.002	W of Eilean Traighe (Loch Etive)	21/09/1990	56.45589	-5.33819	Gentle slope of boulder and cobble on muddy sand. Sediment with a few *Arenicola*, terebellids and thick muddy tubes (indet). Boulders with barnacles, *Eucratea*, ascidians and many covered by thin sheet of ochre sponge. *Halichondria bowerbanki* present but less common than other sites.	IR.LIR.KVS.LsacPhyVS	LS
97	032.010.001	Channel SE of Abbot's Isle. (Loch Etive)	21/09/1990	56.45488	-5.32119	Steep slope with bedrock near the surface, then boulders and cobbles. Some scattered *Laminaria saccharina* to 5m, but generally dense cover of red algae and ascidians, *Corella parallelogramma* and *Ascidiella scabra*.	IR.LIR.KVS.LsacPhyVS	LS
98	032.015.001	NW of Airds Point (Loch Etive)	21/09/1990	56.45817	-5.26803	Filamentous red algae, Foliose red algae has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Sparse park of *L.saccharina* on mixture of boulders and cobbles. Silty weeds, mainly *Phyllophora* spp., *Odonthalia* with a few *Ascidiella scabra* and *Asterias*. *Electra*, *Bowerbankia* and spirorbids on kelp stipes.	IR.LIR.KVS.LsacPhyVS	LS
99	032.015.002	NW of Airds Point (Loch Etive)	21/09/1990	56.45817	-5.26803	Small boulders and cobbles on pebble/gravel slope. Silty *Phyllophora* sp., *Eucratea*, *H.bowerbanki* and solitary ascidians on rocks covered by *Dendrodoa* and *Balanus crenatus*.	IR.LIR.KVS.LsacPhyVS	LS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
100	032.016.001	SW of Kennacraig. (Loch Etive)	16/09/1990	56.46201	-5.26239	Boulders on muddy gravel with *Laminaria saccharina*.	IR.LIR.KVS.LsacPhyVS	LS
101	032.017.001	SE of Kennacraig (Loch Etive)	17/09/1990	56.45786	-5.24953	Infralittoral boulders with mixed cobbles, gravel, fine sand and mud, characterised by *Laminaria saccharina* and foliose algae undergrowth.	IR.LIR.KVS.LsacPhyVS	LS
102	032.019.001	Bonawe School (Loch Etive)	17/09/1990	56.45282	-5.23854	Infralittoral boulder with mixed cobbles, gravel and fine sand, characterised by *Laminaria saccharina*.	IR.LIR.KVS.LsacPhyVS	LS
103	032.022.002	Airds Bay (Loch Etive)	17/09/1990	56.43937	-5.23769	*Laminaria saccharina* dense in places. Sparse understorey of foliose red algae - *Phyllophora pseudoceranoides*, *Phycodrys rubens* and some *Polysiphonia* sp.. Occasional large boulders and cobbles with more algae. *Electra* on *L.saccharina* fronds. Many large bloated *Asterias*. *Corella* and *A.scabra* on scraggy algae. Patches of Ectocarpaceae indet. mats.	IR.LIR.KVS.LsacPhyVS	LS
104	032.025.002	Eilean nan Meann (Loch Etive)	17/09/1990	56.44863	-5.21983	Dense cover of *Laminaria saccharina* over much of the area with dense understorey of *Phyllophora pseudoceranoides* both with *Electra pilosa*. Also lots of *Polysiphonia* sp. and *Asterias* juveniles. Kelp stipes often with dense *Dynamena* just above holdfast.	IR.LIR.KVS.LsacPhyVS	LS
105	032.027.001	W of Sgeirlag Choan. (Loch Etive)	18/09/1990	56.45540	-5.19776	Bedrock in sublittoral fringe with a thick blanket cover of filamentous green algae and some *Laminaria saccharina* plants. Algae covered with spat from *Mytilus edulis* - larger *M.edulis* in clearings and underneath. Many *Asterias rubens* on the green blanket. Patches of blue-green algae and *Beggiatoa*.	IR.LIR.KVS.LsacPhyVS	LS
106	032.027.002	W of Sgeirlag Choan. (Loch Etive)	18/09/1990	56.45540	-5.19776	Silty bedrock and boulders with scattered plants of *Laminaria saccharina*. *Phyllophora* spp. on upward facing rock, supporting ascidians - similar to habitat 3. Coralline crusts abundant under the silt.	IR.LIR.KVS.LsacPhyVS	LS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
107	032.027.003	W of Sgeirlag Choan. (Loch Etive)	18/09/1990	56.45540	-5.19776	*Ascidiella aspersa* has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Muddy gravel plain with scattered outcrops of bedrock and boulders and then a bedrock and boulder slope. All very silty but upward facing surfaces supporting fairly dense cover of red algae, mostly *Phyllophora* spp., which were covered with ascidians - *Corella parallelogramma* and *Ascidiella aspersa* - *Gobius niger* under boulders. Coralline crusts abundant under the silt. Vertical surfaces of boulders with common dead barnacles.	IR.LIR.KVS.LsacPhyVS	LS
108	032.028.003	Mackinley's Cliff (Loch Etive)	23/05/1988	56.45955	-5.18617	Steep and upward facing bedrock covered with thick blanket of filamentous green algae. Many *Asterias rubens* and mussel spat on and amongst the algae - larger *Mytilis edulis* underneath and in clearings.	IR.LIR.KVS.LsacPhyVS	LS
109	032.028.004	Mackinley's Cliff (Loch Etive)	23/05/1988	56.45955	-5.18617	Steep bedrock with ledges, cobbles and silt on ledges. Scattered scruffy *Laminaria saccharina* plants with understorey primarily *Phyllophora* spp., as in habitat 3. Large numbers of *Asterias* adults and juveniles, *Obelia* sp. frequent on kelp fronds.	IR.LIR.KVS.LsacPhyVS	LS
110	032.028.005	Mackinley's Cliff (Loch Etive)	23/05/1988	56.45955	-5.18617	Very steep and vertical granite bedrock with shell, silty ledges and rare overhangs. Dominated by ascidians. Large *Balanus* shells present - but all dead.	IR.LIR.KVS.LsacPhyVS	LS
111	032.031.001	Rocks W of Ardnellan Point (Loch Etive)	18/09/1990	56.48056	-5.15026	Bedrock with a near 100% cover of bright green filamentous algae forming a mat over surface and entangling *Phyllophora pseudoceranoides*. Sparse growth of very small *Laminaria saccharina* plants (smooth rounded stipe) with *Electra* over blades. Numerous *Asterias* present including many juveniles (1` diamater). This zone only briefly examined.	IR.LIR.KVS.LsacPhyVS	LS
112	032.031.002	Rocks W of Ardnellan Point (Loch Etive)	18/09/1990	56.48056	-5.15026	Mixture of smooth bedrock and boulders, some large, with small areas of silty mud. Upper surfaces with silty *Phyllophora pseudoceranoides* covered by *Corella* and *A.scabra*. Some vertical faces dominated by large *Balanus crenatus*(?). *Dendrodoa* common on upper faces, but less common than deeper. Single *Arctica* found in otherwise barren mud.	IR.LIR.KVS.LsacPhyVS	LS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
113	032.038.003	N Ru-inbhir ghuithasan (Loch Etive)	20/09/1990	56.53324	-5.09282	Steep slope of heavily silted boulders with *Phyllophora pseudoceranoides* on upward-facing surfaces but virtually nothing else.	IR.LIR.KVS.LsacPhyVS	LS
114	032.038.001	N Ru-inbhir ghuithasan (Loch Etive)	20/09/1990	56.53324	-5.09282	Bare granite boulders with nothing growing on them or living amongst them! Water entirely fresh and drinkable.	IR.LIR.Lag	LS
115	450.017.002	Leth-Fhonn, Loch Don (Mull)	13/08/1995	56.42495	-5.69886	Boulders with mixed substrata with mud. *F. ceranoides*, *Cladophaora* sp and *Enteromorpha* sp. were common. Associated with the boulders along with *Littorina*. Occasional *Arenicola marina* casts were seen in patches of mud. Sea Trout *Salmo trutta fario* were seen.	IR.LIR.Lag.FcerEnt	LS
116	032.035.001	Rubha Bharr (Loch Etive)	20/09/1990	56.50258	-5.13258	Narrow band of coarse sandy sediment in shallow water with *Fucus serratus* on small boulders and cobbles. *Corella parallelogramma* common over fucoid fronds. *Asterias* common slightly deeper in a narrow band. Freshwater influence near surface very obvious - current flowing out of loch on surface, very cold and poor visibility to 6m BSL. Very low diversity.	IR.LIR.Lag.FChoG	LS
117	032.037.001	E of Sgeir na Beolarach (Loch Etive)	20/09/1990	56.51000	-5.12344	Dead algae in piles and some attached, including kelp stipes, live (?) *Fucus serratus* and *Fucus vesiculosus*. Clearly affected by freshwater. Rare *Carcinus* and *Asterias*.	IR.LIR.Lag.FChoG	LS
118	032.042.001	N of Aird Trilleachan (Loch Etive)	20/09/1990	56.55252	-5.07649	Sheltered sublittoral mud in brackish conditions, gently sloping. Surface of mud extensively mounded by unidentified polychaete with `dirty' leathery tube. Other species included *Chaetopterus variopedatus*, *Ophiura albida* and *Asterias rubens*.	SS.SMu.SMuLS	LS
119	006.050.004	W B…gh Clach an Dobhrain, Lismore (Lower Loch Linnhe)	28/06/1989	56.47610	-5.57752	Ascidia, Hydrozoa, Porifera has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Steep and vertical mixed slope of bedrock and boulders covered in sediment - sediment forming patches between boulders. A fairly thick layer of sediment covered the rock.	CR.HCR.XFa.SwiLgAs	NS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
120	043.003.001	Bach Island, W of Kerrera (Firth of Lorn)	27/05/1988	56.38189	-5.60392	Vertical bedrock from 16 - 27.5 m with some ledges with shell gravel. Rich fauna of ascidians, hydroids and bryozoan turf. Becoming less abundant upwards, with foilose red algae (*Delesseria* and *Plocamium*) down to 18.5 m. The lowest kelp plants were at 16 m.	CR.HCR.XFa.SwiLgAs	NS
121	048.11/3.001	Liath Sgeir (Lower Loch Linnhe)	17/06/1983	56.47457	-5.60443	Porifera has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Vertical cliff in strong current. Overhangs present. Dominated by high densities of sponges especially *Axinella* spp. *Pachymastisma johnstonia* seen in quantity only at this site of survey. High densities of hydroids, erect Bryozoa and Anthozoa. *Alcyonium digitatum* present but, unlike similar site in Loch na Keal, *Alcyonium glomeratum* absent. *Caryophyllia smithii*, *Metridium senile*, *Urticina felina* all found. The tunicates *Ciona intestinalis* and *Clavelina lepadiformis* cover large areas. *Antedon bifida* another dominant species. Many nudibranchs.	CR.HCR.XFa.SwiLgAs	NS
122	624.001.005	North Bach Island (Firth of Lorne)	13/05/1995	56.38288	-5.60078	Circalittoral cliff face with mixed cover of *Securiflustra securifrons* and dense *Antedon bifida*, but with good variety of other species, especially sponges, *Synoicum pulmonaria* colonies particularly large (up to 10 cm across). Recording on a 2 m strip up a transect line - insufficient time to survey thoroughly.	CR.HCR.XFa.SwiLgAs	NS
123	624.001.008	North Bach Island (Firth of Lorne)	13/05/1995	56.38288	-5.60078	Lower circalittoral bedrock face with steps with some surface silt. Faunal turf comprising sponges including *Axinella infundibuliformis*, *Polymastia boletiformis* and *Suberites carnosus*, ascidians, hydroids, *Caryophyllia smithii*, *Neocrania anomala* and *Securiflustra securifrons*.	CR.HCR.XFa.SwiLgAs	NS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
124	085.007.001	Loch Don (Loch Don, Mull)	09/06/1983	56.43319	-5.67272	Flat-lying soft mud with some gravel and boulder areas. There appeared to be a patch of *Zostera* sp. near low water (not investigated due to the softness of the mud). The mud contained numerous *A. marina* and sparse *C. edule*, *M. balthica* and *S. plana*. There were *N. diversicolor* amongst the boulders where there was more gravel. The boulders supported *A. nodosum* and *M. edulis*. The upper shore had *Hydrobia ulvae* and the Sacoglossan mollusc *Limapontia depressa* amongst *Vaucheria* sp., and the stones at high water sheltered numerous *Ligia oceanica* rather than gammarids. NOTE: Substratum % data are converted from the original substratum 1-3 scoring system.	LS.LMp.LSgr.Znol	SG
125	450.017.001	Leth-Fhonn, Loch Don (Mull)	13/08/1995	56.42495	-5.69886	Muddy fine sand flats with *Corophium volutator* visible on the surface. 6* cores were sieved.	SS.SMp.SSgr.Rup	SG
126	005.007.001	Alltshellach (Loch Leven)	24/04/1990	56.69216	-5.17251	Pebbles with a few cobbles on muddy fine sand with much terrestrial debris covered by *Fucus spiralis*, *Ascophyllum nodosum* and *Ascophyllum nodosum* ecad *mackaii*, with *Littorina littorea*, *Littorina obtusata*, *Hyrobia ulvae* and amphipods. Patches of sediment clear of algae have *Arenicola* casts and *Branchiomma* tubes at lowest shore.	LR.LLR.FVS.Ascmac	SL
127	005.011.006	Carness (Loch Leven)	24/04/1990	56.68818	-5.15699	Dense cover of *Ascophyllum nodosum* ecad *mackaii* on stoney sandy mud. Many gammarids and littorinids beneath the algae.	LR.LLR.FVS.Ascmac	SL
128	006.009.004	W end of Annat Narrows (Loch Eil)	22/06/1989	56.84241	-5.16402	Steep bedrock shore dominated by *Ascophyllum nodosum*. Frequent *Cladophora rupestris* and scarce fauna with *Balanus balanoides* (f) and *Mytilus* (o).	LR.HLR.FT.AscT	TS
129	032.003.003	Below Black Crofts (Loch Etive)	19/09/1990	56.45802	-5.37351	Cobbles and boulders with super-abundant *Ascophyllum*.	LR.HLR.FT.AscT	TS
130	032.003.004	Below Black Crofts (Loch Etive)	19/09/1990	56.45802	-5.37351	Mid-eulittoral boulder, dominated by *Ascophyllum nodosum* on upper surfaces. Undersurfaces dominated by spirorbids and clumps of *Mytilus edulis* with a variety of other mobile and encrusting species, including *Littorina saxatilis* and *Flustrellidra hispida*. Dogwhelks and dogwhelk eggs frequent.(Sub-habitat of 032.003.003)	LR.HLR.FT.AscT	TS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
131	032.004.003	Dunfuinary (Loch Etive)	19/09/1990	56.45477	-5.36842	Sloping eulittoral boulders with some stone and shell. Dominated by superabundant *Ascophyllum nodosum* and abundant *Verrucaria mucosa* on boulders.	LR.HLR.FT.AscT	TS
132	032.004.006	Dunfuinary (Loch Etive)	19/09/1990	56.45477	-5.36842	Mid eulittoral very steep bedrock. Tide exposed. Dominated by *Ascophyllum nodosum* with abundant *Cladophora* sp. and frequent *Audouinella* sp. covering rock. Common *B. balanoides*. *Fucus serratus* frequent near the bottom of habitat and covered in *Flustrellidra hispida* and *Dynamena pumila*. *Patella* sp. occasional. *Fucus vesiculosus* occasional at the top of habitat.	LR.HLR.FT.AscT	TS
133	005.027.001	Narrows, Caolas nan Con (Loch Leven)	26/04/1990	56.70567	-5.04454	Upper infralittoral previously dredged narrows with frequent rafted? *Laminaria digitata* and other small red seaweeds. Evidence of very strong currents.	IR.MIR.KT.LdigT	TS
134	006.009.006	W end of Annat Narrows (Loch Eil)	22/06/1989	56.84241	-5.16402	This habitat was the sublittoral fringe at the base of a very steep bedrock shore. Shore subject to strong tidal streams (up to 5 knots). Zone dominated by algae - *L. digitata* (C), *Cladophora rupestris* (F), *Polysiphonia urceolata* (F), *Palmaria palmata* (F). Sparse fauna with *Alcyonidium diaphanum* (O) and *Dynamena pumila* (O).	IR.MIR.KT.LdigT	TS
135	005.004.001	Ballachulish Narrows (Loch Leven)	26/04/1990	56.68981	-5.18619	Foliose red algae has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Extensive shallow channel of boulders of varying sizes in very strong current. Larger boulders with sparse forest of *Laminaria hyperborea* on the tops. Foliose red algae were frequent on the sides of large boulders and on some smaller boulders. Smallest boulders and cobbles are more mobile and not colonised excepting by coralline crusts and *Pomatoceros/Balanus crenatus*. (Not surveyed in detail due to strong current).	IR.MIR.KT.XKT	TS
136	006.068.001	Entrance to loch (Loch Creran)	18/06/1989	56.53650	-5.41947	Mixture of large and small boulders, cobbles, pebbles and gravel in tide-swept area. Abundant algal and animal life with *Laminaria hyperborea*, *Delesseria sanguinea*, *Alcyonium digitatum*. Kelp stipes with abundant *Sertularia argentea*. On patches of pebbles - there were encrusting	IR.MIR.KT.XKT	TS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
						bryozoans and saddle oysters. *Balanus crenatus* was common in patches.		
137	032.002.001	Falls of Lora (Loch Etive)	16/09/1990	56.45620	-5.39193	Upward facing surfaces of rugged bedrock with *Laminaria hyperborea* park (small specimens). Stipes clean or covered by *Diphasia rosacea*. About 70% cover of encrusting coralline algae. Rest covered by barnacles. Foliose algae abundant. Narrow band below kelp park with kelp sporlings. *Sertularia argentea* common.	IR.MIR.KT.XKT	TS
138	032.005.002	NE end of Kilmaronag Narrows to Achnaba. (Loch Etive)	16/09/1990	56.46524	-5.35671	Foliose red algae has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Shallow slope of tideswept boulders with forest of short small *L.hyperborea*. Understorey of foliose red algae and *Laminaria* sporlings (mostly *L.hyperborea*). Rocks covered by *Balanus crenatus*, with many *Nucella*.	IR.MIR.KT.XKT	TS
139	005.009.001	SW of Rubha Charnuis (Loch Leven)	26/04/1990	56.68775	-5.16632	Kelp forest of *Laminaria saccharina* on predominantly pebbles plus small cobbles and empty shells on surface. Various foliose and filamentous red weeds which mainly consisted of young *Phycodrys rubens*. *Mya truncata* were scattered between the pebbles and *Pagurus bernhardus* scampered over them.	IR.MIR.KT.XKTX	TS
140	005.010.004	Rubha Charnuis (Loch Leven)	24/04/1990	56.68521	-5.16196	Mixed stones and coarse sand subject to moderate tidal streams. The kelps *Laminaria digitata* and *Laminaria saccharina* were frequent. Clumps of *Halichondria panicea* were present on holdfasts and between stones. Occasional red algae below kelp plants. *Mya truncata* present in sand.	IR.MIR.KT.XKTX	TS
141	006.008.001	NW of Annat Narrows (Loch Eil)	22/06/1989	56.84779	-5.17255	Mixture of pebbles and cobbles covered in *Balanus crenatus*.	IR.MIR.KT.XKTX	TS

Table 10.2 continued

ID	MR code	Site name	Date	Latitude	Longitude	Description	Biotope	PMF
142	006.010.001	Annat Narrows (Loch Eil)	21/06/1989	56.83897	-5.15453	Fairly level bottom of boulders and cobbles, at -6 to -4m, exposed to strong tidal currents. *Laminaria hyperborea* with very clean fronds abundant, mainly on boulders, which were dragged in the current by the algae. *Mytilus* and *Balanus crenatus*, all of which were small, were both very abundant, covering many boulders and cobbles completely. Relatively few other animal species were noted, even beneath stones - no chitons or decapods could be found, possibly due to the (?) low salinity and/or mobile substratum. *Sertularia argentea* was common.	IR.MIR.KT.XKTX	TS
143	032.005.001	NE end of Kilmaronag Narrows to Achnaba. (Loch Etive)	16/09/1990	56.46493	-5.35452	Hydrozoa has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Pebble dominated plain with some cobbles. Tide swept area of hydroids and foliose red algae. Scattered macrofauna included Echinodermata and Decapoda.	IR.MIR.KT.XKTX	TS
144	006.066.001	W Branra Rock, Lynn of Lismore (Lower Loch Linnhe)	18/06/1989	56.53387	-5.44406	Steep bedrock slope with gullies and fissure sediment on rock. Zone dominated by *Laminaria hyperborea* with dense understorey of red algae.	IR.MIR.KR.LhypTX.Ft	TS
145	005.006.003	E of Loch Leven Hotel (Loch Leven)	24/04/1990	56.69046	-5.17268	Fairly dense individuals of *Modiolus* with abundant cover of *Pomatoceros* and *Ascidiella scabra* common, but otherwise rather impoverished. Stoney gravel between cobbles with many *Mya* and a few *Cerianthus*. Habitat looks a lot more current swept than might be expected from the situation.	SS.SMx.CMx.ClloModHo (probably should be SS.SBR.SMus.ModT)	HM

Table 10.3 Records of PMF species from Marine Recorder, with abundance and location data. The ID is the number used in the text and figures of this report. The MR code is the Marine Recorder sample code, with the first number string identifying the survey (see the last three digits of the survey code in Table 10.1), the second string the site, and the third the habitat

ID	MR code	Site name	Date	Latitude	Longitude	Species	SACFOR
200	006.049.001	Bernera Bay, Lismore (Lower Loch Linnhe)	28/06/1989	56.49072	-5.57785	*Funiculina quadrangularis*	O
201	006.063.001	S of Achnacroish, Lismore (Lower Loch Linnhe)	18/06/1989	56.50908	-5.49194	*Funiculina quadrangularis*	R
202	006.045.001	Port an Dreadhain, Lismore (Lower Loch Linnhe)	28/06/1989	56.50985	-5.53445	*Funiculina quadrangularis*	C
203	006.036.002	W of Beinn Sgluich (Lower Loch Linnhe)	20/06/1989	56.61149	-5.35032	*Funiculina quadrangularis*	O
204	006.017.001	W of Achadh an Todhair Hill (Upper Loch Linnhe)	22/06/1989	56.79818	-5.15951	*Funiculina quadrangularis*	F
205	006.027.001	NE Cuil Bay (Lower Loch Linnhe)	20/06/1989	56.64321	-5.30120	*Funiculina quadrangularis*	F
206	006.034.002	SW of Camasnacroise, Loch a'Choire (Lower Loch Linnhe)	14/06/1988	56.61239	-5.49773	*Funiculina quadrangularis*	O
207	006.023.001	Cuil-Cheanna Spit (Lower Loch Linnhe)	20/06/1989	56.68898	-5.25277	*Funiculina quadrangularis*	F
208	006.044.003	E of Dubh Sgeir, Lismore (Lower Loch Linnhe)	28/06/1989	56.54699	-5.48323	*Funiculina quadrangularis*	F
209	006.038.003	Pinnacle W of Shuna Island (Lower Loch Linnhe)	23/06/1989	56.59154	-5.41368	*Funiculina quadrangularis*	F
210	MRMLN0120000023E.01	Eilean Balnagowan	01/08/1980	56.63473	-5.33928	*Funiculina quadrangularis*	P
211	032.035.003	Rubha Bharr (Loch Etive)	20/09/1990	56.50258	-5.13258	*Pachycerianthus multiplicatus*	R
212	032.029.002	Off Gleann Rudha Alltan. (Loch Etive)	18/09/1990	56.45614	-5.17597	*Pachycerianthus multiplicatus*	O
213	032.038.005	N Ru-inbhir ghuithasan (Loch Etive)	20/09/1990	56.53324	-5.09282	*Pachycerianthus multiplicatus*	R
214	006.035.001	S of Kingairloch, Loch a'Choire (Lower Loch Linnhe)	14/06/1989	56.61331	-5.51160	*Pachycerianthus multiplicatus*	R
215	006.045.001	Port an Dreadhain, Lismore (Lower Loch Linnhe)	28/06/1989	56.50985	-5.53445	*Pachycerianthus multiplicatus*	R
216	006.017.001	W of Achadh an Todhair Hill (Upper Loch Linnhe)	22/06/1989	56.79818	-5.15951	*Pachycerianthus multiplicatus*	F
217	006.003.001	N of Duisky (Loch Eil)	22/06/1989	56.84646	-5.25285	*Pachycerianthus multiplicatus*	O
218	006.050.004	W B…gh Clach an Dobhrain, Lismore (Lower Loch Linnhe)	28/06/1989	56.47610	-5.57752	*Swiftia pallida*	F
219	006.050.005	W B…gh Clach an Dobhrain, Lismore (Lower Loch Linnhe)	28/06/1989	56.47610	-5.57752	*Swiftia pallida*	R
220	MRMLN00100000C8D.01	Off Loch Don	01/01/1972	56.41653	-5.64938	*Palinurus elephas*	P
221	MRMLN00100000C8E.01	Duart Castle	01/01/1972	56.44366	-5.64386	*Palinurus elephas*	P
222	MRMLN00100000C8F.01	Duart Point	01/01/1972	56.45697	-5.65001	*Palinurus elephas*	P

Table 10.3 continued

ID	MR code	Site name	Date	Latitude	Longitude	Species	SACFOR
223	MRMLN00100000C90.01	Rubha Fiart	01/01/1972	56.46103	-5.60331	*Palinurus elephas*	P
224	MRMLN00100000C91.01	Inninmore Bay	01/01/1972	56.49965	-5.69638	*Palinurus elephas*	P
225	006.050.004	W B…gh Clach an Dobhrain, Lismore (Lower Loch Linnhe)	28/06/1989	56.47610	-5.57752	*Leptometra celtica*	O
226	006.044.002	E of Dubh Sgeir, Lismore (Lower Loch Linnhe)	28/06/1989	56.54699	-5.48323	*Leptometra celtica*	R
227	006.048.004	Rubha an Ridire, Lynn of Morven (Lower Loch Linnhe)	28/06/1989	56.49650	-5.68277	*Leptometra celtica*	R
228	006.030.003	Skerry N of Sgeirean nan Torran (Lower Loch Linnhe)	23/06/1989	56.66148	-5.36948	*Leptometra celtica*	R
229	006.047.003	SW of Camas Gorm, Lynn of Morvern (Lower Loch Linnhe)	28/06/1989	56.51516	-5.62780	*Leptometra celtica*	O
230	006.050.005	W B…gh Clach an Dobhrain, Lismore (Lower Loch Linnhe)	28/06/1989	56.47484	-5.57611	*Leptometra celtica*	C
231	MRMCS00700000036.02	Thesis - Stern of the wreck	21/08/2004	56.49876	-5.69137	*Leptometra celtica*	R
232	MRMCS007000003E3.01	Breda wreck	01/11/2008	56.47583	-5.41833	*Leptometra celtica*	R
233	MRMCS0070000043C.02	East of Rubha an Ridire	07/06/2008	56.49929	-5.68017	*Leptometra celtica*	F
234	MRMCS0070000043C.03	East of Rubha an Ridire	07/06/2008	56.49929	-5.68017	*Leptometra celtica*	C
235	MRMCS0070000043D.03	Rubha an Ridire	07/06/2008	56.49947	-5.68016	*Leptometra celtica*	F
236	MRMCS00700000441.01	Eilean Narrows, Rubha an Ridire	07/06/2008	56.50167	-5.67647	*Leptometra celtica*	O
237	MRMCS00700000443.01	Eilean Narrows, rubha an Ridire	07/06/2008	56.50167	-5.69313	*Leptometra celtica*	R
238	MRMCS00700000447.03	Rhuba an Ridire	08/06/2008	56.49714	-5.68834	*Leptometra celtica*	R
239	MRMCS00700000449.02	Rhuba an Ridire bPoint	08/06/2008	56.49714	-5.68834	*Leptometra celtica*	P
240	MRMCS00700000449.03	Rhuba an Ridire bPoint	08/06/2008	56.49714	-5.68834	*Leptometra celtica*	P
241	006.002.001	NW of South Garvan (Loch Eil)	22/06/1989	56.85152	-5.30707	*Glossus humanus*	R
242	006.018.003	N of Callas na Dallaig (Upper Loch Linnhe)	22/06/1989	56.77985	-5.16960	*Glossus humanus*	R
243	032.035.002	Rubha Bharr (Loch Etive)	20/09/1990	56.50258	-5.13258	*Arctica islandica*	F
244	032.031.002	Rocks W of Ardnellan Point (Loch Etive)	18/09/1990	56.48056	-5.15026	*Arctica islandica*	R
245	032.038.004	N Ru-inbhir ghuithasan (Loch Etive)	20/09/1990	56.53324	-5.09282	*Arctica islandica*	F
246	032.024.001	Central Bonawe Narrows (Loch Etive)	16/09/1990	56.44652	-5.22616	*Arctica islandica*	P
247	032.035.003	Rubha Bharr (Loch Etive)	20/09/1990	56.50258	-5.13258	*Arctica islandica*	O
248	624.003.002	S side of Pladda Island	14/05/1995	56.47561	-5.51126	*Arctica islandica*	R
249	624.003.006	S side of Pladda Island	14/05/1995	56.47561	-5.51126	*Arctica islandica*	R
250	624.003.003	S side of Pladda Island	14/05/1995	56.47561	-5.51126	*Arctica islandica*	R
251	624.003.001	S side of Pladda Island	14/05/1995	56.47561	-5.51126	*Arctica islandica*	R

Table 10.3 continued

ID	MR code	Site name	Date	Latitude	Longitude	Species	SACFOR
252	624.003.007	S side of Pladda Island	14/05/1995	56.47561	-5.51126	*Arctica islandica*	R
253	084.010.001	Clovulin Flat, Loch Linnhe (Loch Linnhe)	28/07/1978	56.71482	-5.25124	*Arctica islandica*	P
254	296.003.007	E of Airds Bay (Loch Etive)	04/03/1969	56.44059	-5.23620	*Arctica islandica*	
255	296.003.008	E of Airds Bay (Loch Etive)	04/03/1969	56.44059	-5.23620	*Arctica islandica*	
256	006.032.003	Caimas na Croise (Lower Loch Linnhe)	14/06/1989	56.60982	-5.48113	*Arctica islandica*	O
257	006.018.002	N of Callas na Dallaig (Upper Loch Linnhe)	22/06/1989	56.77985	-5.16960	*Arctica islandica*	A
258	006.002.001	NW of South Garvan (Loch Eil)	22/06/1989	56.85152	-5.30707	*Arctica islandica*	R
259	005.001.002	Off Onich Pier (Loch Leven)	23/04/1990	56.70176	-5.21776	*Arctica islandica*	F
260	005.032.006	S shore opposite Allt Nathrach Bay (Loch Leven)	24/04/1990	56.71081	-4.99953	*Arctica islandica*	R
261	005.013.002	Rock to E of Eilean Choinneich (Loch Leven)	22/04/1990	56.68292	-5.14592	*Arctica islandica*	O
262	006.046.002	Camas Eigneig, Lynn of Morvern (Lower Loch Linnhe)	28/06/1989	56.53377	-5.58261	*Arctica islandica*	R
263	006.039.001	W of Knap Point, Sound of Shuna (Lower Loch Linnhe)	20/06/1989	56.58155	-5.38785	*Arctica islandica*	F
264	006.029.003	W Eilean Balnagowan (Lower Loch Linnhe)	20/06/1989	56.64151	-5.34119	*Arctica islandica*	A
265	005.021.002	S of Callert House (Loch Leven)	22/04/1990	56.69263	-5.11733	*Arctica islandica*	F
266	006.019.002	Victorious Rock (Upper Loch Linnhe)	21/06/1989	56.76513	-5.20724	*Arctica islandica*	A
267	006.014.001	E of McLean Rock, Fort William (Upper Loch Linnhe)	21/06/1989	56.83063	-5.11486	*Arctica islandica*	O
268	006.007.002	Dorathy Stone (Loch Eil)	22/06/1989	56.84743	-5.18170	*Arctica islandica*	A
269	006.031.001	S of Sgeir nan Gillean (Lower Loch Linnhe)	23/06/1989	56.63398	-5.41114	*Arctica islandica*	R
270	006.013.001	S of New Rock, Fort William (Upper Loch Linnhe)	21/06/1989	56.82899	-5.12112	*Arctica islandica*	C
271	006.036.001	W of Beinn Sgluich (Lower Loch Linnhe)	20/06/1989	56.61149	-5.35032	*Arctica islandica*	C
272	006.036.002	W of Beinn Sgluich (Lower Loch Linnhe)	20/06/1989	56.61149	-5.35032	*Arctica islandica*	O
273	006.028.004	E side Eilean Balnagowan (Lower Loch Linnhe)	20/06/1989	56.64156	-5.34282	*Arctica islandica*	R
274	006.001.003	Kinlocheil (Loch Eil)	22/06/1989	56.85646	-5.31367	*Arctica islandica*	A
275	006.017.001	W of Achadh an Todhair Hill (Upper Loch Linnhe)	22/06/1989	56.79818	-5.15951	*Arctica islandica*	C
276	006.028.002	E side Eilean Balnagowan (Lower Loch Linnhe)	20/06/1989	56.64156	-5.34282	*Arctica islandica*	R
277	005.021.003	S of Callert House (Loch Leven)	22/04/1990	56.69263	-5.11733	*Arctica islandica*	R
278	006.022.001	SE of Sallachan Point (Lower Loch Linnhe)	23/06/1989	56.69569	-5.27116	*Arctica islandica*	A
279	006.003.001	N of Duisky (Loch Eil)	22/06/1989	56.84646	-5.25285	*Arctica islandica*	F
280	006.018.003	N of Callas na Dallaig (Upper Loch Linnhe)	22/06/1989	56.77985	-5.16960	*Arctica islandica*	R
281	006.037.008	Creag an Fhithich, Shuna Island (Lower Loch Linnhe)	20/06/1989	56.59066	-5.40464	*Arctica islandica*	O

Table 10.3 continued

ID	MR code	Site name	Date	Latitude	Longitude	Species	SACFOR
282	006.001.001	Kinlocheil (Loch Eil)	22/06/1989	56.85646	-5.31367	*Arctica islandica*	F
283	005.001.003	Off Onich Pier (Loch Leven)	23/04/1990	56.70176	-5.21776	*Arctica islandica*	R
284	005.001.001	Off Onich Pier (Loch Leven)	23/04/1990	56.70176	-5.21776	*Arctica islandica*	O
285	MRMCS00700000395.01	The slates, Ballahulish, 2	27/07/2008	56.67775	-5.14503	*Arctica islandica*	C
286	MRMCS007000003B3.01	Western shore, S of fish farm, upper Loch Linnhe	28/04/2008	56.79194	-5.17144	*Arctica islandica*	P
287	MRMCS0070000044A.03	Rhuba an Ridire	08/06/2008	56.49714	-5.68834	*Arctica islandica*	F
288	032.041.002	Ru Doire Sgriodan (Loch Etive)	20/09/1990	56.54983	-5.07627	*Anguilla anguilla*	F
289	005.026.006	Camas na h-Eirghe (Loch Leven)	25/04/1990	56.70278	-5.07078	*Anguilla anguilla*	R
290	450.017.002	Leth-Fhonn, Loch Don (Mull)	13/08/1995	56.42495	-5.69886	*Salmo trutta*	R
291	032.018.001	SSE of Airds Point. (Loch Etive)	21/09/1990	56.44985	-5.25696	*Gadus morhua*	R
292	032.010.001	Channel SE of Abbot's Isle. (Loch Etive)	21/09/1990	56.45488	-5.32119	*Gadus morhua*	R
293	005.032.005	S shore opposite Allt Nathrach Bay (Loch Leven)	24/04/1990	56.71081	-4.99953	*Gadus morhua*	R
294	MRMCS007000003A1.01	Maiden Isle, south	07/09/2008	56.42916	-5.49158	*Molva molva*	R
295	032.035.002	Rubha Bharr (Loch Etive)	20/09/1990	56.50258	-5.13258	*Pomatoschistus minutus*	O
296	032.035.001	Rubha Bharr (Loch Etive)	20/09/1990	56.50258	-5.13258	*Pomatoschistus minutus*	R
297	032.008.001	NW of Abbot's Isle. (Loch Etive)	17/09/1990	56.45817	-5.32944	*Pomatoschistus minutus*	R
298	006.061.001	Sgeir Sgoraig, Lismore (Lower Loch Linnhe)	18/06/1989	56.47264	-5.55661	*Pomatoschistus minutus*	R
299	005.001.002	Off Onich Pier (Loch Leven)	23/04/1990	56.70176	-5.21776	*Pomatoschistus minutus*	R
300	006.039.001	W of Knap Point, Sound of Shuna (Lower Loch Linnhe)	20/06/1989	56.58155	-5.38785	*Pomatoschistus minutus*	R
301	006.059.002	SW Rubha Fion-aird, Lynn of Lorn (Lower Loch Linnhe)	17/06/1989	56.47900	-5.47780	*Pomatoschistus minutus*	R
302	006.067.001	Narrows N of Appin Rocks, Lynn of Lorn (Lower Loch Linnhe)	18/06/1989	56.55100	-5.42491	*Pomatoschistus minutus*	O
303	006.058.001	W Camas Nathais, Lynn of Lorn (Lower Loch Linnhe)	17/06/1989	56.48239	-5.46244	*Pomatoschistus minutus*	O
304	005.009.002	SW of Rubha Charnuis (Loch Leven)	26/04/1990	56.68772	-5.16740	*Pomatoschistus minutus*	R
305	006.036.001	W of Beinn Sgluich (Lower Loch Linnhe)	20/06/1989	56.61149	-5.35032	*Pomatoschistus minutus*	F
306	006.018.003	N of Callas na Dallaig (Upper Loch Linnhe)	22/06/1989	56.77985	-5.16960	*Pomatoschistus minutus*	O
307	MRMCS00700000448.02	Rhuba an Ridire bPoint	08/06/2008	56.49667	-5.68333	*Pomatoschistus minutus*	O
308	MRMCS00900000022.01	Rubha nam Moine Bay, Loch Linnhe	26/08/2004	56.66884	-5.27373	*Pomatoschistus minutus*	R
309	MRMCS0070000054E.01	Bonawe North Ferry Slip	09/05/2009	56.44701	-5.22950	*Pomatoschistus minutus*	R

Table 10.4 Records of species from the SNH PMF database (v9), not included in Marine Recorder. The ID is the number used in the text and figures of this report

ID	Species	SAC-FOR	Date	Latitude	Longitude	Survey	Determiner
400	*Funiculina quadrangularis*	O	18/09/1996	56.61100	-5.48600	Sea pen and fireworks anemone records from FRS surveys	FRS, FRV Clupea
401	*Funiculina quadrangularis*	P	18/09/1996	56.52400	-5.58200	Fisheries Research Services Marine Laboratory Seapen distribution	FRS surveyors
402	*Funiculina quadrangularis*	P	18/09/1996	56.51000	-5.57200	Fisheries Research Services Marine Laboratory Seapen distribution	FRS surveyors
403	*Pachycerianthus multiplicatus*	F	18/09/1996	56.58100	-5.46700	Sea pen and fireworks anemone records from FRS surveys	FRS, FRV Clupea
404	*Pachycerianthus multiplicatus*	F	18/09/1996	56.54000	-5.51300	Sea pen and fireworks anemone records from FRS surveys	FRS, FRV Clupea

Table 10.5 Records of PMFs neither in Marine Recorder nor the SNH PMF database. The ID is the number used in the text and figures of this report

ID	Survey	Site code	Site name	Date	PMF	Latitude	Longitude	Recorder	Comments
500	Seasearch	SC10/044	North of Tom na Faire 3, SW Lismore, Loch Linnhe, Argyll	22-Aug-10	*Swiftia pallida*	56.47145	-5.58383	Barbara Bellerby	Silty. *Swiftia pallida*
501	Seasearch	SC10/045	North of Tom Na Faire 5, SW Lismore, Loch Linnhe, west Scotland	22-Aug-10	*Leptometra celtica*	56.47280	-5.58167	Fraser Kirkpatrick and Kim Pratt	Curled octopus. *Leptometra celtica*
502	Seasearch	SC10/047	W Bernara 4, W Lismore, Loch Linnhe, west Scotland	22-Aug-10	*Swiftia pallida*	56.49438	-5.58767	Fraser Kirkpatrick and Kim Pratt	*Swiftia pallida*
503	Seasearch	SC10/048	W Bernara 5, W Lismore, Loch Linnhe, W Scotland	22-Aug-10	*Swiftia pallida*	56.49525	-5.58700	Joanne Beaton	At about 15m to 30m there were a lot of small fish about 15cm long swimming in quite large shoals. *Swiftia* also recorded
504	Seasearch	SC10/049	W Bernara 3, W Lismore, Loch Linnhe, west Scotland	22-Aug-10	*Leptometra celtica*	56.49375	-5.58867	Ruth Sharratt	Kelp covered in *Dendronotus frondosus.* *Leptometra* present
505	Seasearch	SC10/053	East Eilean nan Caorach 1, Appin narrows, north Lismore, Loch Linnhe, west Scotland	23-Aug-10	*Limaria bed*	56.56402	-5.41317	Calum Duncan, Roy Restell	Flame shell bed
506	Seasearch	SC10/064	North of Tom na Faire 1, SW Lismore, Loch Linnhe, west Scotland	22-Aug-10	*Leptometra celtica*	56.47058	-5.58550	Ruth Sharratt	Celtic featherstars
507	Seasearch	SC10/065	North of Tom na Faire 2, SW Lismore, Loch Linnhe, west Scotland	22-Aug-10	*Leptometra celtica*	56.47107	-5.59100	Mary Restell	*Leptometra celtica*
508	Seasearch	SC10/066	North of Tom na Faire 4, SW Lismore, Loch Linnhe, west Scotland	22-Aug-10	*Swiftia pallida*	56.47215	-5.58250	Michael Bramham	Profuse sponges and northern sea fans.
509	Seasearch	SC10/067	North of Tom na Faire 6, SW Lismore, Loch Linnhe, west Scotland	22-Aug-10	*Leptometra celtica*	56.47355	-5.58033	Calum Duncan	*Leptometra celtica, Funiculina quadrangularis* (a single specimen on wall!) and *Swiftia pallida*

Table 10.5 continued

ID	Survey	Site code	Site name	Date	PMF	Latitude	Longitude	Recorder	Comments
510	Seasearch	SC10/067	North of Tom na Faire 6, SW Lismore, Loch Linnhe, west Scotland	22-Aug-10	*Swiftia pallida*	56.47355	-5.58033	Calum Duncan	*Leptometra celtica, Funiculina quadrangularis* (a single specimen on wall!) and *Swiftia pallida*
511	Seasearch	SC10/067	North of Tom na Faire 6, SW Lismore, Loch Linnhe, west Scotland	22-Aug-10	*Funiculina quadrangularis*	56.47355	-5.58033	Calum Duncan	*Leptometra celtica, Funiculina quadrangularis* (a single specimen on wall!) and *Swiftia pallida*
512	Seasearch	SC10/068	W Bernara 1, SW Lismore, Loch Linnhe, west Scotland	22-Aug-10	*Leptometra celtica*	56.49282	-5.59100	Mary Restell	*Leptometra celtica*
513	Seasearch	SC10/069	W Bernara 6, SW Lismore, Loch Linnhe, west Scotland	22-Aug-10	*Swiftia pallida*	56.49578	-5.58567	Calum Duncan	*Swiftia pallida* and rich sponge/hydroid communities
514	O'Malley, 2004	PA	Port Appin	23-Nov-03	*Limaria* bed	56.55964	-5.41884	Colin Moore	Seabed with 30% cover of *Limaria* nest material. Depth 8.4 m
515	Forrest, 2005	1	Port Appin	28-Oct-04	*Limaria* bed	56.55677	-5.42117	Colin Moore	Seabed with extensive cover of *Limaria* nest material. Depth 9.9 m
516	Forrest, 2006	2	Port Appin	23-Jan-05	*Limaria* bed	56.56093	-5.41592	Dan Harries	Seabed with extensive cover of *Limaria* nest material. Depth 8.4 m
517	Trigg et al., 2011	PA1	Port Appin	17-Jun-06	*Limaria* bed	56.56323	-5.41365	Colin Trigg	Seabed with 100% cover of *Limaria* nest material. Depth 9.1 m.
518	Trigg & Moore, 2009	PA2	Port Appin	14-Sep-06	*Limaria* bed	56.56408	-5.41362	Colin Trigg	Seabed with almost 100% cover of *Limaria* nest material. Depth 8.0 m
519	Edwards & Moore, 2009	LI	Port na Moralachd, NW Lismore	28-Feb-04 - 23-Jan-05	*Funiculina quadrangularis*	56.54933	-5.47585	Dan Edwards	Common at 18.9-24.3 m depth
520	Ulster Museum	35	Liath Sgeir, SW Lismore	02-Jul-08	*Alcyonium hibernicum*	56.47417	-5.60400	Ulster Museum	Present at 26 m
521	Comely, 1978	PA	Port Appin	1975 - 1976	*Modiolus* bed	56.55738	-5.41384	C. A. Comely	Small bed c. 2500 m2 in extent, 1.5 m below ELWS
522	Comely, 1978	FL	Firth of Lorne	Jul-1976	*Modiolus* bed	56.40048	-5.64137	C. A. Comely	Deep bed at 180-200 m

Table 10.5 continued

T1	Moore, unpublished	T1	Port Appin	22-Apr-2001	*Limaria* bed	56.55676 (lat start) 56.56437 (lat end)	-5.42114 (long start) -5.41326 (long end)	Graham Saunders	*Limaria hians* nests forming thick and topographically complex crust over most of diver transect (largely 100% cover) but with some large bare patches
T2	Moore, unpublished	T2	Port Appin	22-Apr-2001	*Limaria* bed	56.55290 (lat start) 56.55472 (lat end)	-5.41889 (long start) -5.41927 (long end)	Colin Moore	*Limaria hians* bed appearing halfway along diver transect with cover of 65 - 100%
T3	Moore, unpublished	T3	Port Appin	22-Apr-2001	*Limaria* bed	56.55750 lat start) 56.55583 (lat end)	-5.42124 (long start) -5.42289 (long end)	Dan Harries	*Limaria hians* bed with nest cover increasing from 50% to 80% along diver transect

Appendix 11 Overview of GIS project

The project was compiled using ArcGIS Map 9.3 and UTM projection. Coordinates were recorded in WGS84 and retained as WGS84 for all shape files.

The files are stored on DVD in the following structure:

Directory: **Linne_2011_GIS** - All GIS files

Table 1 Project, shape and symbology files

File	Content
Linnhe_2011.mxd	ArcGIS 9.3 map file
Additional_PMF_records.shp	historical PMF records neither in Marine Recorder nor the SNH PMF database
Additional_PMF_records.lyr	symbology file for corresponding shape file
coast25.shp	MHWS Scottish coastline (for context, supplied by SNH)
Dive_data.shp	records from diver observations at sites during surveys of Limaria and Modiolus beds
Dive_data.lyr	symbology file for corresponding shape file
Limaria_dive_transects_2001.shp	observations along dive transects carried out in 2001 by Heriot-Watt University through the *Limaria* bed at Port Appin
Limaria_dive_transects_2001.lyr	symbology file for corresponding shape file
Mackaii_cover.shp	*Ascophyllum nodosum* ecad *mackaii* % cover and thickness at stations within beds
MNCR_data.shp	details of MNCR phase 2 surveys worked
MNCR_data.lyr	symbology file for corresponding shape file
MR_habitat_records.shp	historical records of PMF habitats for the survey area derived from Marine Recorder
MR_habitat_records.lyr	symbology file for corresponding shape file
MR_species_records.shp	historical records of PMF species for the survey area derived from Marine Recorder
MR_species_records.lyr	symbology file for corresponding shape file
Mytilus_cover.shp	*Mytilus edulis* density and SACFOR abundance at stations within beds
Photolog.shp	digital still image log containing MEDIN standard data
PMF_extents.shp	Distribution and extent of *Modiolus*, *Limaria*, *Mytilus* and *Ascophyllum nodosum* ecad *mackaii*
PMF_extents.lyr	symbology file for corresponding shape file
Video&MNCR_tracks.shp	lines linking the start and end points of dropdown and diver video runs and the start and endpoints of MNCR phase 2 surveys.
Video_data.shp	records of dropdown and diver video surveys of areas of *Limaria* and *Modiolus* beds in Lochs Linnhe, Leven and Eil
Video_data.lyr	symbology file for corresponding shape file

Table 2 List of affiliated index, projection and metadata files. Note that the file, Linnhe_2011_xslttransformation.xml serves as the metadata file for the survey as a whole

Additional_PMF_records.dbf	MR_habitat_records.sbx
Additional_PMF_records.prj	MR_habitat_records.shp.xml
Additional_PMF_records.sbn	MR_habitat_records.shx
Additional_PMF_records.sbx	MR_habitat_records_ xslttransformation.xml
Additional_PMF_records.shp.xml	MR_species_records.dbf
Additional_PMF_records.shx	MR_species_records.prj
Additional_PMF_records_xslttransformation.xml	MR_species_records.sbn
coast25.dbf	MR_species_records.sbx
coast25.prj	MR_species_records.shp.xml
coast25.sbn	MR_species_records.shx
coast25.sbx	MR_species_records_ xslttransformation.xml
coast25.shp.xml	Mytilus_cover.dbf
coast25.shx	Mytilus_cover.prj
Dive_data.dbf	Mytilus_cover.sbn
Dive_data.prj	Mytilus_cover.sbx
Dive_data.sbn	Mytilus_cover.shp.xml
Dive_data.sbx	Mytilus_cover.shx
Dive_data.shp.xml	Mytilus_cover_ xslttransformation.xml
Dive_data.shx	Photolog.dbf
Dive_data_xslttransformation.xml	Photolog.prj
Limaria_dive_transects_2001.dbf	Photolog.sbn
Limaria_dive_transects_2001.prj	Photolog.sbx
Limaria_dive_transects_2001.sbn	Photolog.shp.xml
Limaria_dive_transects_2001.sbx	Photolog.shx
Limaria_dive_transects_2001.shp.xml	Photolog_xslttransformation.xml
Limaria_dive_transects_2001.shx	PMF_extents.dbf
Limaria_dive_transects_2001_.xml	PMF_extents.prj
Linnhe_2011.mxd.xml	PMF_extents.sbn
Linnhe_2011_xslttransformation.xml	PMF_extents.sbx
Mackaii_cover.dbf	PMF_extents.shp.xml
Mackaii_cover.prj	PMF_extents.shx
Mackaii_cover.sbn	PMF_extents_ xslttransformation.xml
Mackaii_cover.sbx	Video&MNCR_tracks.dbf
Mackaii_cover.shp.xml	Video&MNCR_tracks.prj
Mackaii_cover.shx	Video&MNCR_tracks.sbn
Mackaii_cover_xslttransforma.xml	Video&MNCR_tracks.sbx
MNCR_data.dbf	Video&MNCR_tracks.shp.xml
MNCR_data.prj	Video&MNCR_tracks.shx
MNCR_data.sbn	Video&MNCR_tracks_ xslttransformation.xml
MNCR_data.sbx	Video_data.dbf
MNCR_data.shp.xml	Video_data.prj
MNCR_data.shx	Video_data.sbn
MNCR_data_xslttransformation.xml	Video_data.sbx
MR_habitat_records.dbf	Video_data.shp.xml
MR_habitat_records.prj	Video_data.shx
MR_habitat_records.sbn	Video_data_ xslttransformation.xml

Table 3 Fields for shape files with data attributes. Field type shows the code for data type (S=string, N=numeric, D=date), field length and number of decimal places

File name and field	Content	Type
Additional_PMF_records.shp		
CODE	site code used in body of current report	N7
SURVEY	reference for survey	S23
SITE_ID	site code used in original data source	S10
DATE_	date	S22
PMF	PMF	S28
SITE	site name	S79
LAT	WGS84 latitude	N10.5
LONG	WGS84 longitude	N9.5
RECORDER	recorder personnel	S31
COMMENTS	comments	S112
Dive_data.shp		
SITE	report site code	S6
ORIG_CODE	field site code	S10
LATITUDE	WGS84 latitude	N8.5
LONGITUDE	WGS84 longitude	N10.5
SURV__AREA	regional location	S19
SURVEYOR	surveyor	S19
DATE_	date	D8
TIME	time	S5
DEPTH_BSL	depth below sea level (m)	N11.1
TIDAL_RISE	tidal rise (m)	N9.1
DEPTH_CD	depth below chart datum (m)	N10.1
SUBSTRATE	substrate description	S102
NEST_COVER	estimate of *Limaria* nest cover (%)	N19
NEST_THICK	*Limaria* nest thickness (cm)	N19
LIM_SEEN	live *Limaria* individuals seen (Y/N)	S18
BRIT_COVER	estimate of brittlestar cover (%)	N18
MODSACFORN	*Modiolus* SACFOR abundance	S19
NOTES	notes	S254
TARGET_PMF	target PMF	S11
PMF	PMF observed	S5
BIOTOPE	biotope observed	S24
Limaria_dive_transects_2001.shp		
PMF	PMF	S5
DATE_	date	D8
TIME_IN	time diver in	N7
TIME_OUT	time diver out	N8
DEPTH_CD	maximum depth below chart datum (m)	N9.1
LATIN	WGS84 latitude in	N8.5
LONGIN	WGS84 longitude in	N8.5
LATOUT	WGS84 latitude out	N8.5
LONGOUT	WGS84 longitude out	N10.5
RECORDER	diver	S21
NOTES	notes	S42
Transect	transect code	S10

Table 3 continued

Mackaii_cover.shp		
STATION	station code	S7
WAYPOINT	positional label used in the field	N9
LATITUDE	WGS84 latitude	N8.5
LONGITUDE	WGS84 longitude	N9.5
_COVER	estimate of *mackaii* cover (%)	N7
THICKNESS	*mackaii* thickness (cm)	N9.1
SUBSTRATE	substrate description	S60
COMMENTS	comments	S72
PHOTO	photo identifier	S16
MNCR_data.shp		
SITE	site name	S9
LOCATION	regional location	S32
PMF	PMF	S13
BIOTOPE1	biotope	S21
LAT_START	WGS84 latitude at transect start	N9.5
LONG_START	WGS84 longitude at transect start	N9.5
LAT_END	WGS84 latitude at transect end	N9.5
LONG_END	WGS84 longitude at transect end	N9.5
LAT_MID	WGS84 latitude at transect midpoint	N9.5
LONG_MID	WGS84 longitude at transect midpoint	N9.5
DATE_	date	D8
BEARING	transect bearing (degrees true)	S9
DEPTHSTART	depth below chart datum at start (m)	S16
DEPTHEND	depth below chart datum at end (m)	S13
SURVEYORS	surveying personnel	S9
MR_habitat_records.shp		
CODE	record code used in 2011 report	N5
OBJECTID	record ID number	N8
SAMPLE_REF	sample reference	S13
SURVEY_KEY	survey key	S20
EVENT_KEY	event key	S20
EVENTNAME	event name	S57
EVENTREF	event reference	S9
EVENTDATE	event date	D8
DERIVDFROM	source of position	S11
COORDSYST	original coordinate system used	S18
SAMPLE_KEY	sample key	S20
USRSAMPREF	user sample reference	S12
DATE_	sample date	D8
SURVEYORS	surveying personnel	S60
LAT	OSGB latitude	N8.5
LONG	OSGB longitude	N8.5
LATWGS84	WGS84 latitude (modified in case of error)	N10.5
LONGWGS84	WGS84 longitude (modified in case of error)	N10.5
EASTING	BNG easting (modified in case of error)	N8
NORTHING	BNG northing (modified in case of error)	N8
HABITAT	habitat type	S86
DESCRIP1	habitat and community description (part)	S254

Table 3 continued

MR_habitat_records.shp continued		
DESCRIP2	habitat and community description (continued)	S254
DESCRIP3	habitat and community description (continued)	S254
BIOTOPE	latest biotope ascription	S25
BIOTOPEOLD	first biotope ascription	S26
DETERMDATE	determination date	D8
ASSESSEDBY	assessor	S13
LWHEIGHTSL	height of lower margin above sea level (m)	S12
UPHEIGHTSL	height of upper margin above sea level (m)	S12
LWHEIGHTCD	height of lower margin above chart datum (m)	S12
UPHEIGHTCD	height of upper margin above chart datum (m)	S12
MR_species_records.shp		
CODE	record code used in 2011 report	N6
SAMPLE_REF	sample reference	S22
LWHEIGHTCD	height of lower margin above chart datum (m)	N13.1
UPHEIGHTCD	height of upper margin above chart datum (m)	N13.1
SPECIES	species	S26
SACFORN	SACFOR abunadance	S10
PA	presence (P)	S3
LATWGS84	WGS84 latitude (modified in case of error)	N10.5
LONGWGS84	WGS84 longitude (modified in case of error)	N11.5
EASTING	BNG easting (modified in case of error)	N8
NORTHING	BNG northing (modified in case of error)	N8
DATE_	date of record	D8
SURVEYORS	surveying personnel	S42
SAMPLE_KEY	sample key	S20
EVENT_KEY	event key	S19
HABITAT	habitat type	S81
DESCRIP1	habitat and community description (part)	S254
DESCRIP2	habitat and community description (continued)	S254
DESCRIP3	habitat and community description (continued)	S254
EVENTNAME	event name	S58
Mytilus_cover.shp		
BED	bed name	S4
STATION	sample station	S7
WAYPOINT	positional label used in the field	N9
LATITUDE	WGS84 Latitude	N8.5
LONGITUDE	WGS84 Longitude	N9.5
PERC_COVER	estimate of *Mytilus* cover (%)	N11
SACFOR	*Mytilus* SACFOR estimate (based on density)	S9
SUBSTRATE	substrate description	S68
COMMENTS	comments	S27
PHOTO	photo identifier	S15
Photolog.shp		
FILENAME	photo identifier	S26
DATE_	date of photo	D8
SITE	site name	S18
LATITUDE	WGS84 Latitude	N9.5
LONGITUDE	WGS84 Longitude	N9.5
DEPTH	depth below chart datum (m)	S9

Table 3 continued

Photolog.shp continued		
DESCRIP	description of subject matter	S254
PHOTOG	photographer	S19
WIDTH	pixel width	N5
HEIGHT	pixel height	N6
X_RES	horizontal resolution	N6
Y_RES	vertical resolution	N5
RES_UNITS	resolution units	S11
PMF_extents.shp		
Id	PMF type code	N6
Extent	bed extent (square metres)	N13.2
Bed	bed name	S254
PMF	PMF	S10
Video&MNCR_tracks.shp		
SITE	site code	S4
LAT_START	WGS84 latitude at start	N8.5
LONG_START	WGS84 longitude at start	N10.5
LAT_END	WGS84 latitude at end	N8.5
LONG_END	WGS84 longitude at end	N9.5
Video_data.shp		
SITE	site code	S4
SITE_ORIG	original field site code	S8
LOCATION	regional location	S13
VESSEL	vessel	S7
METHOD	dropdown or diver video	S9
LAT_START	WGS84 latitude at start	N8.5
LONG_START	WGS84 longitude at start	N10.5
LAT_END	WGS84 latitude at end	N8.5
LONG_END	WGS84 longitude at end	N9.5
LAT_MID	WGS84 latitude at midpoint	N8.5
LONG_MID	WGS84 longitude at midpoint	N9.5
DATE_	date	D8
TIME_START	time at start of run	S18
TIME_END	time at end of run	S18
DEPTH_STRT	depth below chart datum (m) at start of run	N9.1
DEPTH_END	depth below chart datum (m) at end of run	N9.1
MEDIA_CODE	media label (for miniDV tape or computer file)	S19
SUBSTRATE	substrate description	S107
BIOTA1	biota description (part)	S254
BIOTA2	biota description (continued)	S254
BIOTA3	biota description (continued)	S254
BIOTOPE	biotope	S26
ID_CERTAIN	biotope ID certain (Y/N)	S15
COMMENTS	comments on biotope ID	S112
PMF_TARGET	target PMF	S11
PMF	PMF recorded	S5
SURVEYORS	surveying personnel	S15

Appendix 12 Survey log

19/8/2011

Departed Port Appin at 07:30. Wind slight, increasing to force 6 in late afternoon. *Limaria* bed spot dives off west coast of Shuna island in morning, drop down video at Appin narrows. Spot dives for *Limaria* distribution at slack tide in afternoon. Moored at ~18:00.

20/8/2011

Departed Appin at 08:00. Strong southerly in morning, decreasing in afternoon. MNCR phase 2 survey on *Limaria* bed during morning. Spot dives for *Limaria* and *Modiolus* distribution in afternoon. Moored ~18:00. Got fuel for *Aphrodite*.

21/8/2011

Departed Appin at 08:00. Calm sea, light rain, clearing slightly in afternoon. MNCR phase 2 survey carried out on *Swiftia* and sponge community off Bernera Island. *Swiftia* found at ~23 m alongside axinellid and massive sponges. Concurrent work from *Aphrodite* carried out off Southern Morvern - 2 spot dives for *Limaria*. In afternoon *Aphrodite* carried out further 7 spot dives within Appin narrows for *Limaria* distribution. Additional extent of *Modiolus* bed also confirmed at southern end of narrows. *Serpula* and *Aphrodite* sailed to Balluchulish. Moored both vessels ~18:00.

22/8/2011

Boarded *Aphrodite* and *Serpula* ~08:45. Calm sea, light rain. In the morning drop-down video and dives were done to assess presence and extent of *Modiolus* beds. In afternoon MNCR phase 2 was carried out on *Modiolus* bed. *Serpula* and *Aphrodite* were then taken to Fort William. Moored in Fort William at ~21:30.

23/8/2011

Late slack water time resulted in start of 10:00 at Fort William yacht club. Wind was slight but increased over course of day. *Serpula* carried out drop down video sites all day, whilst team of divers on *Aphrodite* carried out a number of spot dives. *Modiolus* beds were recorded at several of the sites around Annat Narrows. Moored boats ~18:15.

24/8/2011

Arrived at moorings at 08:30. Carried out MNCR phase 2 survey of *Modiolus* bed in east Annat Narrows during morning. In afternoon carried out a series of spot dives to delimit *Modiolus* beds either side of Annat Narrows and also investigate possible presence of *Arctica*. Sailed for Appin in late afternoon. Wind picked up from south with heavy rain. Moored vessels at ~18:30.

25/8/2011

Arrived at moorings at 08:00. Carried out MNCR phase 2 survey of *Modiolus* bed in Appin narrows in morning. In afternoon a series of drift dives were done to assess the extent of the *Modiolus* bed and the *Limaria* bed at Appin. Moored boat at 16:30.

26/8/2011

Demobilisation.

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ISBN: 978-1-85397-847-0

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

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