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Marine communities of Kilkieran Bay, the Aran Islands and the Skerd Rocks and an assessment of their conservation importance

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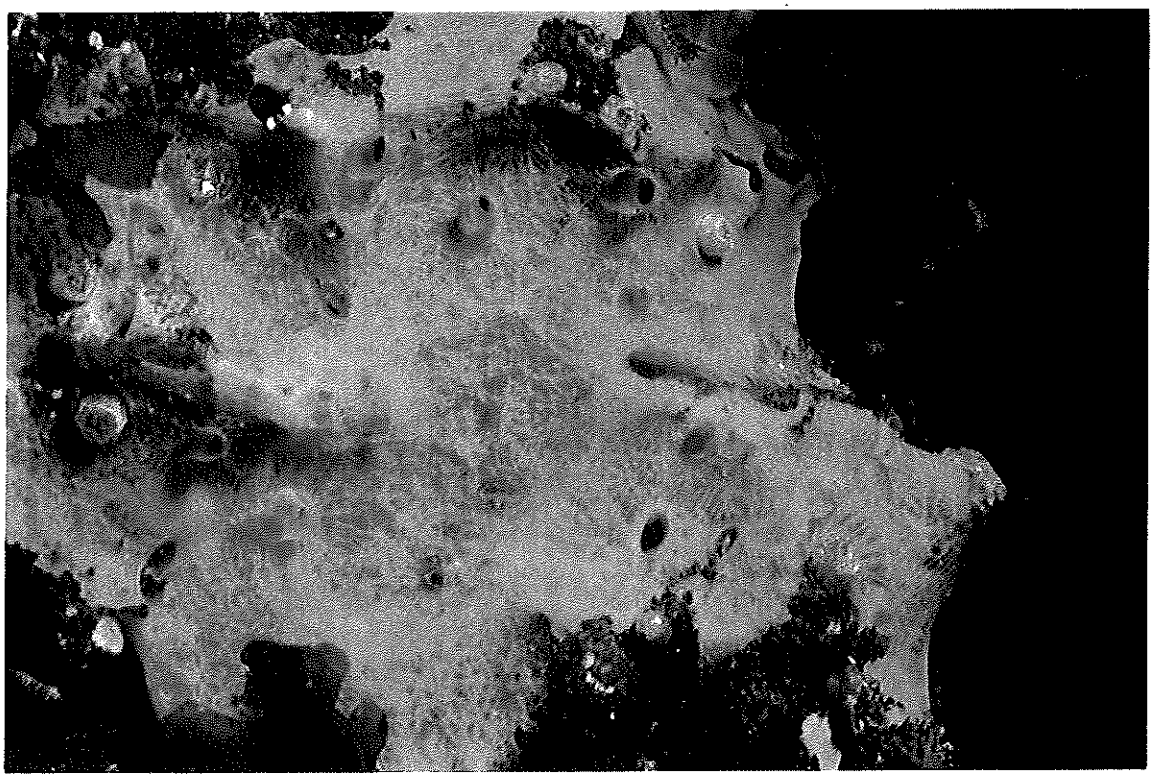

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Life

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CONTENTS

Cover Photograph: A large patch of the encrusting sponge *Hexadella racovitzai* on deep bedrock on the outside of the Aran Islands. This is a new record for the British Isles.

Reference Sides, E. M.; Picton, B. E., Emblow, C. S., Morrow, C. C. and Costello, M. J. Marine communities of Kilkieran Bay, the Aran Islands and the Skerd Rocks and an asssessment of their conservation importance. Field survey report, Environmental Sciences Unit, Trinity College, Dublin.

INTRODUCTION

Investigations of Galway Bay, Kilkieran Bay, Bertraghboy Bay and Cashla Bay have varied from community descriptions (e.g., Bodin and Jackson, 1989; Costelloe, et al., 1986; Keegan, 1974a; Könnecker, 1973, 1977; Könnecker and Keegan, 1983; O'Connor et al., 1977, 1993; Ryland, 1969; Ryland and Nelson-Smith, 1975), the distribution of specific taxa and species (Keegan, 1974b; Ó'Céidigh, 1962, 1964) to the behaviour and ecology of particular species (e.g., Costelloe, 1985; Costelloe and Keegan, 1984a, 1984b; Fives, 1980; King and Fives, 1983; Könnecker and Keegan, 1973). A number of sites are of conservation interest and include areas important for birds and plants. One site, Mweenish Island, has been designated for its diverse marine flora and fauna.

The aim of this survey was to describe as wide a variety of the habitats and their communities in the area as possible using the BioMar methods. The results of the survey are presented and compared to those of previous studies. A conservation assessment is given for the communites observed.

STUDY AREA

Physical conditions

The study area was Kilkieran Bay, Skerd rocks and the most westerly Aran Island, Inishmore (Fig.1). The entrance to Kilkieran Bay, Skerd Rocks and the Aran Islands are all directly exposed to the Atlantic Ocean and the prevailing SW winds. The surface waters in this area are under the direct influence of the North Atlantic Drift and there are frequent intrusions of oceanic water in the area (Tully and Ó'Céidigh, 1989). There are also periodic upwellings from the Lusitanian Current which runs northwards at a depth of 400 m west of the Irish Coast (Tully and Ó'Céidigh, 1989). The maximum tidal range in the area is 4.5 m.

Kilkieran Bay is just north of Galway Bay. It is an indented fjard and much of the complexity is due to numerous rocky outcrops and islands. The larger islands, Lettermore Island, Gorumna Island and Lettermullen Island are connected to the mainland by road. The surrounding terrain is rolling lowland with rock outcrops except for some moderate hills on the northern side with a maximum height of 358 m; the bedrock is acidic intrusives. The soil is lowland peat bog of limited agriculture use (Royal Irish Academy, 1979). Numerous small lakes drain into the bay. The bay is approximately 13 km in length and 7 km at its widest point. The opening to the sea is relatively narrow being 2 km across. The bay and islands have a rocky shoreline which in most places gives way to mud in shallow water. The depth of the bay is 1 to 4 m BCD except where channels are present which range in depth from 11-18 m. The main channel is along the north edge of the bay but forks just north of Kilkieran Point and this branch flows in a north easterly direction to the south of Inishtravin Island. The channels at their distal ends have deep holes which are separated by shallow bars, e.g. Camus Bay. In the main channels the tidal stream has a maximum strength of 1.5 knots on the flood tide, increasing to 2 knots on the ebb flow.

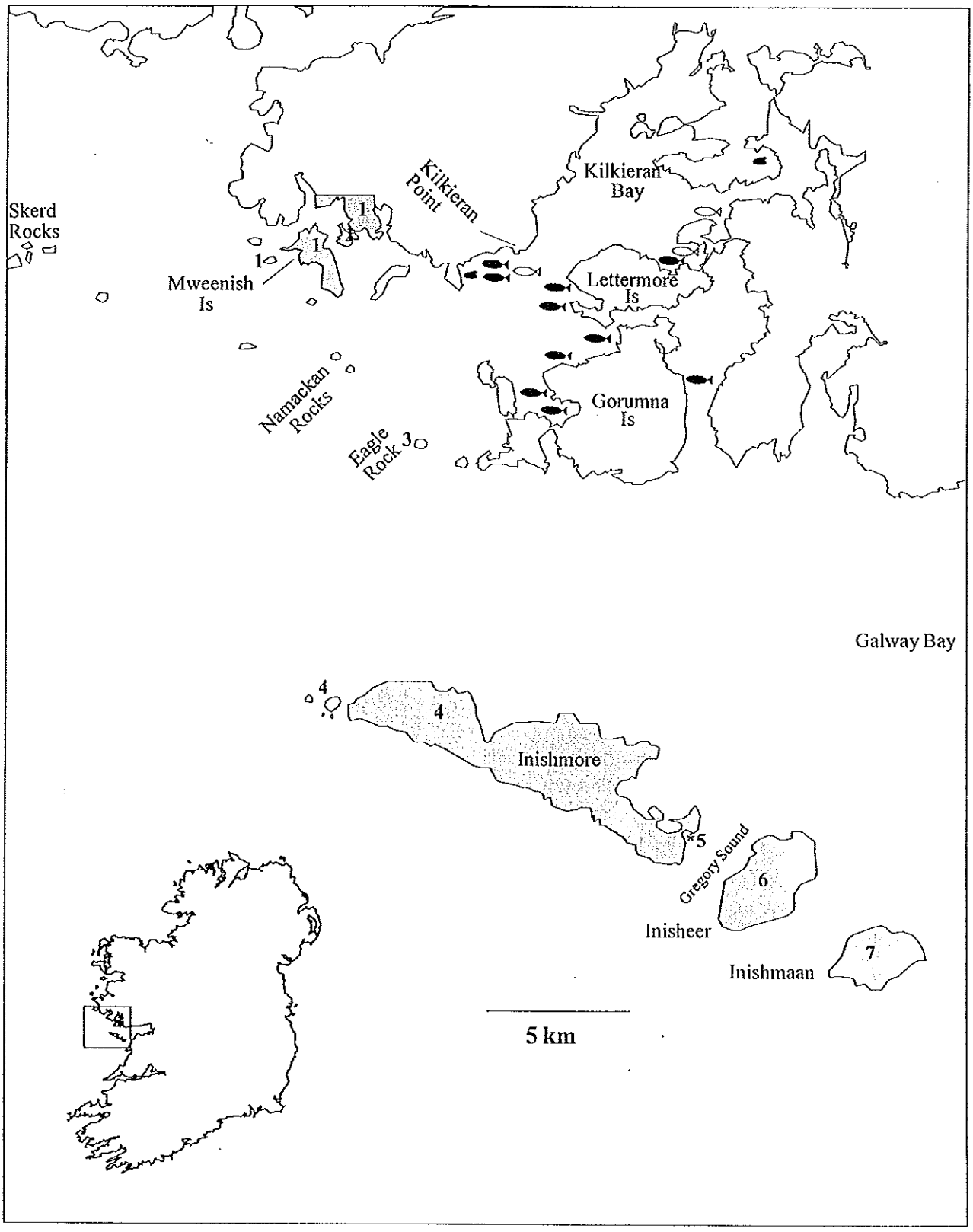

Figure 1. A map of the study area showing the areas of scientific interest (numbered 1-6), and aqua culture areas, salmon farms, trout farms and oyster culture.

The Skerd rocks are a group of small low lying islands and intertidal rocky reefs that lie to the north-west of Mweenish Island. Geologically they are probably the same bedrock as that of Kilkieran Bay, i.e. acidic intrusives. The largest island, Skerdmore, rises 18 m ACD.

The Aran Islands are a series of low-lying islands situated to the south-west of Kilkieran Bay and are approximately 13 km offshore. They lie seaward of the entrance to Galway Bay. The bedrock is carboniferous limestone devoid of topsoil in many places. Inishmore, the largest and most westerly of the three inhabited islands rises on the north-east side in a series of steps and has a cliff face on the south-west side at the north end of the island. Subtidally there are a series of limestone platforms which run parallel to the island.

Human impacts

The hinterland of Kilkieran Bay is very sparsely populated and there is no large centre of population in the area (Royal Irish Academy, 1979); rather there is a ribbon settlement along the coast.

The intertidal algae *Fucus* spp, *Ascophyllum nodosum* and *Laminaria hyperborea* stipes are collected by hand from areas south of Galway Bay to as far north as Killary harbour. The algae are dried at a factory at Kilkieran harbour and shipped to Scotland for further processing.

Kilkieran Bay is a designated aquaculture area. The 1993 La Tene Map records the presence of 11 salmon farms and 3 trout farms in the bay (Fig. 1). Just to the north of Kilkieran Harbour there is a scallop fishery in which young scallops are grown in trays and then removed for reseeding in other parts of the country. The swimming crab *Liocarcinus depurator* is thought to be a predator of small scallops and pots are set in the area to remove as many of these crabs as possible. In addition to the natural oyster beds there are two oyster cultivation areas (Fig. 1). Traditional potting for lobsters, crabs and prawns is carried out in a number of places in Kilkieran Bay, all around the Aran Islands and the Skerd Rocks (pers obs).

The Aran Islands, in particular Inishmore, are a big tourist attraction and there are regular ferries from the mainland every day during the summer.

Conservation interest in the area

There are seven sites of conservation interest in the area (Fig. 1), six of which are islands. They range from being of international to local importance (Table 1). Only Mweenish Island includes the foreshore and was designated for its diverse intertidal marine fauna and flora. Three of the sites are important breeding areas for birds (Wildlife Service, 1989).

Table 1. Coastal areas of Scientific Interest in the Kilkieran and Aran Islands Area listed by the Wildlife Service (1989). * Site number in Figure 1. †M = Marine, B = Botanical, O = Ornithological, Z = Zoological.

Site No*	Site Name	Nat Grid	Type	Importance
1	Mweenish Is/ Mason Is	L 77 30	Ecological (M†)	National
2	Duck Is	L770 273	Ecological (O)	National
3	Eagle Rock	L 80 23	Ecological (O)	National
4	Inishmore/Brannock Is	L 85 07	Ecological (B, Z, O)	International
5	Na Muirbhig Machair (in Gregory Sound)	L 89 07	Ecological (B)	National and Regional
6	Inishmaan	L 93 05	Ecological (B, Z, O)	National
7	Inisheer	L 98 01	Ecological (B),	Local

METHODS

Survey site selection

Information from Admiralty Charts (Nos 1820, 2096, 3339) and the Irish Ordnance Survey map 14, on substrata, topographic features, tidal currents, and exposure was used to select sites to cover the range of habitats and communities likely to occur in the survey area. Sites were also selected that were known to have been surveyed before so that the presence and species composition of documented communities could be confirmed using the BioMar survey methods.

Recording

Sublittoral sites were surveyed using scuba from a rigid hulled inflatable and the shore sites by direct observation. Each site was surveyed following the procedures of the Marine Nature Conservation Review (MNCR) (Hiscock, 1990). For each site, and the habitats within each site, the main physical and biological features were noted on standard forms on the day of observation. The conspicuous flora and fauna were recorded and their abundance estimated using the abundance scales in Hiscock (1990). Details of the sites, and habitats within each site, were recorded on forms used by MNCR but adapted for Ireland.

The littoral sediment samples were sieved through a 1.0 mm and a 0.5 mm sieve and preserved in 10% formalin. The samples were sorted and species identified by AquaFact International Ltd. AquaFact also carried out the granulometric analysis.

Photographs were taken using two Nikon F4 cameras in Aquatica underwater housings with flash guns to record the communities and species in the different habitats. Wide angle photographs were taking using a 20 mm lens and close up photographs with a 60 mm lens. The film used was Kodachrome 64. The photographs were used, in conjunction with voucher specimens collected, to confirm the presence of certain species when reviewing the data recorded in the field.

Specimen collection

Specimens were collected for a voucher collection and when the identification needed to be confirmed. The voucher collection will be lodged with the National Museum. The identification of all preserved algae was confirmed by Prof. M. D. Guiry, University College Galway.

Data storage and analysis

The data collected were entered into a copy of the MNCR database (Mills, 1991) at Trinity College, Dublin for storage and analysis. This allows the comparison of records according to biological and physical characteristics. TWINSPAN (Hill, 1979) was used on the species in different habitats to separate the habitats into broad groupings which formed the basis for the community descriptions of the areas surveyed. The data set analysed was relatively small and the groupings TWINSPAN created were not always biologically meaningful as factors such as substratum and sampling variation were not taken into account. In these cases the groupings have been modified.

RESULTS

Extent of survey

The survey took place from the 15th - 27th August, 1993. Forty-two sublittoral sites and four littoral sites were surveyed (Fig. 2, Table 2). Seventy eight habitat forms were completed and 425 species and higher taxa were recorded (Appendix 3).

Communities

Fifteen littoral and fifteen sublittoral communities have been described for the survey area of which two littoral and two sublittoral are of uncertain status (Table 3).

Littoral sediments

Within Kilkieran Bay there were few intertidal sediment areas, although much of the inner bay was extremely shallow with a muddy substratum. However, littoral sediments were common in Mweenish Bay and between Finish Island and Ardmore Point. On the Aran Islands they were confined to the eastern end of Inishmore and the north eastern side of Inishmaan. Only two sedimentary sites were surveyed, one was an exposed beach on the north western side of Mweenish Island (Site 39) and the other a sheltered beach (Site 37) on the east side of the island. Both beaches were of coarse sand and had a talitrid zone at the top of the beach. In the mid shore zone of the exposed beach the polychaete *Malacoceros fuligenosus* was abundant but there was a paucity of species at low water. In contrast the sheltered shore had a high diversity of species from the lower mid shore to low water. The low shore zone was characterised by an abundance of the polychaete *Marphysa bellii*. The razor shell *Ensis arcuatus* and the holothurian *Leptosynapta inhaerens* were both frequent in this community (KA 20).

Littoral rock

Kilkieran Bay had an almost entirely rocky shore and much of Mweenish Bay and from Finish Island to Ardmore Point also had a rocky shore. One sheltered site was surveyed (Site 40). It was gently sloping with bedrock, boulders, some mud and standing water at low tide. The upper shore was characterised by narrow bands of the algae *Pelvetia canaliculata and Fucus spiralis. Fucus vesiculosus* and *Ascophyllum nodosum* dominated the upper mid shore while *Fucus serratus* formed an extensive zone in the lower mid shore. In the low shore zone *Himanthalia elongata* and *Laminaria saccharina* grew on the bedrock and upper faces of the boulders. The undersides of the boulders had a diverse fauna particularly of sponges and ascidians, most notably the ascidians *Ascidia mentula, Ascidia conchilega, Ascidiella scabra* and the sponges *Clathrina coriacea, Terpios fugax, Hymeniacidon perleve, Dysidea fragilis, Aplysilla rosea,* and *Aplysilla sulfurea.* The anemone *Anthopleura balli* was also abundant.

The one exposed shore (Site 38) surveyed was characterised by a narrow band of the alga *Pelvetia canaliculata* and the barnacle *Semibalanus balanoides,* followed by an extensive midshore zone with the barnacle *Chthamalus stellatus* and the alga *Fucus vesiculosus.* The lower mid shore at the point surveyed was only 3-4 m wide although it appeared to be more extensive at other parts of the shore. This zone was dominated by *Fucus serratus.* The lowshore bedrock and boulders were covered with *Laminaria digitata,* coralline encrusting algae and an understorey of foliose red algae. The sides of the boulders were colonised by the ascidian *Dendrodoa grossularia* and the under surfaces by the sponges *Ophlitaspongia seriata* and *Halichondria panicea* and spirorbid worms.

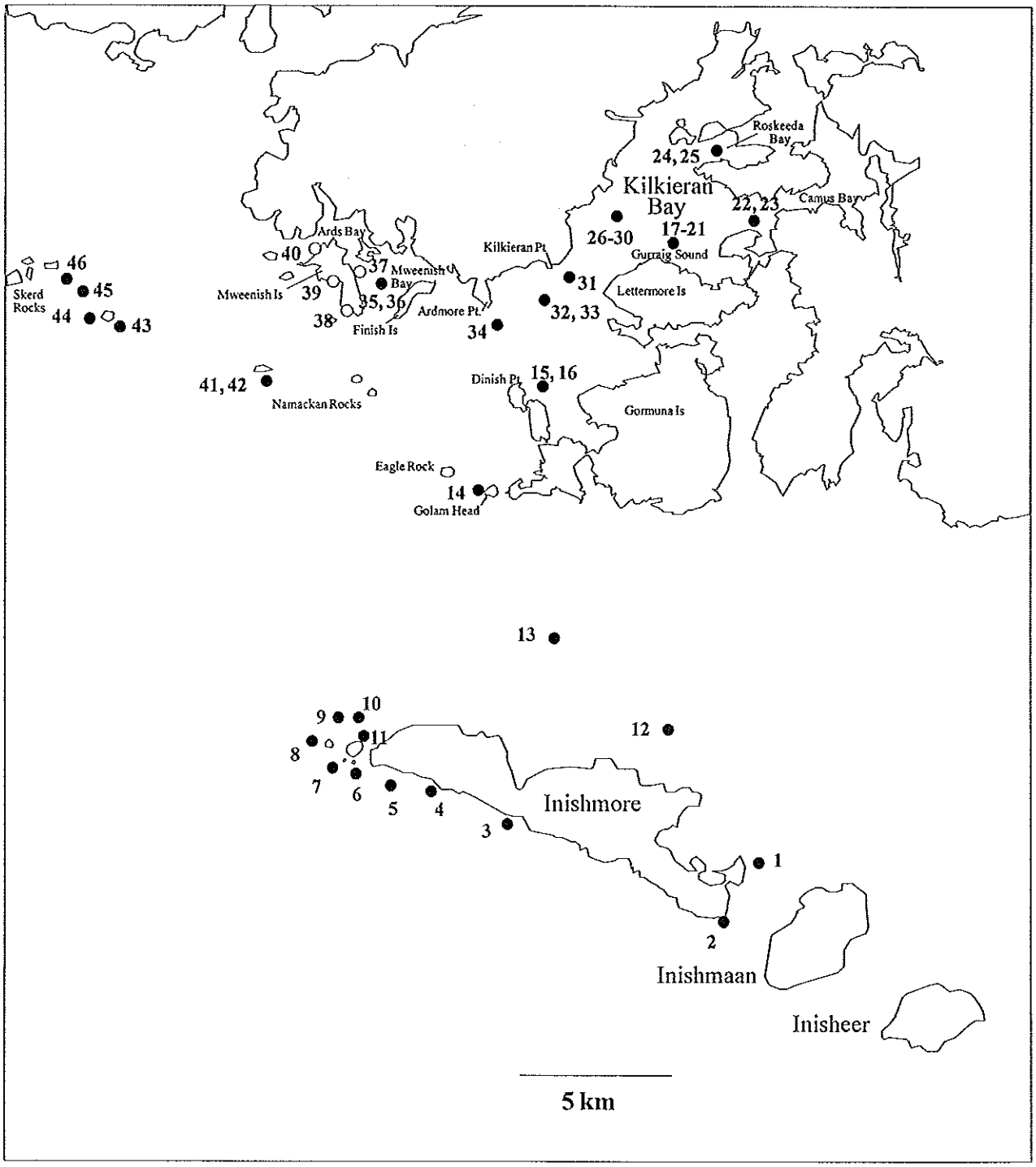

Figure 2. A map showing the location of the sites surveyed. ● Sublittoral sites; ○ Littoral sites.

Table 2. A list of the sites surveyed as stored in the BioMar database and shown in Figure 1. Surveyors initials, CSE, C. S. Emblow; EMS, E. M. Sides; CCM, C. C. Morrow; BEP, B. E. Picton; MJC, M. J. Costello., S = sublittoral; P = photography; R = recording; L = littoral; C = infaunal core taken; G = granulometric core taken.

No.	Site Name	Grid Ref.	Latitude and Longitude	Surveyors initials	Date d/m/yr	Survey Type*
1	N of Carrickamimeraughy, Inishmore, Aran Islands	L 907061	53°05.7'N 09°37.9'W	CSE, EMS	23.08.93	S, P, R
2	Illaunanaur, Gregory Sound, Aran Islands	L 902055	53°05.3'N 09°38.3'W	CCM, BEP	23.08.93	S, P, R
3	W of Blind Sound, Inishmore, Aran Islands	L 821096	53°07.4'N 09°45.7'W	BEP, CCM	16.08.93	S, P, R
4	S of Lackaturlough Point, Inishmore, Aran Islands	L 784106	53°07.9'N 09°49.0'W	CSE, EMS	16.08.93	S, P, R
5	W of Bentlevemore, Inishmore, Aran Islands.	L 784106	53°07.9'N 09°49.0'W	CCM, BEP	16.08.93	S, P, R
6	S of East Brannock Island, Aran Islands.	L 780110	53°08.1'N 09°49.3'W	CCM, BEP	15.08.93	S, P, R
7	S of South Island, Inishmore, Aran Islands.	L 766114	53°08.3'N 09°50.6'W	EMS, CSE	15.08.93	S, P, R
8	W of Rock Island, Aran Islands.	L 747126	53°08.9'N 09°52.4'W	EMS, BEP	26.08.93	S, P, R
9	NW of Rock Island, Aran Islands.	L 751131	53°09.2'N 09°52.0'W	CCM, CSE	26.08.93	S, P, R
10	N of Brannock Island, Aran Islands.	L 774130	53°09.2'N 09°50.0'W	BEP, CCM	22.08.93	S, P, R
11	Brannock East Sound, Inishmore, Aran Islands.	L 773118	53°08.5'N 09°50.0'W	CSE, EMS	15.08.93	S, P, R
12	NE of Kinereigh Point, Inishmore, Aran Islands.	L 881141	53°09.9'N 09°40.4'W	CCM, BEP	23.08.93	S, P, R
13	N of Brocklinmore Bank, Aran Islands.	L 847116	53°11.2'N 09°43.5'W	EMS, CSE	23.08.93	S, P, R
14	W of Golam Head, Kilkieran Bay.	L 813202	53°13.1'N 09°46.6'W	EMS, CSE	22.08.93	S, P, R
15	NE of Dinish Island, Kilkieran Bay.	L 782294	53°18.0'N 09°49.6'W	CCM, BEP	25.08.93	S, P, R
16	NE of Dinish Island, Kilkieran Bay.	L782294	53°18.0'N 09°49.6'W	CSE, EMS	25.08.93	S, P, R
17	S of Inishtravin Island, Kilkieran Bay.	L 885307	53°18.9'N 09°40.3'W	BEP	18.08.93	S, P, R
18	S of Inishtravin Island, Kilkieran Bay.	L 885307	53°18.9'N 09°40.3'W	EMS	18.08.93	S, R
19	S of Inishtravin Island, Kilkieran Bay.	L 885307	53°18.9'N 09°40.3'W	CSE	18.08.93	S, P, R
20	S of Inishtravin Island, Kilkieran Bay.	L 885307	53°18.9'N 09°40.3'W	CCM	18.08.93	S, P, R
21	S of Inishtravin Island, Kilkieran Bay.	L 885307	53°18.9'N 09°40.3'W	MJC	18.08.93	S, R
22	NNE of Leighon Island, Kilkieran Bay.	L 909316	53°19.4'N 09°38.2'W	CCM, EMS	24.08.93	S, P, R
23	NNE of Leighon Island, Kilkieran Bay.	L 909316	53°19.4'N 09°38.2'W	CSE, BEP	24.08.93	S, P, R
24	SE of Mussel Rock, Roskeeda Bay, Kilkieran Bay.	L 902342	53°20.8'N 09°38.9'W	EMS, CCM	24.08.93	S, P, R
25	SE of Mussel Rock, Roskeeda Bay, Kilkieran Bay.	L 902342	53°20.8'N 09°38.9'W	CSE, BEP	28.08.93	S, P, R, C
26	N of Kinnelly Rock, Kilkieran Bay.	L 864319	53°19.5'N 09°42.3'W	BEP	18.08.93	S, P, R
27	N of Kinnelly Rock, Kilkieran Bay.	L 864319	53°19.5'N 09°42.3'W	EMS	18.08.93	S, R
28	N of Kinnelly Rock, Kilkieran Bay.	L 864319	53°19.5'N 09°42.3'W	CSE	18.08.93	S, R
29	N of Kinnelly Rock, Kilkieran Bay.	L 864319	53°19.5'N 09°42.3'W	CCM	18.08.93	S, P, R
30	N of Kinnelly Rock, Kilkieran Bay.	L 864319	53°19.5'N 09°42.3'W	MJC	18.08.93	S, R
31	NW of Lettercallow Spit, Kilkieran Bay.	L 847295	53°18.2'N 09°43.7'W	CSE, EMS	22.08.93	S, P, R
32	Lettercallow Spit, Kilkieran Bay.	L 843291	53°18.0'N 09°44.1'W	EMS, BEP	26.08.93	S, P, R
33	S of Lettercallow Spit, Kilkieran Bay.	L 843291	53°18.0'N 09°44.1'W	CSE, CCM	26.08.93	S, P, R
34	SW of Illaunmaan, Kilkieran Bay.	L 822274	53°17.0'N 09°46.0'W	BEP, CCM	22.08.93	S, P, R
35	Mweenish Bay, Kilkieran Bay.	L 835259	53°16.2'N 09°44.7'W	CCM, BEP	25.08.93	S, P, R, G
36	Centre of Mweenish Bay, Kilkieran Bay.	L 782294	53°18.0'N 09°49.6'W	EMS, CSE	25.08.93	S, R
37	NW Mweenish Bay, Kilkieran Bay.	L 772305	53°18.6'N 09°50.5'W	BEP, EMS, CSE, CCM	20.08.93	L, C, G, R
38	W of Mulroa Point, Kilkieran Bay.	L 772280	53°17.2'N 09°50.4'W	EMS, CSE	21.08.93	L
39	Bay SW of Mweenish Island, Kilkieran Bay.	L 767293	53°18.0'N 09°51.0'W	BEP, CCM	21.08.93	L
40	Quay, N. Mweenish Is		53°18.5'N 09°52.0'W	BEP, CCM MJC	21 08 93	L
41	W of Namackan Sound, Kilkieran Bay.	L 728225	53°14.2'N 09°54.3'W	CCM, BEP	27.08.93	S, P, R
42	W of Namackan Rock, North Sound, Kilkieran Bay.	L 728225	53°14.2'N 09°54.3'W	CSE, EMS	27.08.93	S, P, R
43	E of Doonguddle, Skerd Rocks.	L 674243	53°15.1'N 09°59.2'W	CCM, CSE	17.08.93	S, P, R
44	SW of Doonguddle, Skerd Rocks.	L 672241	53°15.0'N 09°59.4'W	BEP, EMS	17.08.93	S, P, R
45	NW of Doonguddle, Skerd Rocks.	L 669246	53°15.3'N 09°59.6'W	CSE, CCM	17.08.93	S, P, R
46	E of Skerdmore, Skerd Rocks.	L 666248	53°15.4'N 09°59.9'W	BEP, EMS	17.08.93	S, P, R

Table 3. List of communities described for Kilkieran Bay, the Aran Islands and the Skerd Rocks survey.

No	Community Name	Habitat	Site No (Habitat No)
KA1	Lichen zone	Supralittoral fringe bedrock	38(1)
KA2	*Pelvetia canaliculata* zone	Lower littoral fringe bedrock	38(2)
KA3	*Pelvetia canaliculata* and *Fucus spiralis* zone	Lower littoral fringe bedrock	40(1)
KA4	*Fucus vesiculosus* zone	Mid eulittoral bedrock	38(3)
KA5	*Ascophyllum nodosum* and *Fucus vesiculosus* zone	Mid eulittoral bedrock	40(2)
KA6	Dense *Fucus serratus* zone	Lower eulittoral bedrock	40(3)
KA7	*Fucus serratus* zone	Lower eulittoral bedrock	38(4)
KA8	*Laminaria saccharina* and *Himanthalia elongata* zone	Infralittoral fringe	40(4)
KA9	*Laminaria digitata*	Infralittoral fringe	38(5)
KA10	Mixed kelp forest	Upper infralittoral	3(1)
KA11	Sparse *Laminaria hyperborea.* Uncertain status	Lower infralittoral sand scoured bedrock	1(1), 11(2), 4(1)
KA12	Sparse *Laminaria hyperborea* and foliose red algae	Infralittoral bedrock	7(1), 11(1), 46(1), 46(2)
KA13	*Paracentrotus lividus* and kelp	Limestone pavement	6(1)
KA14	??. Uncertain status	Circalittoral cliff face	2(1), 45(1)
KA15	*Raspailia ramosa - Corella parallelogramma*	Circalittoral bedrock and boulders with tidal streams	17(1), 18(1), 19(1), 20(1), 22(1), 23(1), 24(2), 25(2), 26(2), 27(2), 28(1), 29(2), 31(2)
KA16	*Axinella dissimilis - Phakellia ventilabrum*	Deep, exposed and gently sloping circalittoral bedrock	5(1), 8(1), 8(2), 9(1), 10(1), 12(1), 13(1), 14(1), 41 (1), 42(1), 43(1), 44(1), 46(3)
KA17	Talitrid zone	Upper shore sand	37(1), 39(1)
KA18	*Arenicola marina* and *Malacoceros fuliginosus*	Mid to low shore sand	37(3), 39(3), 39(4), 39(5)
KA19	*Scoloplos armiger* and *Bathyporeia elegans* .	Lower midshore sand	37(4)
KA20	*Marphysa belli* and *Ensis*	Low shore sand	37(5)
KA21	Barren sand - uncertain status	Upper mid shore sand	37(2)
KA22	Amphipoda - *Eurydice pulchra*	Upper mid shore, coarse sand	39(2)
KA23	Dead maerl with *Neopentadactyla mixta*	Duned dead maerl with strong tidal currents	34(1)
KA24	Duned maerl with *Aureliania heterocera* and foliose red algae	Duned marel with strong tidal currents	32(1), 33(1)
KA25	Coelenterates and ascidians	Cobble and pebble plain	31(1)
KA26	*Mesacmaea mitchellii* and *Aureliania heterocera*	Gravel plain and dead maerl with moderate tidal currents	22(2), 26(1), 27(1), 28(2), 29(1)
KA27	*Arenicola marina* uncertain status	Shallow sand and mud	35(1), 36(1)
KA28	*Virgularia mirabilis*	Shallow fine mud	24(1), 25(1)
KA29	*Nephrops norvegicus* and *Pecten maximus*	Plain of muddy sand	15(1), 16(1)
KA30	*Pachycerianthus multiplicatus*	Deep fine mud	24(3), 25(3)

Sublittoral sediments

Kilkieran Bay had a wide variety of sublittoral sediments ranging from duned maerl, *Lithothamnium corallioides,* through gravel and sand to mud. Maerl substrata were restricted to areas of strong current flow within the Bay close to the channels (KA 22, KA24) whereas the gravel with dead maerl and sand were in areas of weaker current flow (KA 26). Mud is located in both areas of very weak current flow in the inner parts of the bay and very sheltered areas in the outer part of the Kilkieran Bay (KA28, KA29, KA30)

The maerl was frequently duned with just a sprinkling of live maerl on the surface. At Site 34, south-west of Illaunmaan, which was an area with strong current flow, the burrowing holothurian *Neopentadactyla mixta* was the dominant species (KA23). At Lettercallow spit, sites 32 and 33, where the current flow was less, the conspicuous species in the maerl were the burrowing anemones *Aureliania heterocera* and *Mesacmaea mitchellii* (KA 24). At site 32 a small area of clean dead maerl was banked up against some rocks and was inhabited by the rare nocturnal anemone *Halcampoides elongatus.* Other anemones also present in this small area were *Peachia cylindrica, Scolanthus callimorphus* and *Edwardsia claparedii. Mesacmaea mitchellii* was also common in areas of gravel with maerl debris and mud.

Four mud communities were surveyed (Table 3). Two of these were in same area in Roskeeda Bay (sites 24 and 25). The deep mud in Roskeeda Bay was colonised by the burrowing anemone *Pachycerianthus multiplicatus* (KA30) and the sea pen *Virgularia mirabilis* dominated the shallow mud (KA28). The third mud community (KA29) at the entrance to Casheen Bay (sites 15 and 16) between Dinish Island and Illauneeragh was characterised by occasional *Nephrops norvegicus, Pecten maximus* and frequent *Asterias rubens.* The most notable species recorded at this site was the rare butterfly blenny, *Blennius ocellaris* which was inhabiting an empty bottle lying on the bottom. Debris i.e. ropes and plastic bags from a nearby fish farm was also seen at this site. The fourth community (KA27) was in shallow water in the centre of Mweenish Bay (site 3) and is of uncertain status.

Sublittoral rock

At sites on the Aran Islands and Skerd Rocks exposed to wave action, kelp was found to depths of 25 m. However below 12 m it was sparse (KA11, KA12) and community KA 11 (site 1) was affected by sand scour Above 12 m a mixed kelp forest was found on steep bed rock and boulders in exposed situations (KA10) but on a limestone platform (site 6) at a similar depth a community dominated by a dense population of the sea urchin *Paracentrotus lividus* (KA13) was found. At deep water sites exposed to swell and wave action between 28 - 42 m, where the bedrock was horizontal or gently sloping, the community was characterised by the sponges *Axinella dissimilis* and *Phakellia ventilabrum* (KA16). Other species frequently found in this community were *Axinella infundibuliformis, Eunicella verrucosa, Alcyonium glomeratum* and *Diazona violacea.* In current swept but sheltered areas within Kilkieran Bay the circalittoral bedrock and boulders from about 7-26 m BCD were found to be dominated by a community of erect and encrusting sponges and solitary ascidians, named the *Raspailia ramosa - Corella parallelogramma* community (KA15).

DISCUSSION

Communities

Kilkieran Bay has a variety of habitats ranging from soft mud in sheltered areas to bed rock with strong tidal streams. The Aran Islands and Skerd Rocks have a number of exposed habitats in which some rare species were found.

Könnecker (1973) and Könnecker and Keegan (1983) divided the epibenthic fauna of Kilkieran Bay, Skerd Rocks and Aran Islands into seven distinct groups. In addition, six different types of maerl substrata and their associated fauna were described by Keegan (1974a) and the mud slopes in Roskeeda Bay were found to be dominated by *Virgularia mirabilis* and *Pachycerianthus multiplicatus* (O'Connor et al., 1977).

Within Kilkieran Bay habitats colonised by *Laminaria* spp were divided by Könnecker (1973) and Könnecker and Keegan (1983) into three associations. The first was a shallow association with *Laminaria saccharina* as the dominant species which extended from the intertidal to 10-15 m BCD in sheltered areas. Other characterising species were sponges and ascidians. In the present survey only one habitat was dominated by *L. saccharina* (KA8) and this was on the low shore in a sheltered situation on Mweenish Island. The sponges recorded here were different to those described as characterising by Könnecker and Keegan (1983). However both communities had a number of ascidians in common. The mixed kelp forest community (KA10) of this survey is probably equivalent to the upper *Laminaria hyperborea* association of Könnecker and Keegan (1983) but only one habitat with this community was examined in this survey. The sparse *Laminaria hyperborea* and red foliose algae (KA11) association of this survey is similar to the lower *Laminaria hyperborea* association of Könnecker and Keegan (1983).

The *Raspailia-Stelligera* sponge association was described by Könnecker (1973) and Könnecker and Keegan (1983) as occurring in Gurraig Sound in the circalittoral with an upper limit of 10-15 m to a maximum depth of 41 m. This community has also been documented in detail by Costelloe et al. (1986). It is also known to occur in Camus Bay on large boulders at the entrance to Roskeeda Bay in the inner part of Kilkieran Bay, below 20 m off Kilkieran Point and in the deeper part of the channel to the south-east of Illaunmaan (Könnecker, 1973; Könnecker and Keegan, 1983). The *Raspailia ramosa - Corella parallelogramma* community of this survey (KA15) agrees well with this association but with some interesting differences. Two of the characterising sponges for this association listed by Könnecker and Keegan (1983) were *Haliclona oculata* and *Poecillastra compressa*. Neither of these sponges were recorded on this survey and this seems likely to be due to misidentifications by Könnecker. His interpretation of the species of *Haliclona* was based on the synonymies of Arndt (1935). Arndt lists *Haliclona simulans* as a junior synonym of *Adocia cinerea* and the only thin branching species described in Arndt is *Haliclona oculata*. The recent revision of the Haplosclerida of the north-east Atlantic (de Weerdt, 1986) clarifies the identity of these two species and it is clear that the branching species which is common in Kilkieran Bay should be called *Haliclona simulans*. Neither this survey nor extensive collecting by one of us (BEP) has found *Haliclona oculata* within Kilkieran Bay, though this is quite a common species on the Irish coasts. The identification of *Poecillastra compressa* is rather more puzzling. This is a massive, deep-water species from the northern coasts of the British Isles and has not been collected by any diving survey undertaken by the MNCR nor by the Ulster Museum (Northern Ireland Sublittoral Survey and collections from other parts of the coast). Könnecker describes this species as a loosely adhering crust, common at several stations. A loosely adhering crust fitting this description was identified by the present survey as *Plakortis simplex*. It was found to be quite common in Gurraig Sound and at Mussel Rock, two of the stations where Könnecker reported *Poecillastra compressa*. While the spiculation

of these two species is very different it is probable that Könnecker identified *Plakortis simplex* as *Poecillastra compressa* and that this mistake was then perpetuated in later publications. Another sponge not previously recorded from this community was *Tricheurypon viride* at site 25. *Tricheurypon viride* is a rare sponge that has also been recorded from Salt Lake, Clifden, Co. Galway (Morrow, pers. obs.). Stephens (1921) reported three specimens, all from deep water, the respective depths being 37 fathoms (approx. 68m) 388 fathoms (approx. 709 m) and 468 fathoms (approx. 856 m).

In exposed situations at depths in excess of 25 m the *-Axinella dissimilis- Phakellia ventilabrum* community (KA16) predominated on horizontal and gently sloping bedrock. This community has been described by Cabioch (1968) and by Könnecker (1973, 1977), Könnecker and Keegan (1983) as an *Axinella dissimilis* association. The community has previously been recorded from Golam Head and Skerd Rocks (Könnecker, 1977; Könnecker and Keegan, 1983) and North Sound, Outer Galway Bay (O'Connor et al, 1993). This survey showed that in addition to these sites this community was also found at the Aran Islands and Namackan Rocks. The community may also extend into the upper circalittoral with *Rhodymenia ardissonei* being present. Könnecker (1973) notes that typically this association does not contain encrusting sponges present and that there is generally a layer of silt on the rock surfaces. In contrast, the encrusting species *Phakellia* (=*Bubaris*) *vermiculata* was generally common at the sites examined during this survey. The presence of the encrusting sponge *Hexadella racovitzai* west of Bentlevemore, Inishmore, Aran Islands (site 6) is a new record of this sponge for the British Isles (Morrow & Picton, in press). It has previously been reported from the Mediterranean, the Azores and Roscoff (Borojevic *et al.*, 1968; Boury-Esnault & Lopez, 1985; Topsent, 1896, 1943; Vacelet, 1969). Other rare sponges recorded from this community around the western end of Inishmore were *Axinella flustra*, *Spongionella pulchella* and *Clathria barleei*. *Halicnemia verticillata*, an encrusting sponge, was recorded from the Skerd Rocks (site 44). It was previously known in Ireland only from three records in deep water; 336 fathoms (approx. 614 m), 550 fathoms (approx. 1006 m) and between 627 and 728 fathoms (approx. 1147-1331 m) (Stephens, 1921). *Axinella damicornis*, was also recorded from Skerd Rocks and is known from only a few Irish sites as far north as Rathlin Island (Erwin *et al.*., 1990). Könnecker records another sponge community, the *Tethyopsilla/Tetilla* association, from between 40 m and 200 m depth in the outer part of Galway Bay. These depths were beyond the scuba diving limits of this survey, but the species *Tetilla zetlandica* was found at two of the deeper sites (sites 5 & 9) on the outside of the Aran Islands.

Maerl and mixtures of maerl, gravel and mud have an extensive distribution within Kilkieran Bay (Keegan, 1974a: Könnecker and Keegan, 1983) but are largely confined to the current swept area of the main channel on the west side of the Bay from south-west of Illaunmaan to just north of North Island. Within the complex of maerl substrata a number of distinct communities have been described by Keegan (1974a) and in this survey. In both studies dunes of unstable maerl debris dominated by the burrowing holothurian *Neopentadactyla mixta* were found but in different localities. Keegan (1974a) recorded a *Neopentadactyla mixta* dominated community close to Rosduggan Point and a second location was found in this study south-west of Illaunmaan (site 32) in a much more open situation. The differences in species composition of some of the maerl communities may reflect a difference in the sampling methods. Keegan (1974a) sampled a maximum of 0.25 m^2 at 18 stations to a depth of 24 - 40 cm using a suction pump to determine the species present. However in this study divers were recording macrofauna only and would have covered a much larger area. In addition it is possible that there are small scale differences in the distribution of species particularly as the substrata may not be very stable due to strong current flow and exposure to the prevailing south westerly Atlantic swells. The anemones *Aureliania heterocera* and

Mesacmaea mitchellii were both conspicuous and common in maerl communities but neither species were recorded by Keegan (1974a) or Könnecker and Keegan (1983). Keegan (1974a) recorded *Peachia cylindrica* (= *hastata*) in substrata where there was living maerl debris and gravel and maerl debris with muddy sand. These are the same substrata in which *Mesacmaea mitchellii* was recorded suggesting that *M. mitchellii* was mistaken for *P. cylindrica.* Kilkieran Bay is the only known inshore locality in Ireland for *Mesacmaea mitchellii* and it was quite characteristic of muddy gravels. It is found around south-west Britain as far north as Skomer Island, Pembrokeshire. Stephenson (1935) reports specimens from Port Erin (Isle of Man) and the Nymphe Bank, Co. Cork. *Aureliania heterocera* is a more widespread species, occurring in Strangford Lough and a few Scottish localities as well as in the south-west of the British Isles. Another notable anemone recorded in this community was *Scolanthus callimorphus.* Within the British Isles *S. callimorphus* is only known from Kilkieran Bay and the type locality Weymouth Bay (UK) on the south coast of the British Isles.

The anemone *Halcampoides elongatus* is a rare species, originally described from a specimen collected at 40 m depth 2.1 miles north-east of Clare Island Lighthouse during the Clare Island Survey (Carlgren in Stephens, 1912). It was later considered to be a synonym of the widespread species *Halcampoides purpurea* but a revision of the genus by den Hartog has shown that *H. elongatus* is a distinct species, known only from western Ireland, Naples and Scandinavia (den Hartog, pers. com.). Picton (1985) reported this species (as *Halcampoides purpurea*) from 'Gerd's Hole' in Ard Bay, north-east of Mweenish Island, Co. Galway. It was found on this survey at Lettercallow Spit (site 32) in clean mobile maerl gravel banked up against some rock outcrops. A night dive showed that this nocturnal anemone was common in maerl gravel heaped up by the tide in a narrow band about 2 m wide around the rock outcrop and not present on the more stable maerl seabed nearby. It is likely that *H. elongatus* is more widespread than current records suggest but has specific habitat requirements. It has been observed in a similar habitat at Camaret-sur-Mer, Brittany (Picton, pers.obs.) and photographed by Rupert Lewis (Port Erin Marine Laboratory, Isle of Man) near Port Erin breakwater. It is likely to be overlooked due to its nocturnal behaviour.

The large anemone *Pachycerianthus multiplicatus* and the sea pen *Virgularia mirabilis* are known to occur on mud slopes in inner Kilkieran Bay (O'Connor et al., 1977). In this survey these two species were found in Roskeeda Bay and were considered to be two distinct communities (KA28 and KA30) as there was no overlap in their distribution and they were the dominant species in each area. *V. mirabilis* occurred shallower than *P. multiplicatus.* The only other records of *P. multiplicatus* in Ireland are from Kenmare River in Co. Kerry (Picton, 1985) and Bantry Bay (D. Minchin, pers. comm.). *Scolanthus callimorphus* was also recorded in both communities in Roskeeda Bay.

The butterfly blenny *Blennius ocellaris* is rare around the coasts of Ireland and Britain (Dipper, 1987) but has been recorded in Ireland from Kilkieran Bay, Ballynakill Harbour, Blacksod Bay (Ó'Céidigh, 1964) and on Brocklinmore Bank on the north-east side of the Aran Island Inishmore (Dunne and Könnecker, 1976). Those from within Kilkieran Bay were collected in 11-15 m of water on a substrate of old shell, mud and *Lithothamnion* opposite Kilkieran Harbour. In this survey a single specimen of *B. ocellaris* was observed inhabiting a glass bottle lying on soft mud in a sheltered bay north-east of Dinish Point (Sites 16 and 16). Another notable fish observed during this survey was the reticulated dragonet *Callionymus reticulatus* which was first recorded in Ireland from Mweenish Bay in 1967 (Ryland, 1969). It was recorded north-east of Dinish Point (Site 16), north of Kinnelly Rock (Sites 26 and 28), south-east of Mussel Rock (Site 25), north-west of Lettercallow spit (Site 31), Lettercallow Spit (Site 32) and south-west of Illaunmaan (Site 34) which suggests that it has a widespread distribution in Kilkieran Bay.

The results of this BioMar survey compare well with those of previous studies but also point to some differences which may reflect a change in the species composition with time, small scale variation in communities or different recorders. This survey together with previous studies also indicates the wide variety of communities found within Kilkieran Bay and the adjacent areas.

Zostera beds were recorded by Keegan (1974b) as occurring at several sites in Kilkieran Bay but the community associated has not been documented and was not examined in this survey.

Conservation assessment

Kilkieran Bay is of considerable conservation interest. It is notable for its variety of habitats and communities and for the presence of a number of species which are rare in Ireland. Species of particular interest within the bay are the sponges *Plakortis simplex* and *Tricheurypon viride* and the burrowing sea anemones *Pachycerianthus multiplicatus, Halcampoides elongatus, Scolanthus callimorphus, Mesacmaea mitchellii* and *Aureliania heterocera.* Communities (biotopes) of particular conservation importance are the extensive maerl beds and the rich *Raspailia ramosa-Corella parallelogramma* biotope on sublittoral rock.

The sponge *Plakortis simplex* was found to be quite a common species in the *Raspailia ramosa-Corella parallelogramma* biotope described here. It was found at a further site near Gurraig Sound (Yellow Rocks) in 1992 (Picton, pers.obs.). The only previous record of this sponge in Ireland was from 50 miles west-north-west of Eagle Island, Co. Mayo, at a depth of 388 fathoms (Stephens, 1915). It is a little known species in the British Isles.

Pachycerianthus appears to be at the southern limit of its distribution in Ireland. It is a northern species and has also been found in a number of Scottish sea lochs (Davies, 1989, 1990; Holt, 1991; Howson, 1989; Howson and Davies, 1991). In Roskeeda Bay it is confined to a deep hole of fine mud. The other known site in Kilkieran Bay for this anemone is Connawilleen Bay where it is in much shallower mud (B. O'Connor, pers. com.). The only other records of *P. multiplicatus* in Ireland are from several sites in Kenmare River (Picton, 1985), a designated aquaculture area, and one site in Bantry Bay. (D. Minchin, pers. com.)

The nocturnal anemone *Halcampoides elongatus* lives in maerl debris and prior to this survey the only Irish records were from the Clare Island survey and from Ards Bay close to the ASI of Mweenish Island. Because of its nocturnal activity, this species has probably been overlooked and may be more common than the records suggest. However it appears to have very specific habitat requirements which may limit its distribution to very mobile, clean, coarse gravels.

The anemone *Scolanthus callimorphus* is very rare in the British Isles and *Mesacmaea mitchellii* has a very limited distribution. Kilkieran Bay is the only known locality in Ireland for these species.

Maerl is a biotope with a limited distribution in Ireland and is confined to a number of areas mostly on the west coast of Ireland. Living maerl usually forms a thin layer on top of a thicker deposit of maerl debris. Little is known about the rate of growth of maerl and the environmental parameters under which is grows. Thus it should be considered a fragile biotope. Any extraction of maerl should only be considered once the sustainability of the resource and possible ecological impacts are known. Aquaculture may also result in sedimentation detrimental to the growth of maerl.

The *Raspailia ramosa-Corella parallelogramma* community has a high diversity of encrusting and branching sponges and solitary ascidians. It is quite widely distributed within Kilkieran Bay but is probably best developed along the edges of Gurraig Sound. The rare

sponge *Tricheurypon viride* was recorded from this community. At present little is known about the life histories, in particular growth and recruitment rates of temperate sponges but in many cases they are thought to be slow growing and long lived. Most of the aquaculture activity was confined to the more seaward parts of the bay but with an increasing trend to place cages in areas with strong water movement there is the potential that this community could be affected by increased siltation and eutrophication in the vicinity of fish farm cages if cages were placed close to the channel.

The conservation of Kilkieran Bay should be considered of high importance. It has been designated as an aquaculture area by the Department of Fisheries. For management purposes the bay cannot be protected as a series of small individual sites and it is recommended that the entire bay be given some conservation status as a matter of urgency.

Inishmore was the only one of the Aran Islands to be investigated by the present survey. Both the population of *Paracentrotus lividus* and the *Axinella dissimilis-Phakellia ventilabrum* sponge community are of conservation interest.

The sea urchin *Paracentrotus lividus* occurs both intertidally and subtidally on the south-west, west and north-west coasts of Ireland and is collected commercially in a number of places. It is currently listed in the IUCN Red Data Book (1992) as a commercially threatened species but to date there are no restrictions in Ireland on the collection of this urchin. *P. lividus* has been extensively collected in the Galway-Clare region to the extent that the fishery has collapsed in Galway (B. O'Connor, pers. com.). Subtidal populations such as the one found at the Aran Islands may provide an important source of larvae for the recruitment of populations in the Galway Bay area as intertidal populations are known to have a lower reproductive success than subtidal ones (Byrne, 1990). For this reason and to prevent further depletion of stocks the subtidal populations of this urchin around the Aran Islands warrant protection.

The *Axinella dissimilis - Phakellia ventilabrum* community in the lower circalittoral zone may have a widespread distribution in exposed areas on the west coast of Ireland. The examples of this community observed around the western end of Inishmore and Brannock Island are considered to be particularly rich. The sponges *Hexadella racovitzai, Axinella flustra Spongionella pulchella, Phakellia vermiculata,* and *Clathria barleei* are all rare in Ireland and this area has produced the only records of the first two of these species for the British Isles. *Phakellia ventilabrum* is a rare species in shallow water, yet so common in this area that it is characteristic of the biotope. In addition there are a number of interesting sponge records from the Aran Islands (Ackers *et al.*, 1992 and Picton, pers. obs.).

An upwelling of cooler, bottom water is known to occur in the North Sound (O'Connor, pers. com.) and flowing water was observed by the divers on this survey at several of these sites. It seems likely that local hydrographic conditions in this area result in the unusual richness of this biotope. A seaward extension of the Inishmore ASI is recommended to incorporate areas with this community in addition to populations of *Paracentrotus lividus.*

The Skerd Rocks and Namackan Sound have similar deep circalittoral biotopes to the western end of the Aran Islands, but differ in rock type. Several rare sponge species were recorded only from the north side of the North Sound (Outer Galway Bay) and have not been found on the limestone rock. They include *Axinella damicornis*, known from a few sites in Ireland, and *Halicnemia verticillata*, previously known only from deep water.

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APPENDIX 1: SITE DESCRIPTIONS

(as described at the time of the BioMar survey and extracted from the database)

1 North of Carrickamimeraughy, Inishmore, Aran Islands 53°05.7'N 09°37.9'W

The site was located on the western side of a wide sound between Inishmore and Inishmaan on the exposed offshore Aran Islands. The site was at the northern end of the sound in a relatively sheltered location away from the main south-westerly swell. The seabed at 21.4 m BCD was a rippled sandy plain with *Echinocardium cordatum* (not surveyed) extending to a 2 m vertical step of limestone with many crevices and heavy sand cover. At 18.7 m the bedrock again became horizontal with very heavy sand cover on the horizontal surfaces. Habitat 1: Lower infralittoral bedrock with a heavy sand cover on top of an extensively bored limestone pavement. Characteristic red algae were *Acrosorium uncinatum* with *Plocamium cartilagineum* and the brown algae *Halidrys siliquosa* and *Laminaria hyperborea*. There were numerous calcareous tubes (polychaetes ?) sticking through the sand. Habitat 2; Vertical upper circalittoral limestone with many crevices leading back from the face. Horizontal surfaces were heavily sand covered with the sponge *Ciocalypta penicillus*. *Cliona celata* and *Pachymatisma johnstonia* were frequent with *Alcyonium digitatum* on the vertical faces. *Nemertesia antennina* was also frequent and numerous *Limacia clavigera* were present.

2 Illaunanaur, Gregory Sound, Aran Islands 53°05.3'N 09°38.3'

The site was on the SW corner of a large offshore island. The shore consisted of vertical and overhanging limestone. A steep limestone cliff with horizontal caves some a deep as 10 m. Outside the caves were a few large limestone boulders, then another drop. Caves were present at 17 m BCD and at 20 m BCD. The roofs of the caves had large numbers of *Ascidia mentula*.

3 West of Blind Sound, Inishmore, Aran Islands 53°07.4'N 09°45.7'W

Steep limestone bedrock and large boulders on a very exposed open coast of an offshore island. The upper infralittoral was dominated by *Laminaria hyperborea, Laminaria saccharina, Saccorhiza polyschides* and *Alaria esculenta*. Vertical surfaces were densely covered with foliose red algae, especially *Rhodymenia pseudopalmata*.

4 South of Lackaturlough Point, Inishmore, Aran Islands 53°07.9'N 09°49.0'W

The site was on the extremely exposed southern side of the offshore Aran Islands. The seabed at 28.8 m BCD was large boulders of limestone generally square in profile and heavily pitted with some crevices. The sparse kelp park had a dense understorey of red algae on the upper surfaces. The brown algae *Dictyopteris membranacea* and *Dictyota dichotoma* were frequent. The sides of the boulder had small *Eunicella verrucosa* and occasional colonies of *Diazona violacea*. *Pachymatisma johnstonia* was the dominant sponge.

5 West of Bentlevemore, Inishmore, Aran Islands. 53°07.9'N 09°49.0'W

Extremely exposed bedrock on the south side of a large offshore island. An upper circalittoral limestone platform. There were deep furrows within the bedrock that ran parallel with each other. The furrows were rather barren with occasional *Suberites carnosus* growing in them. The upper faces of the bedrock had a rich sponge fauna. The upper limit of the platform was at 37 m BCD. The habitat was characterised by *Phakellia ventilabrum, Axinella infundibuliformis, Diazona violacea* and *Eunicella verrucosa*.

6 South of East Brannock Island, Aran Islands. 53°08.1'N 09°49.3'W

The site was on a rock outcrop that breaks the surface at low water and on the exposed side of an island facing the Atlantic. There was a horizontal platform of bedrock, then a vertical limestone cliff with large blocks of broken bedrock at the base, resting on a bedrock platform.

7 South of South Island, Inishmore, Aran Islands. 53°08.3'N 09°50.6'W

Extremely exposed south west facing slope with a platform at 20 m BCD. The platform had bedrock/boulders that gave it a ridged appearance. A particularly unimpressive site considering it is the Aran Islands! Poor visibility. Lower infralittoral kelp park with an understorey of red algae particularly *Callophyllis laciniata* and *Acrosorium uncinatum*. The rock was heavily pitted, with sea cucumbers *Pawsonia saxicola* and *Aslia lefevrei* frequent in the rock crevices. Also characteristic were bryozoans, particularly *Amphisbetia operculata* and *Cellepora pumicosa*.

8 West of Rock Island, Aran Islands. 53°08.9'N 09°52.4'W

The site was located to the west of an extremely exposed islet, on a seabed with rock terraces. Habitat 1: The upper circalittoral was characterised by the alga *Rhodymenia ardissonei* growing over horizontal limestone bedrock. A variety of sponges were present. Habitat 2: The lower circalittoral consisted of ridged bedrock, large blocks of limestone, and a vertical 8 m high cliff. A variety of sponges were present, with *Phakellia ventilabrum* common. The horizontal rock was covered by *Corynactis viridis*.

9 North-west of Rock Island, Aran Islands. 53°09.2'N 09°52.0'W

An extremely exposed limestone platform to the north of offshore islands. The seabed at 36 m BCD was upper circalittoral bedrock. The habitat was characterised by *Axinella infundibuliformis*, *Phakellia ventilabrum*, *Holothuria forskali* and *Axinella dissimilis*. Sponges were abundant and diverse. *Eunicella verrucosa* was present only in the lower part of the zone. Tracks were apparent on the seabed indicating recent trawling.

10 North of Brannock Island, Aran Islands. 53°09.2'N 09°50.0'W

The site was to the north of an offshore island. The seabed consisted of undulating limestone bedrock with considerable numbers of white sea fans *Eunicella verrucosa* and sponges *Pachymatisma johnstonia*, *Cliona celata* and *Phakellia ventilabrum*.

11 Brannock East Sound, Inishmore, Aran Islands. 53°08.5'N 09°50.0'W

The site was located in the middle of the channel between the main island of Inishmore and an offshore island on the west end of the archipelago. The site was exposed to the south west and it is likely that current was present but not strong. The sea bed at 18.5 m BCD was ridges of limestone with areas of coarse shelly sand. The seabed rose to the west and east up a nearly vertical face with many crevices and a pitted texture. The rock had sparse kelp, *Laminaria hyperborea*, on the upper surface. The crevices had sea cucumbers *Aslia lefevrei* and *Pawsonia saxicola*. The vertical faces were dominated by *Corynactis viridis* and *Alcyonium digitatum*. The boulders in the lower part of the habitat supported dense *Phoronis hippocrepia*.

12 North-east of Kinereigh Point, Inishmore, Aran Islands. 53°09.9'N 09°40.4'W

The site was located near the entrance of a west facing bay (Galway). The seabed at 38.5 m BCD consisted of lower circalittoral limestone bedrock, covered by a moderately thick layer of silt. The cup coral *Caryophyllia smithii* was super-abundant.

13 North of Brocklinmore Bank, Aran Islands. 53°11.2'N 09°43.5'W

There was an exposed flat bedrock platform at 36.5 m BCD in centre of a west facing sound between the mainland and some large offshore islands. Lower circalittoral flat bedrock was dominated by *Ophiothrix fragilis*, *Alcyonium digitatum* and barnacles, probably *Balanus crenatus*. The barnacles had silt on them. *Ophiocomina nigra* and *Suberites carnosa* were scattered throughout. *Corynactis viridis* was common on the shelf at 35.5 m BCD. *Marthasterias glacialis*, *Urticina felina*, *Nemertesia antennina* and *N. ramosa* were occasional. Generally the habitat had a poor species diversity.

14 West of Golam Head, Kilkieran Bay. **53°13.1'N 09°46.6'W**

The site was exposed bedrock and boulders at the entrance to a large bay, with boulders at the edge of sand at 36 m BCD. Several blocks of bedrock and large boulders merged with the sand at 36 m BCD. Above this was bedrock. Initially the area looked bare and species poor but improved on the bedrock at 30 m BCD. The lower circalittoral bedrock and boulders were dominated by *Caryophyllia smithii*, *Holothuria forskali* and *Echinus esculentus*. The starfish *Luidia ciliaris*, *Marthasterias glacialis* and *Henricia oculata* were observed. Several colonies of *Eunicella verrucosa*, *Porella compressa* and *Omalosecosa ramulosa* were also observed. *Phakellia ventilabrum* was abundant on the bedrock at 28.2 m BCD. Identification of this sponge vs. *Axinella infundibuliformis in situ* was uncertain but specimens of *Phakellia ventilabrum* were collected.

15 North-east of Dinish Island, Kilkieran Bay. **53°18.0'N 09°49.6'W**

A sheltered muddy slope in a west facing bay. A gentle slope of soft, anaerobic mud. The Dublin Bay Prawn *Nephrops norvegicus* was present. There were scattered scallops and frequent asteroids. The rare Butterfly Blenny was found in an empty beer bottle. Debris was common on the seabed e.g. old ropes and beer bottles.

16 North-east of Dinish Island, Kilkieran Bay. **53°18.0'N 09°49.6'W**

The site was located in a bay exposed to the SW winds and with offshore islands. The site was adjacent to a fish farm. The sea bed at 25 m BCD was a flat and gently sloping plain of mud with shell debris. The mud was characterised by *Turritella* shells inhabited by *Pagurus bernhardus* and *P. prideaux* and occasional *Hydractinia echinata* and *Adamsia carciniopados*. *Asterias rubens* was common. *Nephrops norvegicus* and *Pecten maximus* were occasional.

17 South of Inishtravin Island, Kilkieran Bay. **53°18.9'N 09°40.3'W**

The site was on the south side of a rock outcrop exposed at low water in a narrow channel with strong tidal streams. There was a steep slope consisting of vertical bedrock and boulder covered terraces, with some steep boulder slopes. The lower circalittoral zone extended downwards from 12m BCD and was dominated by the ascidians *Ascidia mentula*, *Corella parallelogramma* and *Ascidia virginea*. Sponges were diverse and abundant.

18 South of Inishtravin Island, Kilkieran Bay. **53°18.9'N 09°40.3'W**

A south facing bedrock slope with boulders on the western end of a west facing bay with many islets. The site was at the western end of a relatively narrow channel with tidal current and was lower circalittoral vertical bedrock with boulders on a steep slope. The dominant species were *Corella parallelogramma*, *Aplidium punctum*, *Alcyonidium diaphanum*. *Ascidia virginea*, *Haliclona simulans* and *Esperiopsis fucorum* were common.

19 South of Inishtravin Island, Kilkieran Bay. **53°18.9'N 09°40.3'W**

The site was located on the south side of an isolated rock in an enclosed section of Kilkieran Bay. The area was subjected to strong tidal currents. The seabed dropped steeply from kelp at 4.4 m BCD (not surveyed) down to the limit of red algae at 9.4 m BCD (not surveyed). A boulder and bedrock slope dropped down to 22.7 m and beyond. The lower circalittoral bedrock and boulder slope was covered with some silt and was characterised by sponges particularly *Haliclona simulans* in the holes between the boulders and the erect sponges *Stelligera stuposa*, *Stelligera rigida* and *Raspailia ramosa* on the open rock. Tunicates covered much of the remaining rock particularly *Corella parallelogramma* and *Ciona intestinalis*. The slope extended beyond the area surveyed.

20 South of Inishtravin Island, Kilkieran Bay. 53°18.9'N 09°40.3'W
The site consisted of submerged rocks in a narrow sound with strong tidal streams. The sound was located in a sheltered west facing bay. There was circalittoral bedrock with steep and horizontal surfaces. There were also medium sized boulders lying on top of the bedrock. The habitat had a diverse sponge fauna. It was dominated by the ascidians *Ascidia mentula, Ascidia virginea, Corella parallelogramma,* and *Aplidium punctum.*

21 South of Inishtravin Island, Kilkieran Bay. 53°18.9'N 09°40.3'W
The site was to one side of a 40 m deep channel with strong tidal currents but sheltered from south-west winds. Most of the survey was between 17-22 m on a sublittoral cliff top with boulder scree above. Tunicate dominated sessile fauna from 12-22 m; sponges secondarily dominant. goldsinny wrasse dominated the mobile fauna, however the leopard spotted gobies and ballan wrasse were also common.

22 North north-east of Leighon Island, Kilkieran Bay. 53°19.4'N 09°38.2'W
The site was located to the north east of a small islet in a sheltered west facing bay (Galway). The site was selected because it was an unusually deep hole in the bay and a possible site for *Pachycerianthus multiplicatus.* Habitat 1: Large stable boulders with abundant and diverse sponges. The habitat was characterised by solitary ascidians and erect and encrusting sponges. Habitat 2: Sheltered muddy gravel with weak tidal streams. The habitat was lower circalittoral gravel and was characterised by the anemones *Mesacmaea mitchellii* and *Aureliania heterocera.*

23 North north-east of Leighon Island, Kilkieran Bay. 53°19.4'N 09°38.2'W
The site was located in a 'deep' hole in the northern sheltered area of Kilkieran Bay. The area was surrounded by inlets and islands with extensive areas of shallow water. The seabed at 27 m BCD was a flat level plain of sandy gravel overlying mud leading up to a slope of boulders at 25.4 m BCD. Habitat 1: A steep slope of silty boulders covered with encrusting sponges particularly *Pachymatisma johnstonia, Mycale rotalis, Esperiopsis fucorum* and *Polymastia* spp. Tunicates were common on the steeper faces of the boulders with abundant *Corella parallelogramma* and *Ascidia mentula.* Habitat 2: A plain of muddy, sandy gravel with *Mesacmaea mitchellii, Aureliania heterocera* and *Scolanthus callimorphus.* The sediment was relatively soft although it was gravel.

24 South-east of Mussel Rock, Roskeeda Bay, Kilkieran Bay. 53°20.8'N 09°38.9'W
A steeply sloping muddy hole in an extremely sheltered inlet of a complex bay. There were bedrock outcrops at the side of the slope. The slope became a gentle incline at 30 m BCD. Habitat 1: Very soft sediment at 4 m to 7 m BCD was dominated by *Virgularia mirabilis,* with *Pagurus bernhardus* with *Hydractinia echinata* occasionally seen on the shells. The anemone *Sagartia undatus* was frequent. Habitat 2: Lower circalittoral steeply sloping bedrock that was covered with a thick layer of silt. The dominant animals were the ascidians *Corella parallelogramma, Ascidia mentula* and *Ascidia virginea.* Also common were the sponges *Suberites carnosus, Tethya aurantium, Polymastia boletiformis, Mycale rotalis, Haliclona fistulosa* and *Dysidea fragilis. Plakortis simplex* was occasionally seen. Rock extended from 7 m to 22 m BCD. Habitat 3: A steep slope of very soft mud dominated by *Pachycerianthus multiplicatus.* The shore crab *Carcinus maenas* was also common. The soft mud extended from 17-30 m BCD.

25 South-east of Mussel Rock, Roskeeda Bay, Kilkieran Bay. 53°20.8'N 09°38.9'W
The site was a deep depression in a shallow channel in the inner part of a sheltered fjard. It had steep mud slopes, and to the north-east a bedrock wall with boulders at the top. Habitat 1: A mud slope extended from 4 m to 14 m BCD with abundant *Virgularia mirabilis* and

frequent *Sagartiogeton undatus*. Habitat 2: Silty boulders and bedrock extended from 6-17 m BCD and were covered by thinly encrusting sponges and *Ascidia mentula*. The sponges included *Mycale contarenii, M. rotalis, Dysidea fragilis* and *Eurypon* species. Habitat 3: A mud slope extended from 14-32 m BCD and *Pachycerianthus multiplicatus* was common.

26 North of Kinnelly Rock, Kilkieran Bay. 53°19.5'N 09°42.3'W

The site was between two islands in a fiardic sea lough in a depression with moderately strong tidal streams. Habitat 1: The coarse gravel seabed had a surface layer of *Molgula occulta* and a recent settlement of 1 cm tall *Corella parallelogramma*. The anemone *Mesacmaea mitchellii* was common. Habitat 2: Large silty boulders and low bedrock outcrops were dominated by large patches of *Polymastia mamillaris*. *Ascidia mentula* and *A. virginea* were both frequent, as were a variety of sponges.

27 North of Kinnelly Rock, Kilkieran Bay. 53°19.5'N 09°42.3'W

There was coarse sediment on the east side of a complex south-west facing bay, near the main channel. Habitat 1: The seabed was lower circalittoral sediment consisting of shell, coarse sand and maerl. The dominant species were *Corella parallelogramma, Alcyonidium diaphanum* and *Mesacmaea mitchellii. Cliona celata, Suberites carnosa,* and *Esperiopsis fucorum* were occasional. There were many dead *Pecten maximus* shells but no live ones were observed. The sediment graded into an area of boulders. Habitat 2: The seabed was low flat boulders with some sediment on and between them. The characterising species were *Polymastia mamillaris, Stelligera stuposa, Ascidia mentula, Dysidea fragilis, Alcyonidium diaphanum* and *Corella parallelogramma.* Beneath the sediment on the boulders there were small encrusting tunicates with red siphons. There were also large amounts of 'snow' like didemnids.

28 North of Kinnelly Rock, Kilkieran Bay. 53°19.5'N 09°42.3'W

The site was located on the north side on an isolated group of rocks within Kilkieran Bay. The current running into the bay was strong. The seabed at 20.9 m BCD was a level gently sloping plain of gravel, shell and maerl fragments with mud beneath the surface. At 16.1 m BCD the sediment gave way to scoured, silty boulders and bedrock. At approx. 10 m BCD the boulders gave way to duned maerl (not surveyed). The boulders and bedrock supported numerous sponge species particularly *Tethya aurantium* and massive *Dysidea fragilis*.

29 North of Kinnelly Rock, Kilkieran Bay. 53°19.5'N 09°42.3'W

Habitat 1: A plain of muddy gravel with maerl. The anemones *Mesacmaea mitchellii* and *Aureliania heterocera* were characteristic. Habitat 2: There were broken bedrock ridges in the lower circalittoral. The ascidians *Aplidium punctum* and *Corella parallelogramma* were frequent and the sponges *Polymastia mamillaris* and *Haliclona simulans* were characteristic.

30 North of Kinnelly Rock, Kilkieran Bay. 53°19.5'N 09°42.3'W

Sublittoral cliff below 20 m and boulder scree above. The site was on the side of a 40 m deep channel with strong tidal currents but sheltered from the southwest wind. Tunicates dominated the sessile fauna from 12-22 m, sponges secondarily dominant, Goldsinny very abundant and the leopard spotted goby was common.

31 North-west of Lettercallow Spit, Kilkieran Bay. 53°18.2'N 09°43.7'W

The site was located on the western bank of a submerged spit adjacent to a deep water channel in the shelter of Kilkieran Bay. The seabed at 18.2 m was a steep slope of angular boulders with patches of sand between, leading up to an almost level plain of cobbles and pebbles with some with patches of maerl. Habitat 1: Cobble and pebble plain characterised by coralline crusts with *Epizoanthus couchii* on much of the rock. The sponge *Oscarella*

lobularis was occasional on some of the cobbles. The sediment between the stones had *Mesacmaea mitchellii*; *Cerianthus lloydii* was rare. *Antedon bifida* was abundant on the rock surfaces. Habitat 2: A steep boulder slope with sponges and *Flustra foliacea* on the lower boulders. *Antedon bifida* was frequent, with the hydroid *Nemertesia antennina* on the upper rock faces. Patches of gravel between the rocks had rare *Chaetopterus variopedatus*.

32 Lettercallow Spit, Kilkieran Bay. **53°18.0'N 09°44.1'W**

The site was a shallow spit of maerl gravel with occasional rock outcrops extending across the entrance channel of a fjord, experiencing approx. a 2 knot tidal stream. The habitat consisted of dunes of maerl gravel with a surface covering of live maerl, especially on the slopes of the dunes. Foliose red algae were abundant in the hollows, while some dunes appeared to be advancing and consisted of more bare maerl gravel. A rock outcrop modified the habitat in one area, greatly increasing the diversity of anthozoans present. *Cereus pedunculatus*, *Peachia cylindrica*, *Halcampoides elongatus* and *Scolanthus callimorphus* were all frequent to common in this small area.

33 South of Lettercallow Spit, Kilkieran Bay. **53°18.0'N 09°44.1'W**

The site was located on the end of a shallow submerged spit in an enclosed bay. The spit was adjacent to relatively deep water and subject to reasonably strong tidal streams. The seabed at 7 m BCD was duned maerl gravel with live maerl growing in the hollows. The *Lithothamnion coralloides* was covered with red algae particularly *Calliblepharis ciliata*, *Plocamium cartilagineum* and *Acrosorium reptans*. Sponges were also present particularly *Dysidea fragilis* and *Haliclona fistulosa*. Anthozoans were common in the dead maerl ridges with frequent *Cereus pedunculatus*, *Aureliania heterocera* and *Cerianthus lloydii*.

34 South-west of Illaunmaan, Kilkieran Bay. **53°17.0'N 09°46.0'W**

The site was in the entrance to a large fjard, with moderately strong tidal streams.The sea bed consisted of long dunes of maerl gravel with a sprinkling of live maerl on the surface and many red algae in the hollows. The sea cucumber *Neopentadactyla mixta* was superabundant, and the mollusc *Gibbula magus* was common.

35 Mweenish Bay, Kilkieran Bay. **53°16.2'N 09°44.7'W**

A plain of muddy sand in a very sheltered area of a west facing bay. *Arenicola marina* casts were common. The sand dab *Limanda limanda* was abundant. Sand gobies and dragonets were also present in large numbers.

36 Centre of Mweenish Bay, Kilkieran Bay. **53°18.0'N 09°49.6'W**

The site was located in a sheltered shallow inlet open to the main coast by shallow water to the south. The sea bed at 4.7 m BCD was a plain of muddy fine sand adjacent to an area of extensive drift algae, mostly *Asparagopsis armata* (not surveyed). A muddy sandy plain with frequent mounds of *Arenicola marina* and numerous fish species particularly *Callionymus lyra* and *Limanda limanda*. Hermit crabs *Pagurus bernhardus* were common, with occasional *Hydractinia echinata*.

37 North-west Mweenish Bay, Kilkieran Bay. **53°18.6'N 09°50.5'W**

The site was on the east side of an island on the Atlantic coast of Ireland, with sheltering offshore islets. The upper shore was soft coarse sand with no large fauna present. The lower shore was a shallow slope of fine, rippled, waterlogged sand with many bivalve shells lying at the surface. At about 2 m ACD cockles were occasional, from 1 m ACD down to the low water mark *Ensis arcuatus* and *Echinocardium cordatum* were frequent.

38 West of Mulroa Point, Kilkieran Bay. 53°17.2'N 09°50.4'W

The site was located on the southern end of a peninsula on the west side of Kilkieran bay. The site was exposed to the south west but protected to the south and south east by an offshore island and shallows. Habitat 1: Lichen zone on the upper shore with *Ramalina* sp being the most abundant and extensive. *Xanthoria parietina* was occasional on the upper reaches of the habitat. Habitat 2: A very limited habitat characterised by a narrow band of *Pelvetia canaliculata* with *Semibalanus balanoides* on the exposed rock faces. Within the dead barnacles *Littorina neglecta* were superabundant. Habitat 3: The most extensive habitat on the shore was characterised by *Fucus vesiculosus* and the barnacle *Chthalamus stellatus*. Crevices were colonised by *Actinia equina*. *Fucus vesiculosus* was restricted in general to the lower part of the habitat with fewer plants within the rest of the habitat. Habitat 4: *Fucus serratus* zone on the lower part of the bedrock and upper boulders. The boulders has common *Dendrodoa grossularia* and *Porcellana platycheles* on the undersides. Generally a restricted zone approx. 3-4 m wide at the point surveyed although likely to be more extensive at other parts of the shore. Habitat 5: *Laminaria digitata* on lower shore boulders with thick coralline crusts on the upper boulder surfaces. The under surfaces had abundant Spirorbid worm tubes with *Asterina gibbosa*, *Porcellana platycheles* and encrusting sponges, particularly *Ophlitaspongia seriata* and *Halichondria panicea*.

39 Bay south-west of Mweenish Island, Kilkieran Bay. 53°18.0'N 09°51.0'W

Beach at the head of a bay on the sout-west side of island exposed to Atlantic swells and with offshore islets. At the head of the beach was a berm.

40 Quay, North Mweenish Island. 53°18.5'N 09°52.0'W

A shallow sloping rocky shore on a northwest facing coast of a small island. The site was very sheltered and was separated from the mainland by a narrow channel with weak tidal streams.

41 West of Namackan Sound, Kilkieran Bay. 53°14.2'N 09°54.3'W

The site was extremely exposed circalittoral bedrock at the western extreme of a west facing bay (Galway Bay). The sea bed was very three dimensional with a variety of vertical and horizontal surfaces. The lower circalittoral bedrock had steep, vertical and horizontal surfaces. *Holothuria forskali* was abundant and the encrusting sponge *Phakellia vermiculata* was common. The habitat was characterised by Axinellid sponges, *Eunicella verrucosa*, *Myxilla fimbriata* and *Phakellia ventilabrum*. The overall species abundance was not very high, however the diversity was high and many rare species were present.

42 West of Namackan Rock, North Sound, Kilkieran Bay. 53°14.2'N 09°54.3'W

The site was located on deep bedrock on the open coast on the extreme western edge of Galway Bay near the entrance of Kilkieran Bay. The seabed at 34.7 m BCD was broken bedrock and boulders with red crusts, *Caryophyllia smithii* and hydroids, particularly *Schizotricha frutescens*. The boulders lead to flat smooth bedrock covered with Axinellid sponges, *Eunicella verrucosa* and *Alcyonium glomeratum*. Echinoderms were well represented with frequent *Holothuria forskali* and *Echinus esculentus*.

43 East of Doonguddle, Skerd Rocks. 53°15.1'N 09°59.2'W

The site was located on the east side of a ridge of rocks. The seabed was extremely exposed lower circalittoral bedrock and boulders. The rock was very hard, probably granite. The seabed was circalittoral bedrock with *Axinella infundibuliformis*, *Phakellia ventilabrum*, *Axinella dissimilis*, *Axinella damicornis*, *Alcyonium glomeratum*, *Eunicella verrucosa* and *Diazona violacea*.

44 South-west of Doonguddle, Skerd Rocks. **53°15.0'N 09°59.4'W**

The site was located on the west side of a ridge running south from an offshore islet. Steeply sloping bedrock in large angular blocks. Lower circalittoral from 19.75 to 41.75 m BCD was dominated by *Caryophyllia smithii, Holothuria forskali, Phakellia ventilabrum* with occasional *Axinella infundibuliformis, Diazona violacea* and *Alcyonium glomeratum.* A thermocline was present at 38 m BCD and the temperature dropped from 15^0 C to 13^0 C. There was a subzone below 34 m where *Phakellia ventilabrum* became abundant on the horizontal surfaces.

45 North-west of Doonguddle, Skerd Rocks. **53°15.3'N 09°59.6'W**

The site was located in a channel between two isolated offshore islands, exposed to the west with deep water adjacent. The sea bed flattened out at 17 m BCD. The cliff was characterised by *Corynactis viridis* and *Caryophyllia smithii* with a dense coverage of the bryozoan *Crisia eburnea.* An adjacent gully and the cliff top had red algae particularly *Nitophyllum punctatum* and some *Drachiella spectabilis.* Common sponges were *Pachymatisma johnstonia* and *Cliona celata* with occasional *Raspailia ramosa* and *Polymastia mamillaris.*

46 East of Skerdmore, Skerd Rocks. **53°15.4'N 09°59.9'W**

The site was on the east side of an offshore islet. It consisted of a steep ridge of bedrock, with vertical faces and narrow terraces. Habitat 1: The upper infralittoral zone extended upwards from 17 m BCD to the top of a ridge at 12 m BCD and there was a sparse *Laminaria hyperborea* forest with scattered red algae, many amphipod tubes and large clumps of *Cliona celata.* Habitat 2: The lower infralittoral zone extended from 17 to 23 m BCD. The vertical faces were covered with small *Corynactis viridis* and the horizontal surfaces with several species of foliose red algae. Habitat 3: The upper circalittoral zone consisted of relatively barren boulders and bedrock with *Holothuria forskali, Cliona celata* and *Abietinaria abietina* present.

APPENDIX 2: COMMUNITY DESCRIPTIONS

A detailed description of each community recorded during the present survey is given below. Each description comprises the following sections:

a. A title for the **community type**, which indicates the main characterising taxa. The community types are numbered consecutively with the prefix KA denoting the survey area, Kilkieran Bay and the Aran Islands. These numbers do not relate to numbers given for community descriptions in other BioMar or MNCR type survey reports.

b. The key physical characteristics of the **habitat type**.

c. A **site and habitat classification** according to MNCR terms (see Hiscock 1990). Where the habitat is present over a range of conditions the range within each category is indicated.

d. The recorded **distribution** of the community within the survey area. The numbers given refer to the site and habitat records, which correspond with MNCR database records, for example, 14(1) is site record 14 and habitat record 1.

e. The known or expected **extent** of the habitat within the survey area.

f. A **description** of the habitat, including the important physical and biological features, and any variations in community structure at particular sites.

g. The **species composition** of the community. Species included occurred at 35% or more of the stations from which the community was recorded, unless otherwise stated. Beside each species the range and median abundance within the community is shown (see Hiscock 1990 for abundance scales). **Frequency** is the number of habitats, from those assigned to each community, from which the species was recorded. The **%** displays this as a percentage of the total number of records assigned to that community. The **abundance** relates to those defined in Hiscock 1990. i.e.

P-present
R-rare
O-occasional
F-frequent
C-common
A-abundant
S-super abundant

COMMUNITY KA1 Lichen zone

HABITAT Supralittoral rock

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Exposed
Tidal stream:	Uncertain
Geology:	Hard/Igneous
Zone/Range:	Supralittoral
Substratum:	Bedrock

Distribution 38(1)

Extent

This community is likely to be found in all coastal areas with rocky outcrops and a high degree of exposure.

Description

The characterising species of this lichen zone were *Ramalina* spp. which were abundant. *Xanthoria parietina* was present in the uppermost areas of the habitat. The other lichens recorded were *Caloplaca* sp., *Lecanora atra, Verrucaria maura* and unidentified grey encrusting lichens.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Lecanora atra	1	100	F - F	F
Ramalina indet.	1	100	C - C	C
Verrucaria maura	1	100	F - F	F
Xanthoria parietina	1	100	F - F	F
Grey lichens indet.	1	100	F - F	F

COMMUNITY KA2 --- *Pelvetia canaliculata* zone

HABITAT Exposed upper rocky shore

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Exposed
Tidal stream:	Uncertain
Geology:	Hard/Igneous
Zone/Range:	Lower littoral fringe
Substratum:	Bedrock

Distribution 38(2)

Extent

This community is likely to occur on all rocky shores in the survey area with a high degree of wave exposure.

Description

This community was restricted to a narrow band characterised by *Pelvetia canaliculata* with *Semibalanus balanoides*. *Littorina neglecta* was abundant and *Littorina saxatilis* was occasionally observed in dead barnacles. *Lichina confinis* and *Verrucaria maura* were frequently seen on the rock surface.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Semibalanus balanoides	1	100	F - F	F
Littorina neglecta	1	100	A - A	A
Littorina saxatilis	1	100	O - O	O
Pelvetia canaliculata	1	100	F - F	F
Lichina confinis	1	100	F - F	F
Verrucaria maura	1	100	F - F	F

COMMUNITY KA3 *Pelvetia canaliculata* and *Fucus spiralis* zone

HABITAT Granite bedrock with shallow pools, boulders and cobbles

Classification

Situation:	Sound
Salinity:	Normal
Wave exposure:	Very sheltered
Tidal stream:	Weak
Geology:	Igneous
Zone/Range:	Lower littoral fringe
Substratum:	Bedrock, boulders and cobbles

Distribution 40(1)

Extent

This community is likely to occur on all sheltered rocky shores in the survey area..

Description

This upper shore community was characterised by a narrow band of *Pelvetia canaliculata* and below this a thin band of *Fucus spiralis.*

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Mysidacea indet.	1	100	C - C	C
Palaemon serratus	1	100	C - C	C
Carcinus maenas	1	100	O - O	O
Lepidochitona cinereus	1	100	O - O	O
Monodonta lineata	1	100	C - C	C
Littorina littorea	1	100	F - F	F
Littorina saxatilis	1	100	C - C	C
Hinia reticulata	1	100	O - O	O
Lasaea rubra	1	100	O - O	O
Pomatoschistus pictus	1	100	F - F	F
Ascophyllum nodosum mackaii	1	100	O - O	O
Fucus spiralis	1	100	C - C	C
Pelvetia canaliculata	1	100	C - C	C
Lichina pygmaea	1	100	O - O	O
Verrucaria maura	1	100	F - F	F

COMMUNITY KA 4 *Fucus vesiculosus* zone

HABITAT Exposed mid shore

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Exposed
Tidal stream:	Uncertain
Geology:	Hard/Igneous
Zone/Range:	Upper eulittoral
Substratum:	Bedrock

Distribution 38(3)

Extent

Likely to occur on all exposed rocky shores.

Description

This community covered an extensive area on the shore and was characterised by *Fucus vesiculosus* and the barnacle *Chthamalus stellatus*. *Fucus vesiculosus* was generally restricted to the lower parts of the habitat; elsewhere it was only occasional. The gastropods *Gibbula umbilicalis, Littorina neritoides* and *Nucella lapillus* were common. The cracks in the rock were colonised by *Actinia equina.*

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Halichondria panicea	1	100	R - R	R
Actinia equina	1	100	F - F	F
Spirorbidae indet.	1	100	F - F	F
Chthamalus stellatus	1	100	A - A	A
Porcellana platycheles	1	100	O - O	O
Carcinus maenas	1	100	R - R	R
Anurida maritima	1	100	O - O	O
Patella vulgata	1	100	A - A	A
Gibbula umbilicalis	1	100	C - C	C
Littorina neritoides	1	100	C - C	C
Littorina saxatilis	1	100	R - R	R
Nucella lapillus	1	100	C - C	C
Mytilus edulis	1	100	O - O	O
Asterina gibbosa	1	100	R - R	R
Hildenbrandia rubra	1	100	F - F	F
Corallinaceae crusts indet.	1	100	C - C	C
Corallina officinalis	1	100	C - C	C
Laminaria digitata	1	100	R - R	R
Fucus serratus	1	100	O - O	O
Fucus vesiculosus	1	100	C - C	C
Enteromorpha	1	100	O - O	O
Ulva indet.	1	100	O - O	O

Codium indet.	1	100	R - R	R
Lichina confinis	1	100	O - O	O
Verrucaria mucosa	1	100	O - O	O

COMMUNITY KA5 *Ascophyllum nodosum* and *Fucus vesiculosus* zone

HABITAT Sheltered slope of granite bedrock and boulders

Classification

Situation: Straits
Salinity: Normal
Wave exposure: Very sheltered
Tidal stream: Weak
Geology: Igneous
Zone/Range: Upper eulittoral
Substratum: Bedrock and boulders

Distribution 40(2)

Extent

As this community is characteristic of sheltered rocky shores it should occur on all sheltered rocky shores in the survey area.

Description

The granite bedrock and boulders of this sheltered midshore habitat were covered with *Ascophyllum nodosum* and *Fucus vesiculosus. Polysiphonia lanosa* was common on the *A. nodosum.* The dominant fauna were the barnacles *Chthamalus stellatus* and the gastropods *Patella vulgata, Monodonta lineata, Gibbula cineraria, Littorina obtusa* and *Nucella lapillus.*

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Chthamalus stellatus	1	100	C - C	C
Patella vulgata	1	100	F - F	F
Monodonta lineata	1	100	F - F	F
Gibbula cineraria	1	100	F - F	F
Littorina obtusata	1	100	O - O	O
Nucella lapillus	1	100	F - F	F
Polysiphonia lanosa	1	100	C - C	C
Ascophyllum nodosum	1	100	A - A	A
Fucus vesiculosus	1	100	A - A	A
Enteromorpha indet.	1	100	O - O	O

COMMUNITY KA6 Dense *Fucus serratus*

HABITAT Sheltered granite lower shore with bedrock and boulders

Classification

Situation:	Sound
Salinity:	Normal
Wave exposure:	Very sheltered
Tidal stream:	Weak
Geology:	Igneous
Zone/Range:	Lower eulittoral
Substratum:	Bedrock and boulders

Distribution 40(3)

Extent

Likely to occur on sheltered rocky shores on the west coast of Ireland that are gently sloping and have some standing wate

Description

An extensive coverage of *Fucus serratus* dominated this sheltered midshore habitat of bedrock and boulders. Standing water was present on the horizontal bedrock. The algae *Palmaria palmata* and *Mastocarpus stellatus* were also characteristic of this community. The conspicuous fauna were the anemone *Anthopleura ballii;* the barnacles *Chthamalus stellatus* and *Balanus crenatus,* the limpet *Patella vulgata,* the gastropods *Gibbula umbilicalis, Littorina mariae* and *Nucella lapillus.* The bryozoans *Alcyonidium gelatinosum, Flustrellidra hispida* and the ascidian *Botrylloides leachi* were also frequently observed.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Dynamena pumila	1	100	O - O	O
Anthopleura ballii	1	100	F - F	F
Chthamalus stellatus	1	100	F - F	F
Balanus crenatus	1	100	F - F	F
Patella vulgata	1	100	F - F	F
Monodonta lineata	1	100	O - O	O
Gibbula umbilicalis	1	100	F - F	F
Littorina littorea	1	100	O - O	O
Littorina mariae	1	100	F - F	F
Cingula cingillus	1	100	O - O	O
Nucella lapillus	1	100	F - F	F
Ocenebra erinacea	1	100	R - R	R
Hinia reticulata	1	100	O - O	O
Alcyonidium gelatinosum	1	100	F - F	F
Flustrellidra hispida	1	100	F - F	F
Asterina gibbosa	1	100	O - O	O
Botryllus schlosseri	1	100	O - O	O
Botrylloides leachi	1	100	F - F	F
Pholis gunnellus	1	100	O - O	O

Palmaria palmata	1	100	O - O	O
Mastocarpus stellatus	1	100	F - F	F
Fucus serratus	1	100	C - C	C

COMMUNITY KA7 *Fucus serratus* zone

HABITAT Lower exposed shore of bedrock

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Exposed
Tidal stream:	Uncertain
Geology:	Hard/Igneous
Zone/Range:	Lower eulittoral
Substratum:	Bedrock and boulders

Distribution 38(4)

Extent

This community is likely to be found on all exposed rocky shores in the survey area.

Description

The community in the area surveyed was restricted to a band 3-4 m wide although it is likely to be more extensive at adjacent parts of the shore and on other shores. The characterising species was *Fucus serratus* on the bedrock and upper surfaces of the boulders. The algae *Lomentaria clavellosa, Himanthalia elongata, Mastocarpus stellatus* and coralline crusts were all common. The limpet *Patella ulyssiponensis* was also common. The undersides of the boulders were characterised by *Dendrodoa grossularia* and *Porcellana platycheles;* the starfish *Asterina gibbosa* was frequently observed.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Halisarca dujardini	1	100	O - O	O
Actinia equina	1	100	O - O	O
Eulalia viridis	1	100	O - O	O
Pomatoceros triqueter	1	100	F - F	F
Porcellana platycheles	1	100	C - C	C
Patella ulyssiponensis	1	100	C - C	C
Calliostoma zizyphinum	1	100	O - O	O
Littorina obtusata/mariae	1	100	O - O	O
Nucella lapillus	1	100	O - O	O
Asterina gibbosa	1	100	F - F	F
Psammechinus miliaris	1	100	O - O	O
Aslia lefevrei	1	100	O - O	O
Dendrodoa grossularia	1	100	C - C	C

Audouinella indet.	1	100	O - O	O
Hildenbrandia rubra	1	100	O - O	O
Corallinaceae crusts indet.	1	100	C - C	C
Mastocarpus stellatus	1	100	C - C	C
Lomentaria articulata	1	100	O - O	O
Lomentaria clavellosa	1	100	F - F	F
Fucus serratus	1	100	A - A	A
Himanthalia elongata	1	100	F - F	F
Ulva indet.	1	100	O - O	O
Codium indet.	1	100	O - O	O
Verrucaria mucosa	1	100	F - F	F

COMMUNITY KA8 *Laminaria saccharina* and *Himanthalia elongata*

HABITAT Lower shore of bedrock and boulders

Classification

Situation:	Sound
Salinity:	Normal
Wave exposure:	Very Sheltered
Tidal stream:	Weak
Geology:	Igneous
Zone/Range:	Sublittoral fringe
Substratum:	Bedrock and boulders

Distribution 40(4)

Extent

This community would be expected to occur in the survey area on sheltered rocky shores where there is a weak current.

Description

The lower shore consisted of granite bedrock ridges and boulders covered with a layer of silt. The conspicuous species of this community were *Laminaria saccharina* and *Himanthalia elongata* which were growing on the bedrock ridges and the tops of boulders. An understorey of *Chondrus crispus, Polyides rotundus, Griffithsia corallinoides, Leathesia difformis* and *Enteromorpha sp.* was present. The undersides of the boulders had a rich and diverse fauna most notably the sponges *Clathrina coriacea, Terpios fugax, Hymeniacidon perleve, Dysidea fragilis, Aplysilla rosea, Aplysilla sulfurea* and the ascidians *Ascidiella scabra, Ascidia conchilega* and *Ascidia mentula.* The anemone *Anthopleura ballii* was abundant.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Clathrina coriacea	1	100	F - F	F
Leuconia nivea	1	100	R - R	R
Tethya aurantium	1	100	O - O	O
Terpios fugax	1	100	F - F	F
Polymastia mamillaris	1	100	R - R	R
Hymeniacidon perleve	1	100	F - F	F
Dysidea fragilis	1	100	F - F	F
Aplysilla rosea	1	100	F - F	F
Aplysilla sulfurea	1	100	F - F	F
Halisarca dujardini	1	100	O - O	O
Porifera indet crusts	1	100	F - F	F
Anemonia viridis	1	100	O - O	O
Anthopleura ballii	1	100	A - A	A
Caryophyllia smithii	1	100	R - R	R
Alentia gelatinosa	1	100	O - O	O
Harmothoe indet.	1	100	O - O	O
Eupolymnia nebulosa	1	100	F - F	F
Filograna implexa	1	100	O - O	O

Pagurus bernhardus	1	100	O - O	O
Galathea squamifera	1	100	O - O	O
Pisidia longicornis	1	100	F - F	F
Porcellana platycheles	1	100	O - O	O
Cancer pagurus	1	100	O - O	O
Liocarcinus puber	1	100	O - O	O
Pilumnus hirtellus	1	100	O - O	O
Xantho incisus	1	100	O - O	O
Gibbula cineraria	1	100	O - O	O
Calliostoma zizyphinum	1	100	O - O	O
Lamellaria perspicua	1	100	R - R	R
Berthella plumula	1	100	O - O	O
Cadlina laevis	1	100	O - O	O
Aeolidia papillosa	1	100	R - R	R
Chlamys varia	1	100	F - F	F
Pecten maximus	1	100	R - R	R
Anomia ephippium	1	100	O - O	O
Pododesmus squamula	1	100	O - O	O
Schizomavella linearis	1	100	O - O	O
Asterina gibbosa	1	100	F - F	F
Ophiothrix fragilis	1	100	O - O	O
Amphipholis squamata	1	100	R - R	R
Clavelina lepadiformis	1	100	R - R	R
Sidnyum turbinatum	1	100	O - O	O
Aplidium nordmanni	1	100	O - O	O
Aplidium punctum	1	100	O - O	O
Didemnidae indet.	1	100	F - F	F
Didemnum maculosum	1	100	O - O	O
Ciona intestinalis	1	100	F - F	F
Ascidiella scabra	1	100	C - C	C
Ascidia conchilega	1	100	A - A	A
Ascidia mentula	1	100	A - A	A
Dendrodoa grossularia	1	100	O - O	O
Botryllus schlosseri	1	100	O - O	O
Botrylloides leachi	1	100	O - O	O
Taurulus bubalis	1	100	R - R	R
Pholis gunnellus	1	100	O - O	O
Gobius paganellus	1	100	O - O	O
Gobiusculus flavescens	1	100	P - P	P
Chondrus crispus	1	100	A - A	A
Polyides rotundus	1	100	C - C	C
Griffithsia corallinoides	1	100	C - C	C
Leathesia difformis	1	100	C - C	C
Chorda filum	1	100	F - F	F
Laminaria saccharina	1	100	F - F	F
Himanthalia elongata	1	100	F - F	F
Enteromorpha indet.	1	100	C - C	C

COMMUNITY KA9 *Laminaria digitata*

HABITAT Sublittoral fringe, hard substrata.

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure :	Exposed
Tidal stream:	Uncertain
Geology:	Hard
Zone/Range:	Sublittoral fringe
Substratum:	Bedrock and boulders

Distribution 38(5)

Extent

Likely to occur on all exposed rocky shores in the survey area.

Description

Laminaria digitata dominated this community and was attached to the upper surfaces of large boulders. The upper surfaces of the boulders were covered with coralline crusts. On the undersides of the boulders the encrusting sponges *Ophlitaspongia seriata* and *Halichondria panicea,* the crab *Porcellana platycheles* and spirorbid worms were all common and the starfish *Asterina gibbosa* was abundant.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Scypha ciliata	1	100	R - R	R
Halichondria panicea	1	100	O - O	O
Myxilla incrustans	1	100	O - O	O
Ophlitaspongia seriata	1	100	O - O	O
Halisarca dujardini	1	100	O - O	O
Actinia equina	1	100	O - O	O
Urticina felina	1	100	O - O	O
Harmothoe indet.	1	100	O - O	O
Pomatoceros triqueter	1	100	O - O	O
Spirorbidae indet.	1	100	A - A	A
Idotea indet.	1	100	O - O	O
Porcellana platycheles	1	100	O - O	O
Liocarcinus puber	1	100	O - O	O
Xantho incisus	1	100	R - R	R
Diodora graeca	1	100	O - O	O
Helcion pellucidum	1	100	F - F	F
Calliostoma zizyphinum	1	100	O - O	O
Berthella plumula	1	100	O - O	O
Aeolidia papillosa	1	100	R - R	R
Kellia suborbicularis	1	100	R - R	R
Electra pilosa	1	100	O - O	O
Bryozoa indet crusts	1	100	O - O	O

Asterina gibbosa	1	100	O - O	O
Asterias rubens	1	100	O - O	O
Marthasterias glacialis	1	100	R - R	R
Ophiothrix fragilis	1	100	O - O	O
Ophiocomina nigra	1	100	R - R	R
Amphipholis squamata	1	100	C - C	C
Psammechinus miliaris	1	100	F - F	F
Paracentrotus lividus	1	100	R - R	R
Pawsonia saxicola	1	100	O - O	O
Dendrodoa grossularia	1	100	F - F	F
Botryllus schlosseri	1	100	O - O	O
Nerophis lumbriciformis	1	100	R - R	R
Corallinaceae crusts indet.	1	100	C - C	C
Corallina officinalis	1	100	O - O	O
Mastocarpus stellatus	1	100	O - O	O
Chondrus crispus	1	100	O - O	O
Plocamium cartilagineum	1	100	O - O	O
Lomentaria articulata	1	100	O - O	O
Ceramium indet.	1	100	O - O	O
Acrosorium uncinatum	1	100	O - O	O
Membranoptera alata	1	100	O - O	O
Ectocarpaceae indet.	1	100	O - O	O
Laminaria digitata	1	100	A - A	A
Fucus serratus	1	100	F - F	F
Cladophora indet.	1	100	O - O	O

COMMUNITY KA10 Mixed kelp forest.

HABITAT Extremely exposed steep limestone bedrock and large boulders.

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Extremely exposed
Tidal stream:	Very weak
Geology:	Limestone
Zone/Range:	Upper infralittoral; 4 - 10 m BCD
Substratum:	Bedrock and boulders

Distribution 3(1)

Extent

Likely to occur in the survey area on rocky substrata in shallow water in exposed situations.

Description

A kelp forest of *Laminaria hyperborea, L. saccharina, Saccorhiza polyschides* and *Alaria esculenta* dominated the upper surfaces of the steep bedrock and boulders. The vertical surfaces had a dense cover of foliose red algae; *Rhodymenia pseudopalmata* was the most abundant. Other common algae were *Callophyllis laciniata, Plocamium cartilagineum* and *Dictyota dichotoma.* The most frequently observed fauna were *Corynactis viridis, Crisia denticulata* and encrusting Didemnidae indet.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Clathrina coriacea	1	100	O - O	O
Leuconia johnstoni	1	100	O - O	O
Leuconia nivea	1	100	O - O	O
Aglaophenia pluma	1	100	O - O	O
Plumularia setacea	1	100	O - O	O
Obelia geniculata	1	100	F - F	F
Alcyonium digitatum	1	100	O - O	O
Sagartia elegans	1	100	O - O	O
Cereus pedunculatus	1	100	O - O	O
Actinothoe sphyrodeta	1	100	O - O	O
Corynactis viridis	1	100	F - F	F
Caryophyllia smithii	1	100	O - O	O
Calliostoma zizyphinum	1	100	O - O	O
Limacia clavigera	1	100	O - O	O
Crisia denticulata	1	100	C - C	C
Electra pilosa	1	100	F - F	F
Phoronis hippocrepia	1	100	O - O	O
Henricia oculata	1	100	F - F	F
Asterias rubens	1	100	F - F	F
Clavelina lepadiformis	1	100	F - F	F
Morchellium argus	1	100	O - O	O

Aplidium nordmanni	1	100	F - F	F
Didemnidae indet.	1	100	C - C	C
Diplosoma spongiforme	1	100	O - O	O
Pollachius pollachius	1	100	F - F	F
Crenilabrus melops	1	100	O - O	O
Labrus bergylta	1	100	F - F	F
Parablennius gattorugine	1	100	O - O	O
Bonnemaisonia asparagoides	1	100	F - F	F
Dilsea carnosa	1	100	F - F	F
Callophyllis laciniata	1	100	C - C	C
Kallymenia reniformis	1	100	F - F	F
Meredithia microphylla	1	100	F - F	F
Corallinaceae crusts indet.	1	100	F - F	F
Phyllophora crispa	1	100	F - F	F
Chondrus crispus	1	100	O - O	O
Plocamium cartilagineum	1	100	C - C	C
Rhodymenia pseudopalmata	1	100	C - C	C
Acrosorium uncinatum	1	100	F - F	F
Cryptopleura ramosa	1	100	C - C	C
Delesseria sanguinea	1	100	O - O	O
Myriogramme bonnemaisonii	1	100	O - O	O
Nitophyllum punctatum	1	100	O - O	O
Phycodrys rubens	1	100	F - F	F
Polyneura laciniata	1	100	F - F	F
Dictyopteris membranacea	1	100	F - F	F
Dictyota dichotoma	1	100	C - C	C
Desmarestia ligulata	1	100	O - O	O
Laminaria hyperborea	1	100	C - C	C
Laminaria saccharina	1	100	C - C	C
Saccorhiza polyschides	1	100	C - C	C
Alaria esculenta	1	100	C - C	C

COMMUNITY KA11 Sparse *Laminaria hyperborea* Uncertain status

HABITAT Limestone pavement covered with sand

Classification

Situation:	Sound
Salinity:	Normal
Wave exposure:	Moderately exposed
Tidal stream:	Uncertain
Geology:	Limestone
Zone/Range:	Lower infralittoral, 17 - 29 m BCD
Substratum:	Bedrock and boulders

Distribution 1(1), 1(2), 4(1)

Extent

The uncertain status of this community makes it difficult to estimate its extent. However sand scoured communities are likely to occur on much of the southern side of Inishmore, Gregory Sound, the south-west end of Inisheer and the south-east tip of Golam Head.

Description

This community may represent a sand scoured community which extended from the lower infralittoral to the upper circalittoral. *Laminaria* species were present at sites 1(1) and 4(1) but not at 1(2). *Laminaria hyperborea* was growing on a limestone pavement covered with a layer of sand several centimetres deep at site 1(1) whereas *L. hyperborea* was on boulders at site 4(1). The algae *Acrosorium uncinatum, Delesseria sanguinea* and *Dictyopteris membranacea* were present at all three sites. The most conspicuous fauna were *Cliona celata, Echinus esculentus* and *Holothuria forskali.* Projecting through the sand at site 1(1) were fine paired calcareous tubes. The identity of the organisms producing these tubes was not ascertained.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 3)	%	Range	Median
Pachymatisma johnstonia	2	67	F - C	F
Limacia clavigera	2	67	R - F	R
Electra pilosa	2	67	O - C	O
Luidia ciliaris	2	67	O - C	O
Henricia oculata	2	67	O - O	O
Echinus esculentus	3	100	O - C	O
Holothuria forskali	3	100	O - C	O
Botryllus schlosseri	2	67	O - O	O
Ctenolabrus rupestris	3	100	O - F	O
Labrus bergylta	2	67	O - O	O
Kallymenia reniformis	2	67	O - O	O
Corallinaceae crusts indet.	3	100	O - C	F
Acrosorium uncinatum	3	100	O - C	F
Delesseria sanguinea	3	100	O - C	C
Dictyopteris membranacea	3	100	O - F	O

Laminaria hyperborea	2	67	O - O	O

COMMUNITY KA12 Sparse *Laminaria hyperborea* and red foliose red algae.

HABITAT Exposed and steeply sloping bedrock with ridges.

Classification

Situation:	Open coast/Sound
Salinity:	Normal
Wave exposure:	Extremely exposed
Tidal stream:	Weak/uncertain
Geology:	Limestone
Zone/Range:	Lower infralittoral; 12 - 24 m BCD
Substratum:	Bedrock with ridges and steep faces

Distribution 7(1), 11(1), 46(1)*, 46(2)* *incomplete record.

Extent

Likely to occur on exposed rocky substrates in the survey area between the depths of 12 - 24 metres

Description

Limestone bedrock with ridges supporting a kelp park with an understorey of red algae, in particular *Callophyllis laciniata* and *Acrosorium uncinatum.* The limestone was heavily pitted and the numerous crevices were occasionally inhabited by *Pawsonia saxicola* and *Aslia lefevrei. Amphisbetia operculata* was the most commonly observed hydroid whereas *Gymnangium montagui* and *Sertularella polyzonias* were occasionally seen. Another characteristic species was *Corynactis viridis.* Deadmans' fingers, *Alcyonium digitatum,* the crinoid *Antedon bifida,* the starfish *Luidia ciliaris* and *Marthasterias glacialis* and the sea cucumber *Holothuria forskali* were also conspicuous species but only recorded as being occasional.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 4)	%	Range	Median
Clathrina coriacea	2	50	R - O	R
Pachymatisma johnstonia	3	75	O - F	O
Tethya aurantium	2	50	R - O	R
Cliona celata	3	75	R - F	O
Hemimycale columella	2	50	R - O	R
Dysidea fragilis	2	50	R - O	R
Aglaophenia pluma	2	50	O - O	O
Aglaophenia tubulifera	2	50	O - O	O
Gymnangium montagui	2	50	R - R	R
Plumularia setacea	2	50	O - O	O
Amphisbetia operculata	3	75	O - C	F
Sertularella gayi	2	50	R - O	R
Sertularella polyzonias	2	50	O - O	O

Alcyonium digitatum	2	50	O - O	O
Corynactis viridis	3	75	O - C	F
Caryophyllia smithii	3	75	O - F	O
Gibbula cineraria	2	50	R - O	R
Calliostoma zizyphinum	2	50	O - O	O
Crisia denticulata	3	75	P - C	F
Cellepora pumicosa	2	50	R - O	R
Membranipora membranacea	2	50	O - C	O
Electra pilosa	2	50	F - C	F
Cellaria indet.	2	50	R - O	R
Antedon bifida	2	50	F - F	F
Luidia ciliaris	2	50	O - F	O
Henricia oculata	2	50	R - O	R
Asterias rubens	2	50	R - O	R
Marthasterias glacialis	2	50	O - F	O
Echinus esculentus	2	50	F - F	F
Pawsonia saxicola	2	50	O - F	O
Aslia lefevrei	2	50	R - F	R
Ascidia mentula	2	50	R - R	R
Botryllus schlosseri	3	75	O - O	O
Labrus bergylta	2	50	O - O	O
Bonnemaisonia asparagoides	2	50	O - F	O
Dilsea carnosa	2	50	O - O	O
Callophyllis laciniata	2	50	F - F	F
Kallymenia reniformis	2	50	O - O	O
Meredithia microphylla	2	50	O - O	O
Corallinaceae crusts indet.	2	50	F - F	F
Plocamium cartilagineum	2	50	O - O	O
Acrosorium uncinatum	2	50	F - C	F
Cryptopleura ramosa	2	50	O - O	O
Delesseria sanguinea	2	50	F - C	F
Myriogramme bonnemaisonii	2	50	O - O	O
Phycodrys rubens	2	50	O - C	O
Heterosiphonia plumosa	3	75	P - O	O
Dictyopteris membranacea	3	75	R - O	O
Dictyota dichotoma	2	50	O - F	O
Laminaria hyperborea	4	100	O - A	O

COMMUNITY KA13 *Paracentrotus lividus* and Kelp

HABITAT Exposed limestone pavement

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Extremely Exposed
Tidal stream:	Very weak
Geology:	Limestone
Zone/Range:	Infralittoral; 8.5 - 10 m BCD
Substratum:	Bedrock

Distribution 6(1)

Extent

This community is likely to occur on shallow water limestone platforms in exposed situations and is probably extensive around the Aran Islands.

Description

This community consisted of a dense population of the sea urchin *Paracentrotus lividus* burrowed into the rock on a shallow water limestone pavement. The anemones *Anemonia viridis* and *Sagartia elegans* were both frequent and the kelp *Laminaria hyperborea* and *Saccorhiza polyschides* were both occasionally observed. The community was species poor, presumably because of the grazing pressure by the dense population of *Paracentrotus lividus.*

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Cliona celata	1	100	O - O	O
Anemonia viridis	1	100	F - F	F
Urticina felina	1	100	R - R	R
Sagartia elegans	1	100	F - F	F
Corynactis viridis	1	100	O - O	O
Paracentrotus lividus	1	100	S - S	S
Crenilabrus melops	1	100	O - O	O
Labrus bergylta	1	100	O - O	O
Labrus mixtus	1	100	R - R	R
Laminaria hyperborea	1	100	O - O	O
Saccorhiza polyschides	1	100	O - O	O

COMMUNITY KA14 Exposed upper circalittoral Uncertain status

HABITAT Very exposed cliff faces

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Very to extremely exposed
Tidal stream:	Weak to moderate
Geology:	Limestone and Igneous
Zone/Range:	Upper circalittoral; 16-25 m BCD
Substratum:	Bedrock and boulders

Distribution 2(1), 45(1)

Extent

This community may occur on exposed cliff faces in the survey area but more data are needed to determine if this is a distinct community as the characterising species at each site were different.

Description

This upper circalittoral community occurred on two cliff faces with boulders at the base. At site 2(1) the cliff face was characterised by encrusting didemnid ascidians and *Metridium senile* while at site 45(1) the characterising species were *Corynactis viridis, Caryophyllia smithii* with a dense coverage of the bryozoan *Crisia eburnea.* Site 2(1) had a deep cave at the base of the cliff in which *Alcyonium glomeratum, Eunicella verrucosa,* sponges and ascidians were observed growing on the roof. At both sites the boulders were colonised by *Cliona celata* and red foliose algae.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 2)	%	Range	Median
Clathrina coriacea	1	50	C - C	C
Leuconia johnstoni	1	50	O - O	O
Leuconia nivea	1	50	F - F	F
Oscarella lobularis	1	50	F - F	F
Dercitus bucklandi	1	50	O - O	O
Pachymatisma johnstonia	2	100	F - F	F
Thymosia guernei	1	50	C - C	C
Tethya aurantium	2	100	R - O	R
Suberites carnosus	1	50	O - O	O
Suberites domuncula	1	50	O - O	O
Polymastia boletiformis	2	100	O - O	O
Polymastia mamillaris	1	50	O - O	O
Cliona celata	2	100	F - C	F
Stelligera rigida	1	50	O - O	O
Stelligera stuposa	1	50	O - O	O

Raspailia hispida	1	50	O - O	O
Spongosorites indet.	1	50	O - O	O
Myxilla fimbriata	1	50	O - O	O
Myxilla incrustans	2	100	O - O	O
Hemimycale columella	2	100	O - O	O
Haliclona fistulosa	1	50	O - O	O
Haliclona urceolus	1	50	O - O	O
Haliclona viscosa	1	50	R - R	R
Dysidea fragilis	2	100	O - O	O
Porifera indet crusts	1	50	P - P	P
Halecium halecinum	1	50	O - O	O
Aglaophenia pluma	2	100	O - O	O
Aglaophenia tubulifera	1	50	O - O	O
Kirchenpaueria pinnata	1	50	O - O	O
Nemertesia antennina	2	100	O - F	O
Nemertesia ramosa	1	50	O - O	O
Amphisbetia operculata	1	50	O - O	O
Sertularella gayi	2	100	O - O	O
Obelia geniculata	1	50	R - R	R
Alcyonium digitatum	2	100	O - F	O
Alcyonium glomeratum	2	100	O - F	O
Eunicella verrucosa	1	50	O - O	O
Actinothoe sphyrodeta	1	50	R - R	R
Corynactis viridis	1	50	C - C	C
Caryophyllia smithii	1	50	F - F	F
Pomatoceros triqueter	1	50	F - F	F
Balanus balanus	1	50	F - F	F
Cancer pagurus	1	50	O - O	O
Liocarcinus puber	1	50	O - O	O
Calliostoma zizyphinum	1	50	O - O	O
Onchidoris sparsa	1	50	R - R	R
Limacia clavigera	1	50	O - O	O
Polycera faeroensis	1	50	O - O	O
Cadlina laevis	1	50	O - O	O
Crisia denticulata	1	50	O - O	O
Crisia eburnea	1	50	C - C	C
Cellepora pumicosa	2	100	O - O	O
Bicellariella ciliata	1	50	R - R	R
Phoronis hippocrepia	1	50	F - F	F
Luidia ciliaris	2	100	O - F	O
Henricia oculata	2	100	O - O	O
Marthasterias glacialis	2	100	R - O	R
Ophiactis balli	1	50	C - C	C
Echinus esculentus	1	50	C - C	C
Holothuria forskali	2	100	F - C	F
Aslia lefevrei	1	50	O - O	O
Polyclinum aurantium	1	50	O - O	O
Aplidium punctum	1	50	O - O	O
Didemnidae indet.	1	50	F - F	F
Ciona intestinalis	1	50	F - F	F
Corella parallelogramma	1	50	O - O	O
Ascidia mentula	1	50	C - C	C

Botryllus schlosseri	1	50	F - F	F
Molva molva	1	50	O - O	O
Pollachius pollachius	2	100	O - O	O
Taurulus bubalis	1	50	O - O	O
Ctenolabrus rupestris	1	50	F - F	F
Labrus bergylta	1	50	F - F	F
Labrus mixtus	2	100	F - F	F
Parablennius gattorugine	2	100	R - F	R
Zeugopterus punctatus	1	50	R - R	R
Dilsea carnosa	1	50	O - O	O
Callophyllis laciniata	2	100	F - F	F
Kallymenia reniformis	1	50	F - F	F
Meredithia microphylla	1	50	F - F	F
Corallinaceae crusts indet.	2	100	F - F	F
Plocamium cartilagineum	2	100	R - F	R
Rhodymenia pseudopalmata	1	50	F - F	F
Rhodymenia ardissonei	1	50	O - O	O
Acrosorium uncinatum	1	50	F - F	F
Cryptopleura ramosa	1	50	F - F	F
Delesseria sanguinea	1	50	C - C	C
Drachiella spectabilis	1	50	O - O	O
Myriogramme bonnemaisonii	1	50	F - F	F
Nitophyllum punctatum	1	50	C - C	C
Phycodrys rubens	1	50	F - F	F
Polyneura laciniata	1	50	F - F	F
Heterosiphonia plumosa	1	50	F - F	F
Dictyopteris membranacea	2	100	O - F	O
Dictyota dichotoma	2	100	O - F	O
Laminaria hyperborea	1	50	F - F	F

COMMUNITY KA15 *Raspailia ramosa - Corella parallelogramma*

HABITAT Circalittoral bedrock and boulders

Classification

Situation:	Enclosed coast
Salinity:	Normal
Wave exposure:	Very to extremely sheltered
Tidal stream:	Uncertain to moderate
Geology:	Igneous
Zone/Range:	Lower circalittoral; 7 - 26 m BCD
Substratum:	Bedrock and boulders

Distribution 17(1), 18(1), 19(1), 20(1), 22(1), 23(1), 24(2), 25(2), 26(2), 27(2), 28(1), 29(2), 31(2)

Extent

This community should occur in rocky areas in Kilkieran Bay that are sheltered, current swept and where some silt is present.

Description

This current swept habitat varied from vertical to horizontal bedrock and boulders covered with silt and was characterised by a wide variety of ascidians and sponges. The characterising sponges were, *Raspailia ramosa, Stelligera rigida, Esperiopsis fucorum, Haliclona simulans, Plakortis simplex, Tethya aurantium, Polymastia boletiformis, P. mamillaris* and *Dysidea fragilis.* The most abundant ascidians were *Corella parallelogramma, Ascidia mentula* and *Ascidia virginea.* The bryozoan *Alcyonidium diaphanum* was also frequently observed. The rare sponge *Tricheurypon viride* was collected at site 25.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 13)	%	Range	Median
Plakortis simplex	5	38	O - C	F
Pachymatisma johnstonia	12	92	O - C	O
Tethya aurantium	12	92	O - C	F
Suberites carnosus	7	54	O - A	O
Polymastia boletiformis	12	92	O - C	F
Polymastia mamillaris	13	100	O - C	F
Cliona celata	6	46	O - F	O
Stelligera rigida	11	85	O - C	F
Stelligera stuposa	10	77	O - C	O
Raspailia hispida	5	38	O - O	O
Raspailia ramosa	13	100	R - C	O
Mycale rotalis	9	69	R - C	F
Esperiopsis fucorum	11	85	O - C	F
Iophon ingalli	7	54	O - C	O
Hemimycale columella	11	85	O - F	O

Haliclona fistulosa	11	85	O - C	O
Haliclona simulans	10	77	O - C	F
Haliclona viscosa	5	38	O - F	O
Dysidea fragilis	13	100	F - C	C
Antennella secundaria	5	38	O - C	O
Nemertesia antennina	7	54	O - F	O
Nemertesia ramosa	5	38	O - O	O
Alcyonium digitatum	5	38	O - O	O
Caryophyllia smithii	10	77	O - C	O
Liocarcinus puber	5	38	R - O	R
Calliostoma zizyphinum	8	62	R - O	O
Alcyonidium diaphanum	7	54	O - C	C
Henricia oculata	11	85	R - O	O
Marthasterias glacialis	5	38	R - O	O
Echinus esculentus	8	62	R - O	O
Aplidium punctum	8	62	O - A	C
Ciona intestinalis	6	46	O - C	O
Corella parallelogramma	10	77	F - S	C
Ascidia mentula	10	77	O - A	C
Ascidia virginea	8	62	O - A	C
Botryllus schlosseri	10	77	R - C	O
Ctenolabrus rupestris	8	62	R - C	F
Labrus bergylta	5	38	O - O	O
Labrus mixtus	5	38	O - O	O

COMMUNITY KA16 *Axinella dissimilis* and *Phakellia ventilabrum*

HABITAT Extremely exposed circalittoral bedrock

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Very to extremely exposed
Tidal stream:	Uncertain to very weak
Geology:	Limestone/Igneous
Zone/Range:	Circalittoral; 20 - 39m BCD
Substratum:	Bedrock

Distribution 5(1), 8(1), 8(2), 9(1), 10(1), 12(1), 13(1),14(1), 41 (1), 42(1), 43(1), 44(1), 46(3)

Extent

This community is likely to occur on extremely exposed circalittoral bedrock that is horizontal or gently sloping.

Description

This community was found on horizontal or gently sloping bedrock in extremely exposed situations and generally at depths in excess of 28 metres BCD. It is characterised by the small cup shaped sponge *Phakellia ventilabrum* and the erect *Axinella dissimilis* (=*polypoides*). A variety of other sponges were present, most notably *Axinella infundibuliformis* and *Stelligera stuposa*. Other species characteristic of the habitat were *Alcyonium digitatum, A. glomeratum, Eunicella verrucosa, Porella compressa* and *Holothuria forskali.* The colonial ascidian *Diazona violacea* was also observed in this community. At a number of sites the community extended into the upper circalittoral where the red algae *Rhodymenia ardissonei* was common. Rare sponges recorded from this community were *Hexadella racovitzai, Axinella flustra, Spongionella pulchella, Phakellia* (= *Bubaris*) *vermiculata* and *Clathria barleei.*

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 13)	%	Range	Median
Oscarella lobularis	7	54	R - F	O
Pachymatisma johnstonia	12	92	R - C	F
Tethya aurantium	6	46	O - F	O
Suberites carnosus	12	92	O - F	O
Polymastia boletiformis	9	69	O - F	O
Polymastia mamillaris	8	62	R - F	O
Sphaerotylus indet.	5	38	R - F	O
Cliona celata	10	77	O - C	F
Axinella infundibuliformis	10	77	O - C	F
Axinella dissimilis	10	77	R - F	O
Phakellia ventilabrum	11	85	F - C	F
Phakellia vermiculata	7	54	O - C	O
Stelligera rigida	6	46	O - F	O

Stelligera stuposa	11	85	O - C	F
Raspailia ramosa	5	38	O - O	O
Spongosorites indet.	6	46	R - F	O
Myxilla fimbriata	6	46	F - A	F
Myxilla incrustans	8	62	O - F	O
Hemimycale columella	6	46	O - O	O
Haliclona viscosa	9	69	R - F	O
Dysidea fragilis	9	69	O - F	F
Aglaophenia tubulifera	7	54	O - F	O
Nemertesia antennina	9	69	O - F	O
Nemertesia ramosa	9	69	O - F	O
Sertularella gayi	9	69	O - C	O
Alcyonium digitatum	11	85	R - C	O
Alcyonium glomeratum	11	85	R - C	O
Eunicella verrucosa	12	92	R - C	F
Urticina felina	8	62	R - F	O
Corynactis viridis	7	54	R - A	F
Caryophyllia smithii	12	92	O - S	F
Calliostoma zizyphinum	12	92	R - F	O
Cadlina laevis	6	46	R - O	O
Pentapora foliacea	5	38	O - F	O
Porella compressa	12	92	O - F	F
Omalosecosa ramulosa	8	62	O - F	O
Luidia ciliaris	8	62	O - F	O
Henricia oculata	11	85	R - F	O
Asterias rubens	6	46	O - F	O
Marthasterias glacialis	6	46	R - F	O
Echinus esculentus	10	77	R - C	F
Holothuria forskali	12	92	R - A	F
Diazona violacea	7	54	R - F	O
Pollachius pollachius	7	54	R - C	F
Ctenolabrus rupestris	7	54	O - F	F
Labrus bergylta	5	38	O - C	O
Labrus mixtus	9	69	O - C	O

COMMUNITY KA17 Talitrid zone

HABITAT Strandline on a sandy beach

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Sheltered to Exposed
Tidal stream:	Very weak
Geology:	Not applicable
Zone/Range:	Mid to low shore
Substratum:	Coarse sand

Distribution 37(1), 39(1)

Extent

This community is likely to occur between the high water neap and high water spring levels on sandy beaches in the survey area.

Description

Strand line of clean coarse sand with drift sea weed and abundant *Talitrus saltator* and *Talorchestia deshayesii.*

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 2)	%	Range	Median
Oligochaeta indet.	1	50	P - P	P
Eurydice indet.	1	50	P - P	P
Talitrus saltator	2	100	C - A	C
Talorchestia deshayesii	2	100	P - A	P

COMMUNITY KA18 *Arenicola marina* and *Malacoceros fuliginosus*

HABITAT Clean coarse sand

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Sheltered to exposed
Tidal stream:	Very weak
Geology:	Not Applicable
Zone/Range:	Mid to low shore
Substratum:	Coarse sand

Distribution 37(3), 39(3), 39(4), 39(5)

Extent

This community is likely to occur on sandy beaches in the survey area but may be more extensive on exposed beaches than on sheltered ones.

Description

The infaunal community in coarse sand from the mid to low shore was characterised by the polychaete *Arenicola marina* and *Malacoceros fuliginosus*. The casts of *A. marina* were observed and the pores of *M. fuliginosus* were observed on the surface of the sand at sites 39(4 and 5) Infaunal samples showed that at one station *Pygospio elegans* was abundant (37(3)) while at another station *Capitella capitata* (39(3)) was common. The gastropod *Hinia reticulata* was common at the exposed low shore station (39 (5)).

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 4)	%	Range	Median
Malacoceros fuliginosus	4	100	P - A	C
Arenicola marina	3	75	P - F	O

COMMUNITY KA19 *Scoloplos armiger* and *Bathyporeia elegans*

HABITAT Lower mid shore of a sandy beach

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Sheltered
Tidal stream:	Very weak
Geology:	Not applicable
Zone/Range:	Lower mid shore
Substratum:	Sand

Distribution 37(4)

Extent

Likely to be restricted to sheltered beaches in the survey area.

Description

This community was found on the lower mid shore of a sheltered sandy beach. The conspicuous large infauna were the bivalves *Cerastoderma edule, Spisula subtruncata* and *Angulus tenuis; Arenicola marina* casts were abundant only occasionally. Infaunal samples showed that the polychaete *Scoloplos armiger* was super abundant and the crustacean *Bathyporeia elegans* was common.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Scoloplos armiger	1	100	S - S	S
Nephtys indet.	1	100	O - O	O
Lanice conchilega	1	100	O - O	O
Bathyporeia elegans	1	100	C - C	C
Crangon crangon	1	100	O - O	O
Cerastoderma edule	1	100	O - O	O
Spisula subtruncata	1	100	O - O	O
Angulus tenuis	1	100	O - O	O

COMMUNITY KA20 *Marphysa bellii* and *Ensis* spp.

HABITAT Lower shore

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Sheltered
Tidal stream:	Very weak
Geology:	Not applicable
Zone/Range:	Low shore
Substratum:	Coarse sand

Distribution 37(5)

Extent

This community is likely be restricted to sheltered beaches that are waterlogged at low tide.

Description

The lower mid shore of this sheltered beach was a gentle slope of fine rippled and water logged sand with many bivalve shells lying on the surface. The conspicuous fauna were the bivalves *Ensis arcuatus*, *Chamelea gallina* and *Ensis arcuatus* and the burrowing holothurian *Leptosynapta inhaerens*. Infaunal samples showed that the polychaete *Marphysa bellii*, was also abundant. The green algae *Cladostephus spongiosus* and Ectocarpaceae were common to frequent on the surface of the sand.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Marphysa bellii	1	100	A - A	A
Ensis arcuatus	1	100	F - F	F
Angulus squalidus	1	100	R - R	R
Chamelea gallina	1	100	F - F	F
Leptosynapta inhaerens	1	100	F - F	F
Ectocarpaceae indet.	1	100	C - C	C
Cladostephus spongiosus	1	100	F - F	F

COMMUNITY KA21 Barren coarse sand

HABITAT Upper mid shore

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Sheltered
Tidal stream:	Very weak
Geology:	Not applicable
Zone/Range:	Upper mid shore
Substratum:	Sand

Distribution 37(2)

Extent

Because of the uncertain status of this community it is not possible to estimate the extent to which it is likely to occur in the study area

Description

The upper shore station of this sheltered beach consisted of coarse soft sand and had no large fauna present. Only one individual each of *Scoloplos armiger* and *Idotea* were found in the infaunal samples. Too few data are available to determine if this is a distinct community and it is of uncertain status.

COMMUNITY KA22 Amphipod - *Eurydice pulchra*

HABITAT Upper shore

Classification

Situation:	Open coast
Salinity:	Normal
Wave exposure:	Exposed
Tidal stream:	Very weak
Geology:	Not applicable
Zone/Range:	Upper shore
Substratum:	Coarse sand

Distribution 39(2)

Extent

Due to the uncertain status of this community it is not possible to predict its distribution within the survey area

Description

The uppershore this exposed beach was clean coarse sand that was inhabited by small numbers of amphipod crustaceans and *Eurydice* sp. both visible to the eye on the shore. Infaunal samples showed that oligochaetes and *Eurydice pulchra* were present This community is of uncertain status at present as too few data are available at present to determine if this is a distinct community.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Oligochaeta indet.	1	100	F - F	F
Amphipoda indet.	1	100	F - F	F
Eurydice pulchra	1	100	F - F	F

COMMUNITY KA23 Dead maerl with *Neopentadactyla mixta*

HABITAT Duned dead maerl

Classification

Situation:	Sound
Salinity:	Normal
Wave exposure:	Moderately exposed
Tidal stream:	Moderate, 1 - 3 knots
Geology:	Not applicable
Zone/Range:	Circalittoral; 14-17 m BCD
Substratum:	Maerl

Distribution 34(1)

Extent

This community, within the survey area, is likely to be restricted to Kilkieran Bay where maerl and maerl/gravel substrata are present and where there are strong currents..

Description

Dead maerl in large dunes with a sprinkling of live maerl on the surface and super abundant *Neopentadactyla mixta*. In the hollows between the dunes the foliose red algae *Scinaia turgida, S. forcellata* and *Halarachnion ligulatum* were common and *Rhodophyllis divaricata* and *Calliblepharis ciliata* were frequently observed.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1	%	Range	Median
Kirchenpaueria pinnata	1	100	O - O	O
Nemertesia antennina	1	100	O - O	O
Dynamena pumila	1	100	R - R	R
Urticina eques	1	100	O - O	O
Hormathia coronata	1	100	R - R	R
Adamsia carciniopados	1	100	R - R	R
Halcampa chrysanthellum	1	100	R - R	R
Gibbula magus	1	100	C - C	C
Melanella alba	1	100	F - F	F
Hancockia uncinata	1	100	R - R	R
Doto indet.	1	100	R - R	R
Polycera faeroensis	1	100	O - O	O
Cadlina laevis	1	100	R - R	R
Lutraria lutraria	1	100	O - O	O
Clausinella fasciata	1	100	F - F	F
Luidia ciliaris	1	100	F - F	F
Marthasterias glacialis	1	100	O - O	O
Ocnus lactea	1	100	O - O	O
Neopentadactyla mixta	1	100	S - S	S
Leptosynapta bergensis	1	100	R - R	R
Polycarpa rustica	1	100	O - O	O

Callionymus reticulatus	1	100	F - F	F
Scinaia forcellata	1	100	C - C	C
Scinaia turgida	1	100	C - C	C
Dudresnaya verticillata	1	100	O - O	O
Lithothamnion corallioides	1	100	A - A	A
Halarachnion ligulatum	1	100	C - C	C
Calliblepharis ciliata	1	100	F - F	F
Rhodophyllis divaricata	1	100	F - F	F
Champia parvula	1	100	O - O	O
Pterothamnion plumula	1	100	F - F	F
Acrosorium uncinatum	1	100	P - P	P
Sporochnus pedunculatus	1	100	F - F	F
Arthrocladia villosa	1	100	O - O	O

COMMUNITY KA24 Duned maerl with *Aureliania heterocera* and foliose red algae.

HABITAT Duned maerl, maerl gravel, sand and mud.

Classification

Situation:	Enclosed coast (Channel)
Salinity:	Normal
Wave exposure:	Sheltered
Tidal stream:	Moderate, 1-3 knots
Geology:	Not applicable
Zone/Range:	Upper circalittoral; 4 - 9 m BCD
Substratum:	Maerl

Distribution 32 (1), 33(1)

Extent

Likely to be restricted to areas with moderate current where maerl is present.

Description

The habitat consisted of long shallow dunes of maerl debris with a surface covering of live maerl, especially on the slopes of the dunes. The anemone *Aureliania heterocera* was abundant on the dune slopes, *Cereus pedunculatus* and *Cerianthus lloydii* were frequent and *Mesacmaea mitchellii* was rare to occasional. The live maerl had the sponges *Dysidea fragilis, Haliclona fistulosa* and *H. cinerea* growing at the base. The hollows of the dunes were filled with muddy maerl debris and foliose red algae, in particular*Calliblepharis ciliata,* and *Plocamium cartilagineum. Polysiphonia elongata* was frequent and *Scinaia turgida* occasional. A rock outcrop with maerl around it modified the habitat at site 32 (1) greatly increasing the diversity of anthozoans present; *Peachia cylindrica, Halcampoides elongatus* and *Scolanthus callimorphus* were all common in this small area.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 2)	%	Range	Median
Ciocalypta penicillus	1	50	O - O	O
Haliclona cinerea	1	50	F - F	F
Haliclona fistulosa	2	100	O - C	O
Haliclona viscosa	1	50	F - F	F
Dysidea fragilis	2	100	O - F	O
Aglaophenia pluma	1	50	R - R	R
Plumularia setacea	1	50	F - F	F
Cerianthus lloydii	2	100	F - F	F
Anemonia viridis	1	50	O - O	O
Urticina felina	1	50	O - O	O
Anthopleura ballii	1	50	O - O	O
Aureliania heterocera	2	100	F - A	F
Sagartia elegans	1	50	O - O	O
Cereus pedunculatus	2	100	F - F	F
Halcampoides elongatus	1	50	O - O	O

Mesacmaea mitchellii	2	100	R - O	R
Peachia cylindrica	1	50	O - O	O
Scolanthus callimorphus	1	50	O - O	O
Lineus longissimus	1	50	O - O	O
Terebellidae indet.	1	50	F - F	F
Lanice conchilega	2	100	O - O	O
Megalomma vesiculosum	1	50	F - F	F
Amphipoda indet.	1	50	R - R	R
Pagurus bernhardus	1	50	O - O	O
Maja squinado	1	50	R - R	R
Inachus phalangium	1	50	O - O	O
Cancer pagurus	1	50	O - O	O
Liocarcinus corrugatus	2	100	O - F	O
Liocarcinus depurator	2	100	O - O	O
Liocarcinus puber	1	50	R - R	R
Gibbula magus	2	100	O - F	O
Lutraria lutraria	1	50	O - O	O
Gari tellinella	1	50	P - P	P
Venus verrucosa	2	100	O - O	O
Clausinella fasciata	1	50	P - P	P
Antedon bifida	1	50	O - O	O
Asterias rubens	2	100	O - O	O
Marthasterias glacialis	2	100	O - C	O
Taurulus bubalis	1	50	O - O	O
Callionymus reticulatus	1	50	O - O	O
Gobiusculus flavescens	1	50	O - O	O
Pomatoschistus pictus	1	50	O - O	O
Scinaia forcellata	1	50	F - F	F
Scinaia turgida	2	100	O - F	O
Lithothamnion corallioides	1	50	A - A	A
Maerl indet	1	50	A - A	A
Plocamium cartilagineum	2	100	F - C	F
Halarachnion ligulatum	1	50	F - F	F
Calliblepharis ciliata	2	100	O - C	O
Acrosorium uncinatum	1	50	F - F	F
Cryptopleura ramosa	1	50	F - F	F
Hypoglossum hypoglossoides	1	50	O - O	O
Polysiphonia elongata	1	50	F - F	F
Desmarestia ligulata	1	50	O - O	O

COMMUNITY KA25 Coelentrates and ascidians

HABITAT Cobble and pebble plain in the lower circalittoral

Classification

Situation:	Enclosed coast
Salinity:	Normal
Wave exposure:	Sheltered
Tidal stream:	Moderate
Geology:	Igneous
Zone/Range:	Lower circalittoral; 14 - 17 m BCD
Substratum:	Mixture of cobbles, pebbles, gravel and maerl.

Distribution 31(1)

Extent

Likely to be restricted to areas with weak to moderate current flow and a substratum with some gravel and maerl.

Description

The cobbles were frequently encrusted with coralline crusts, the sponge *Oscarella lobularis* and the anthozoan *Epizoanthus couchii.* The crinoid *Antedon bifida* was abundant; the ascidians *Corella parallelogramma* and *Aplidium punctum* were frequent and attached to the cobbles and pebbles. The anemones *Mesacmaea mitchellii* and *Cerianthus lloydii* were frequently observed in the sediment between the stones.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 1)	%	Range	Median
Oscarella lobularis	1	100	F - F	F
Alcyonium digitatum	1	100	O - O	O
Cerianthus lloydii	1	100	R - R	R
Epizoanthus couchii	1	100	C - C	C
Cereus pedunculatus	1	100	O - O	O
Mesacmaea mitchellii	1	100	F - F	F
Lanice conchilega	1	100	R - R	R
Antedon bifida	1	100	A - A	A
Asterias rubens	1	100	O - O	O
Marthasterias glacialis	1	100	O - O	O
Polyclinum aurantium	1	100	R - R	R
Aplidium punctum	1	100	F - F	F
Corella parallelogramma	1	100	F - F	F
Ascidia mentula	1	100	O - O	O
Botryllus schlosseri	1	100	O - O	O
Botrylloides leachi	1	100	O - O	O
Corallinaceae	1	100	C - C	C
Lithothamnion corallioides	1	100	F - F	F

COMMUNITY KA26 Gravel plain with *Mesacmaea mitchellii* and *Aureliania heterocera*

HABITAT Gravel plain with cobbles and mud.

Classification

Situation:	Enclosed coast
Salinity:	Normal
Wave exposure:	Very sheltered
Tidal stream:	Moderate; 1-3 knots
Geology:	Igneous
Zone/Range:	16 - 26 BCD
Substratum:	Cobbles, gravel and mud

Distribution 22(2), 26(1), 27(1), 28(2), 29(1).

Extent

Likely to be restricted to areas with a strong to moderate current flow and a substratum of mixed gravel and mud.

Description

The dominant fauna of the gravel plains were the anemones *Mesacmaea mitchellii* and *Aureliania heterocera* in the sediment. *Pecten maximus* and *Suberites carnosa* were occasional and *Cerianthus lloydii* was rare. The ascidian *Corella parallelogramma* was abundant, being attached to the cobbles and shell debris but *Aplidium punctum* was not as common.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 5)	%	Range	Median
Suberites carnosus	3	60	O - O	O
Cliona celata	4	80	R - O	O
Cerianthus lloydii	3	60	R - O	O
Epizoanthus couchii	2	40	O - O	O
Aureliania heterocera	4	80	O - F	O
Mesacmaea mitchellii	5	100	F - C	C
Pagurus bernhardus	2	40	O - O	O
Pecten maximus	3	60	O - O	O
Alcyonidium diaphanum	3	60	O - C	F
Aplidium punctum	3	60	O - C	F
Corella parallelogramma	5	100	F - S	F
Dendrodoa grossularia	2	40	O - F	O
Callionymus reticulatus	2	40	O - O	O

COMMUNITY KA27 Arenicola marina - Uncertain status

HABITAT Muddy sand

Classification

Situation:	Enclosed
Salinity:	Normal
Wave exposure:	Sheltered
Tidal stream:	Very weak
Geology:	Not applicable
Zone/Range:	5 - 10 m BCD
Substratum:	Sand and mud

Distribution 35(1), 36(1)

Extent

Likely to be restricted to shallow sandy areas within the survey area.

Description

A shallow water plain of muddy sand with numerous *Arenicola* casts. Small dab, *Limanda limanda,* were abundant. The other fish common in the area were *Callionymus lyra* and *Pomatoschistus* spp. The burrowing anemone *Sagartiogeton undatus* was also common.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 2)	%	Range	Median
Hydractinia echinata	1	50	O - O	O
Sagartiogeton undatus	2	100	F - C	F
Arenicola indet.	1	50	F - F	F
Arenicola marina	1	50	C - C	C
Lanice conchilega	1	50	R - R	R
Palaemon serratus	1	50	F - F	F
Anapagurus laevis	1	50	O - O	O
Pagurus bernhardus	2	100	O - C	O
Liocarcinus depurator	2	100	C - C	C
Carcinus maenas	2	100	R - O	R
Hinia reticulata	1	50	R - R	R
Lucinoma borealis	2	100	R - O	R
Ophiura albida	1	50	O - O	O
Trisopterus minutus	1	50	O - O	O
Eutrigla gurnardus	1	50	O - O	O
Trigla lucerna	1	50	R - R	R
Callionymus indet.	1	50	C - C	C
Callionymus lyra	1	50	F - F	F
Pomatoschistus indet.	1	50	F - F	F
Pomatoschistus minutus	1	50	C - C	C
Limanda limanda	2	100	F - A	F
Pleuronectes platessa	1	50	R - R	R

COMMUNITY KA28 *Virgularia mirabilis* bed

HABITAT Mud

Classification

Situation:	Enclosed
Salinity:	Normal
Wave exposure:	Extremely sheltered
Tidal stream:	Very weak
Geology:	Not applicable
Zone/Range:	4 - 7 m BCD
Substratum:	Mud

Distribution 24(1), 25(1)

Extent
Likely to be restricted to areas of very soft mud with little current.

Description
This habitat was a small area of soft mud in shallow water dominated by the sea pen *Virgularia mirabilis.* The anemone *Sagartiogeton undatus* was frequently observed while *Edwardsia claparedii* and the rare species *Scolanthus callimorphus* were occasionally seen. The hermit crab *Pagurus bernhardus* with *Hydractinia echinata* on the shell were occasionally recorded. The opistobranch *Armina loveni* which preys on *Virgularia mirabilis* was also present.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 2)	%	Range	Median
Hydractinia echinata	2	100	O - O	O
Virgularia mirabilis	2	100	A - S	A
Anthopleura ballii	1	50	O - O	O
Sagartiogeton undatus	2	100	F - F	F
Edwardsia claparedii	2	100	O - O	O
Scolanthus callimorphus	2	100	O - O	O
Pagurus bernhardus	2	100	O - O	O
Inachus dorsettensis	1	50	R - R	R
Armina loveni	1	50	P - P	P
Ophiura ophiura	1	50	O - O	O
Callionymus reticulatus	1	50	R - R	R

COMMUNITY KA29 *Nephrops norvegicus* and *Pecten maximus*

HABITAT Mud plain

Classification

Situation:	Enclosed coast
Salinity:	Normal
Wave exposure:	Sheltered
Tidal stream:	Uncertain
Geology:	Not applicable
Zone/Range:	23 - 25.5 m BCD
Substratum:	Mud

Distribution 15(1), 16(1).

Extent

Likely to be restricted to sheltered areas with a soft mud.

Description

This gently sloping plain of soft anaerobic mud was characterised by occasional *Nephrops norvegicus* and *Pecten maximus* and frequent *Asterias rubens*. Dead *Turritella communis* shells were abundant on the surface and were generally inhabited by *Pagurus bernhardus, Anapagurus laevis* and *Pagurus prideaux*. Other conspicuous species were the ophiuroid *Ophiura albida* and the fishes *Callionymus reticulatus* and *Pomatoschistus pictus*. There was a considerable amount of debris e.g. ropes, bottles etc. from a nearby fish farm and an empty bottle had been colonised by the anemone *Anemonia viridis*. The most notable species at this site was the rare butterfly blenny *Blennius ocellaris* which was inhabiting the empty bottle.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 2)	%	Range	Median
Suberites carnosus	1	50	F - F	F
Cliona celata	1	50	R - R	R
Hydractinia echinata	1	50	O - O	O
Cerianthus lloydii	2	100	C - C	C
Anemonia viridis	1	50	R - R	R
Adamsia carciniopados	2	100	O - O	O
Phascolion strombus	1	50	O - O	O
Nephrops norvegicus	2	100	O - O	O
Anapagurus laevis	1	50	F - F	F
Pagurus bernhardus	2	100	F - C	F
Pagurus prideaux	1	50	F - F	F
Inachus dorsettensis	1	50	R - R	R
Liocarcinus depurator	1	50	O - O	O
Turritella communis	1	50	F - F	F
Pecten maximus	2	100	O - F	O
Luidia ciliaris	1	50	O - O	O
Henricia oculata	1	50	R - R	R
Asterias rubens	2	100	F - C	F

Marthasterias glacialis	2	100	O - O	O
Ophiothrix fragilis	1	50	R - R	R
Ophiura albida	2	100	O - C	O
Ophiura ophiura	1	50	O - O	O
Echinus esculentus	1	50	O - O	O
Corella parallelogramma	1	50	F - F	F
Trisopterus minutus	1	50	F - F	F
Eutrigla gurnardus	1	50	O - O	O
Blennius ocellaris	2	100	R - R	R
Callionymus reticulatus	1	50	F - F	F
Pomatoschistus pictus	1	50	F - F	F

COMMUNITY KA30 *Pachycerianthus multiplicatus*

HABITAT Mud

Classification

Situation:	Enclosed
Salinity:	Normal
Wave exposure:	Extremely sheltered
Tidal stream:	Very weak
Geology:	Not applicable
Zone/Range:	14 - 32 m
Substratum:	Mud

Distribution 24(3), 25(3)

Extent

Pachycerianthus multiplicatus is known to be restricted within Kilkieran Bay to this site and one other in the outer part of the Bay.

Description

The community on this slope of fine mud was characterised by the large burrowing anemone *Pachycerianthus multiplicatus* with occasional *Edwardsia claparedii, Scolanthus callimorphus, Anemonia viridis* and *Sagartiogeton undatus.* The hermit crab *Pagurus bernhardus* with *Hydractinia echinata* was also frequently observed.

Species composition

Species name	Frequency of occurrence		Abundance	
	No. of records (Total 2)	%	Range	Median
Suberites carnosus	1	50	O - O	O
Hydractinia echinata	2	100	O - F	O
Pachycerianthus multiplicatus	2	100	C - A	C
Anemonia viridis	1	50	R - R	R
Sagartiogeton undatus	1	50	R - R	R
Edwardsia claparedii	1	50	O - O	O
Scolanthus callimorphus	1	50	O - O	O
Pagurus bernhardus	2	100	O - F	O
Cancer pagurus	1	50	R - R	R
Liocarcinus depurator	1	50	O - O	O
Carcinus maenas	1	50	C - C	C
Philine aperta	1	50	R - R	R
Ophiura ophiura	1	50	O - O	O
Pholis gunnellus	1	50	R - R	R
Callionymus reticulatus	1	50	R - R	R
Beggiatoa indet.	1	50	O - O	O

APPENDIX 3: LIST OF TAXA RECORDED DURING THE PRESENT SURVEY

The sites at which each species was recorded are given. Taxa are listed according to Howson (1987) except for *Esperiopsis fucorum* (previously *Amphilectus fucorum*) and *Axinella dissimilis* (previously *A. polypoides*).

Porifera

Clathrina coriacea	2; 3; 4; 7; 10; 11; 17; 22; 40
Clathrina lacunosa	12
Leucosolenia botryoides	29
Leucosolenia complicata	19
Scypha ciliata	12; 38
Leuconia johnstoni	2; 3
Leuconia nivea	2; 3; 29; 40
Oscarella lobularis	2; 5; 10; 12; 14; 31; 41; 43; 44
Plakortis simplex	17; 18; 20; 22; 24
Dercitus bucklandi	2; 17; 23
Stryphnus ponderosus	10; 17; 20; 24
Pachymatisma johnstonia	1; 2; 4; 5; 7; 8; 9; 10; 11; 13; 14; 17; 18; 19; 20; 22; 23; 24; 26; 27; 28; 29; 31; 41; 42; 43; 44; 45; 46
Tetilla zetlandica	5; 9
Thymosia guernei	2; 8; 9; 10
Tethya aurantium	2; 5; 7; 9; 10; 11; 17; 19; 20; 22; 23; 24; 25; 26; 27; 28; 29; 31; 40; 41; 42; 43; 45
Suberites carnosus	2; 5; 8; 9; 10; 13; 14; 15; 20; 22; 23; 24; 25; 26; 27; 29; 41; 42; 43; 44; 46
Suberites domuncula	2; 24; 25; 31
Laxosuberites incrustans	6: 10; 20; 22; 24; 26
Terpios fugax	40
Polymastia indet.	10; 43
Polymastia boletiformis	1; 2; 5; 8; 9; 10; 12; 17; 18; 19; 20; 22; 23; 24; 25; 26; 27; 28; 29; 41; 42; 43; 44; 45
Polymastia mamillaris	4; 5; 9; 10; 12; 14; 17; 18; 19; 20; 22; 23; 24; 25; 26; 27; 28; 29; 31; 40; 41; 43; 44; 45
Sphaerotylus indet..	10; 12; 41; 43; 44
Cliona celata	1; 2; 4; 5; 6; 7; 8; 9; 10; 11; 12; 16; 19; 20; 22; 24; 26; 27; 28; 29; 31; 41; 42; 43; 44; 45; 46
Axinella damicornis	17; 41; 43
Axinella flustra	5; 12
Axinella infundibuliformis	5; 8; 9; 10; 12; 41; 42; 43; 44
Axinella dissimilis	5; 8; 9; 10; 41; 42; 43; 44; 46
Phakellia ventilabrum	5; 8; 9; 10; 12; 14; 41; 42; 43; 44
Phakellia vermiculata	5; 8; 9; 10; 41; 43; 44
Stelligera rigida	9; 10; 11; 12; 17; 18; 19; 20; 22; 23; 25; 26; 28; 29; 31; 41; 43; 44; 45
Stelligera stuposa	5; 8; 9; 10; 14; 17; 18; 19; 20; 22; 23; 24; 26; 28; 29; 41; 42; 43; 44; 45; 46
Paratimea constellata	14; 20
Raspailia aculeata	24; 25
Raspailia hispida	9; 10; 17; 18; 19; 22; 23; 26; 41; 43; 44; 45
Raspailia ramosa	9; 10; 11; 17; 18; 19; 20; 22; 23; 24; 25; 26; 27; 28; 29;

	31; 43; 44; 46
Tricheurypon viride	25
Hymeraphia stellifera	17; 20; 23
Halichondria bowerbanki	25
Halichondria panicea	7; 38
Ciocalypta penicillus	1; 5; 9; 10; 32
Spongosorites indet.	2; 4; 5; 6; 8; 9; 10; 12; 43
Hymeniacidon perleve	40
Rhaphidostyla kitchingi	22; 24
Mycale contarenii	20; 22; 24; 25
Mycale rotalis	10; 17; 18; 19; 20; 22; 23; 24; 25; 29; 41; 44; 46
Biemna variantia	23
Esperiopsis fucorum	17; 19; 20; 22; 23; 24; 25; 26; 27; 29; 31
Myxilla fimbriata	5; 10; 23; 41; 42; 43; 44; 45
Myxilla incrustans	2; 5; 8; 9; 10; 38; 41; 43; 45; 46
Myxilla rosacea	8; 9; 12
Iophonopsis nigricans	5; 8; 23; 41; 44
Iophon ingalli	20; 22; 24; 25; 26; 27; 29
Hymedesmia indet.	44
Hymedesmia pansa	17; 20; 29
Hymedesmia paupertas	9; 17; 23; 24; 25; 43
Crella indet.	8
Crella rosea	9; 14
Hemimycale columella	2; 5; 7; 8; 9; 17; 18; 20; 22; 23; 24; 25; 27; 28; 29; 31; 41; 43; 45; 46
Clathria barleei	8; 9
Ophlitaspongia seriata	38
Haliclona cinerea	18; 19; 25; 32; 43
Haliclona fistulosa	12; 18; 20; 22; 23; 24; 25; 26; 27; 28; 29; 31; 32; 33; 43; 45; 46
Haliclona simulans	17; 18; 19; 20; 22; 24; 26; 28; 29; 31
Haliclona urceolus	5; 9; 10; 29; 45
Haliclona viscosa	1; 2; 5; 8; 9; 12; 22; 24; 26; 28; 31; 32; 41; 42; 44; 46
Dysidea fragilis	2; 5; 7; 8; 9; 10; 12; 17; 18; 19; 20; 22; 23; 24; 25; 26; 27; 28; 29; 31; 32; 33; 40; 41; 43; 44; 45; 46
Spongionella pulchella	8
Aplysilla rosea	40
Aplysilla sulfurea	17; 20; 40
Hexadella racovitai	6
Halisarca dujardini	22; 26; 28; 29; 38; 40
Porifera indet crusts	19; 40; 41; 45

Cnidaria

Tubularia indivisa	8
Bougainvillia ramosa	12
Hydractinia echinata	16; 23; 24; 25; 36; 37
Halecium halecinum	11; 31; 43; 45
Aglaophenia kirchenpaueri	10; 12
Aglaophenia pluma	1; 2; 3; 7; 8; 32; 42; 45; 46
Aglaophenia tubulifera	2; 10; 11; 12; 14; 41; 43; 44; 46
Gymnangium montagui	7; 10; 11; 43
Thecocarpus myriophyllum	14

Antennella secundaria	22; 24; 25; 27; 29
Kirchenpaueria pinnata	2; 24; 25; 34
Kirchenpaueria similis	29
Nemertesia antennina	1; 2; 9; 10; 12; 13; 14; 18; 22; 23; 24; 26; 29; 31; 34; 41; 42; 44; 45; 46
Nemertesia ramosa	2; 5; 9; 10; 12; 13; 14; 17; 18; 23; 24; 26; 41; 43; 44
Plumularia setacea	3; 7; 11; 33
Schizotricha frutescens	12; 14; 41; 42
Abietinaria abietina	46
Amphisbetia operculata	7; 11; 45; 46
Diphasia rosacea	11
Dynamena pumila	34; 40
Sertularella gayi	1; 2; 7; 8; 9; 11; 12; 13; 14; 23; 29; 41; 42; 43; 45
Sertularella polyzonias	4; 5; 7; 10; 11; 43
Sertularia argentea	22; 27; 29
Sertularia cupressina	23
Obelia indet.	29
Obelia geniculata	1; 3; 45; 46
Obelia plicata	13
Alcyonium digitatum	1; 2; 3; 4; 7; 8; 9; 10; 11; 12; 13; 14; 23; 26; 27; 29; 31; 42; 43; 44; 45; 46
Alcyonium glomeratum	2; 5; 8; 9; 10; 12; 14; 19; 41; 42; 43; 44; 45; 46
Eunicella verrucosa	2; 4; 5; 8; 9; 10; 12; 13; 14; 41; 42; 43; 44; 46
Virgularia mirabilis	24; 25
Cerianthus lloydii	15; 16; 26; 28; 29; 31; 32; 33
Pachycerianthus multiplicatus	24; 25
Epizoanthus couchii	1; 9; 22; 23; 26; 29; 31
Parazoanthus axinellae	43
Isozoanthus sulcatus	11; 24; 25; 42
Actinia equina	38
Anemonia viridis	6; 15; 22; 23; 24; 25; 32; 40
Urticina felina	1; 6; 9; 10; 11; 12; 13; 14; 24; 29; 32; 38; 41; 43; 46
Urticina eques	34
Anthopleura ballii	25; 32; 40
Aureliania heterocera	22; 23; 24; 26; 28; 29; 32; 33
Metridium senile	14; 24; 29
Sagartia elegans	3; 6; 8; 11; 19; 22; 31; 32
Cereus pedunculatus	1; 3; 31; 32; 33
Actinothoe sphyrodeta	3; 17; 29; 45
Sagartiogeton undatus	24; 25; 35; 36
Hormathia coronata	23; 34
Adamsia carciniopados	12; 15; 16; 27; 34
Halcampoides elongatus	32
Mesacmaea mitchellii	22; 23; 26; 27; 28; 29; 31; 32; 33
Peachia cylindrica	32
Halcampa chrysanthellum	34
Edwardsia claparedii	24; 25
Scolanthus callimorphus	23; 24; 25; 32
Corynactis viridis	3; 4; 6; 7; 8; 9; 10; 11; 12; 13; 14; 45; 46
Caryophyllia smithii	1; 3; 4; 5; 7; 8; 9; 10; 11; 12; 14; 17; 19; 22; 23; 25; 26; 27; 28; 29; 31;40; 41; 42; 43; 44; 45; 46

Nemertea

Nemertea indet	37
Lineus longissimus	32

Sipuncula

Phascolion strombus	15

Annelida

Alentia gelatinosa	40
Harmothoe indet.	38; 40
Anaitides mucosa	37
Eulalia viridis	38
Eumida bahusiensis	37
Glycera tridactyla	37
Nephtys indet.	37
Nephtys hombergii	37
Marphysa bellii	37
Scoloplos armiger	37
Malacoceros fuliginosus	37; 39
Pygospio elegans	37
Chaetopterus variopedatus	1; 29; 31
Capitella capitata	39
Notomastus latericeus	37
Arenicola indet.	36
Arenicola marina	35; 37; 39
Armandia polyophthalma	37
Terebellidae indet.	22; 32; 33
Eupolymnia nebulosa	40
Lanice conchilega	28; 31; 32; 33; 35; 37
Polycirrus aurantiacus	31
Bispira volutacornis	19; 24
Branchiomma bombyx	28
Megalomma vesiculosum	32
Sabella pavonina	24
Serpulidae indet.	24
Pomatoceros triqueter	7; 18; 29; 38; 45
Filograna implexa	26; 40
Protula tubularia	29
Salmacina dysteri	29
Spirorbidae indet.	38
Oligochaeta indet.	39

Crustacea (Lower)

Chthamalus stellatus	38; 40
Semibalanus balanoides	38
Balanus balanus	19; 43; 45
Balanus crenatus	14; 23; 24; 25; 29; 31; 40; 43

Cylindropsyllus laevis	23
Crustacea (Higher)	
Mysidacea indet.	40
Amphipoda indet..	32; 46
Talitrus saltator	37; 39
Talorchestia deshayesii	37; 39
Urothoe brevicornis	37
Urothoe marina	37
Ampelisca brevicornis	37
Bathyporeia elegans	37
Bathyporeia guilliamsoniana	37
Corophium crassicorne	37
Siphonoecetes kroyeranus	37
Eurydice indet.	39
Eurydice pulchra	39
Idotea indet.	37; 38
Astacilla indet.	13
Palaemon serratus	35; 40
Crangon crangon	37
Nephrops norvegicus	15; 16
Anapagurus laevis	15; 35
Pagurus bernhardus	15; 16; 23; 24; 25; 27; 29; 33; 35; 36; 37; 40
Pagurus prideaux	16
Galathea squamifera	40
Munida rugosa	12
Pisidia longicornis	40
Porcellana platycheles	38; 40
Maja squinado	1; 24; 26; 27; 32
Inachus dorsettensis	16; 25
Inachus phalangium	32
Macropodia rostrata	13
Cancer pagurus	2; 9; 11; 25; 31; 33; 40
Liocarcinus corrugatus	32; 33
Liocarcinus depurator	16; 24; 32; 33; 35; 36
Liocarcinus puber	2; 7; 8; 12; 23; 26; 28; 29; 31; 32; 38; 40
Carcinus maenas	22; 24; 35; 36; 37; 38; 40
Pilumnus hirtellus	40
Xantho incisus	38; 40
Insecta	
Anurida maritima	38
Mollusca	
Lepidochitona cinereus	40
Diodora graeca	38
Patella ulyssiponensis	38
Patella vulgata	38; 40
Helcion pellucidum	38
Monodonta lineata	40
Gibbula magus	29; 32; 33; 34

Gibbula cineraria	7; 11; 14; 22; 31; 40
Gibbula umbilicalis	38; 40
Calliostoma zizyphinum	2; 3; 5; 7; 8; 9; 10; 11; 12; 13; 17; 18; 19; 23; 27; 28; 29; 31; 38; 40; 41; 42; 43; 44; 46
Littorina littorea	40
Littorina neritoides	38
Littorina mariae	40
Littorina obtusata	40
Littorina neglecta	38
Littorina saxatilis	38; 40
Littorina obtusata/mariae	38
Cingula cingillus	40
Turritella communis	16
Melanella alba	34
Simnia patula	9; 10
Trivia arctica	7; 12
Trivia monacha	7
Erato voluta	12
Lamellaria perspicua	40
Nucella lapillus	38; 40
Ocenebra erinacea	19; 25; 40
Hinia reticulata	36; 37; 39; 40
Philine aperta	25
Elysia viridis	1
Hermaea bifida	1
Aplysia punctata	7
Berthella plumula	38; 40
Tritonia nilsodhneri	5; 9; 12; 43
Hancockia uncinata	34
Doto indet.	11; 34
Doto eireana	46
Doto koenneckeri	1
Acanthodoris pilosa	12
Onchidoris sparsa	2; 7
Crimora papillata	31
Limacia clavigera	1; 2; 3; 11; 31
Polycera faeroensis	14; 22; 31; 34; 45
Cadlina laevis	5; 9; 10; 22; 24; 25; 28; 34; 40; 41; 43; 45; 46
Aldisa zetlandica	5
Archidoris pseudoargus	25; 28
Armina loveni	24
Flabellina pedata	24; 46
Eubranchus indet..	13
Aeolidia papillosa	38; 40
Mytilus edulis	38
Ostrea edulis	23; 25
Chlamys varia	25; 40
Aequipecten opercularis	28; 31
Pecten maximus	15; 16; 23; 24; 26; 27; 28; 29; 40
Anomia ephippium	40
Pododesmus squamula	40
Lucinoma borealis	35; 36; 37

Lasaea rubra	40
Kellia suborbicularis	38
Cerastoderma edule	37
Spisula subtruncata	37
Lutraria lutraria	32; 34
Ensis indet.	37
Ensis arcuatus	37
Angulus squalidus	37
Angulus tenuis	37
Gari tellinella	32
Gari depressa	31
Venus verrucosa	32; 33
Chamelea gallina	37
Clausinella fasciata	32; 34

Brachiopoda

Terebratulina retusa	9

Bryozoa

Crisiidae indet.	11; 18
Crisia indet.	13
Crisia denticulata	2; 3; 4; 7; 11; 29; 46
Crisia eburnea	4; 12; 29; 45
Alcyonidium diaphanum	14; 17; 18; 19; 22; 24; 27; 28; 29; 31
Alcyonidium gelatinosum	40
Alcyonidium parasiticum	24
Flustrellidra hispida	40
Amathia indet.	18
Amathia lendigera	27
Bowerbankia	19
Pentapora foliacea	8; 43; 44; 46
Parasmittina trispinosa	29; 44; 46
Porella compressa	5; 8; 9; 10; 12; 14; 41; 42; 43; 44; 46
Schizomavella linearis	12; 40
Sertella indet.	43
Cellepora pumicosa	2; 5; 7; 11; 12; 41; 43; 45
Omalosecosa ramulosa	8; 9; 10; 12; 14; 42; 43
Membranipora membranacea	7; 46
Electra pilosa	1; 3; 7; 11; 38
Flustra foliacea	26; 27; 29; 31
Securiflustra securifrons	28
Cellaria indet.	1; 7; 11
Cellaria sinuosa	9; 10
Bicellariella ciliata	13; 45
Bugula indet.	18
Bugula plumosa	19; 23; 25; 26
Bugula turbinata	31
Bryozoa indet. crusts	11; 19; 33; 38; 41; 46

Phoronida

Phoronis hippocrepia	1; 2; 3; 11

Echinodermata

Antedon bifida	1; 5; 7; 11; 18; 22; 23; 31; 32
Luidia ciliaris	1; 2; 4; 5; 7; 8; 10; 11; 12; 14; 15; 29; 34; 43; 44; 45; 46
Porania pulvillus	5; 12
Asterina gibbosa	7; 17; 19; 29; 31; 38; 40; 43
Crossaster papposus	29
Henricia oculata	1; 2; 3; 4; 7; 8; 9; 10; 11; 12; 13; 14; 15; 17; 18; 19; 23; 24; 25; 26; 27;28; 29; 31; 41; 42; 44; 45; 46
Stichastrella rosea	4; 41; 42; 44
Asterias rubens	3; 4; 7; 8; 9; 11; 12; 13; 14; 15; 16; 26; 31; 32; 33; 38; 46
Marthasterias glacialis	2; 7; 9; 10; 11; 13; 14; 15; 16; 19; 26; 28; 29; 31; 32; 33; 34; 38; 42; 45; 46
Ophiothrix fragilis	9; 13; 15; 22; 24; 29; 38; 40; 41
Ophiocomina nigra	13; 29; 38
Ophiactis balli	2
Amphipholis squamata	38; 40
Ophiura albida	15; 16; 35
Ophiura ophiura	15; 25
Psammechinus miliaris	7; 12; 38
Echinus esculentus	1; 2; 4; 7; 8; 9; 10; 11; 12; 14; 15; 17; 18; 22; 23; 26; 27; 29; 31; 41; 42;43; 44; 46
Paracentrotus lividus	6; 38
Holothuria forskali	1; 2; 4; 5; 8; 9; 10; 11; 13; 14; 26; 27; 31; 41; 42; 43; 44; 45; 46
Pawsonia saxicola	1; 7; 11; 12; 38; 43; 46
Aslia lefevrei	1; 7; 11; 38; 43; 44; 45; 46
Ocnus lactea	34
Thyone roscovita	31
Neopentadactyla mixta	34
Leptosynapta bergensis	34
Leptosynapta inhaerens	37

Tunicata

Clavelina lepadiformis	3; 9; 22; 24; 29; 40
Polyclinum aurantium	2; 9; 26; 31
Morchellium argus	3; 46
Sidnyum turbinatum	40
Aplidium indet.	4; 7
Aplidium nordmanni	3; 8; 40
Aplidium pallidum	14
Aplidium punctum	11; 17; 18; 19; 22; 23; 26; 27; 28; 29; 31; 40; 45
Didemnidae indet.	3; 22; 24; 29; 31; 40; 45
Didemnum maculosum	26; 40
Diplosoma listerianum	22; 29
Diplosoma spongiforme	3; 17; 19; 23; 29
Lissoclinum perforatum	26; 46
Ciona intestinalis	9; 11; 19; 22; 23; 24; 25; 28; 40; 45
Diazona violacea	4; 8; 9; 10; 12; 41; 43; 44

Scophthalmus rhombus	1
Zeugopterus punctatus	2; 14
Limanda limanda	35; 36
Pleuronectes platessa	36

Cyanophycota

Beggiatoa sp.	25

Rhodophycota

Audouinella indet.	38
Scinaia forcellata	32; 34
Scinaia turgida	1; 32; 33; 34
Asparagopsis armata	1
Bonnemaisonia asparagoides	3; 7; 11; 27
Palmaria palmata	40
Dilsea carnosa	1; 3; 7; 11; 45
Dudresnaya verticillata	27; 34
Callophyllis laciniata	2; 3; 7; 11; 45
Kallymenia reniformis	1; 2; 3; 4; 7; 11
Meredithia microphylla	2; 3; 7; 11
Hildenbrandia rubra	38
Corallinaceae indet	1; 2; 3; 4; 7; 11; 31; 38; 45
Corallina officinalis	38
Lithothamnion corallioides	31; 32; 34
Maerl indet	33
Phyllophora indet.	11
Phyllophora crispa	1; 3
Schottera nicaeensis	4; 7
Mastocarpus stellatus	38; 40
Chondrus crispus	3; 38; 40
Polyides rotundus	40
Plocamium cartilagineum	1; 2; 3; 11; 32; 33; 38; 45; 46
Halarachnion ligulatum	32; 34
Calliblepharis ciliata	11; 32; 33; 34
Rhodophyllis divaricata	34
Rhodymenia indet.	4
Rhodymenia pseudopalmata	3; 45
Rhodymenia ardissonei	5; 8; 10; 45; 46
Champia parvula	34
Lomentaria articulata	38
Lomentaria clavellosa	1; 38
Ceramium indet.	27; 38
Griffithsia corallinoides	40
Pterothamnion plumula	34
Acrosorium uncinatum	1; 2; 3; 4; 7; 11; 33; 34; 38
Cryptopleura ramosa	3; 7; 33; 45; 46
Delesseria sanguinea	1; 2; 3; 4; 11; 46
Drachiella spectabilis	4; 45
Hypoglossum hypoglossoides	1; 11; 33; 46
Membranoptera alata	38
Myriogramme bonnemaisonii	1; 2; 3; 7; 46

Nitophyllum punctatum	3; 45; 46
Phycodrys rubens	3; 4; 7; 45; 46
Polyneura laciniata	2; 3; 46
Heterosiphonia plumosa	2; 11; 46
Polysiphonia elongata	32
Polysiphonia lanosa	40

Chromophycota

Ectocarpaceae indet	37; 38
Leathesia difformis	40
Cladostephus spongiosus	37
Dictyopteris membranacea	1; 2; 3; 4; 7; 11; 45; 46
Dictyota dichotoma	2; 3; 4; 7; 11; 45
Sporochnus pedunculatus	34
Desmarestia ligulata	3; 32
Arthrocladia villosa	34
Chorda filum	40
Laminaria digitata	1; 7; 38
Laminaria hyperborea	3; 6; 7; 11; 45; 46
Laminaria saccharina	3; 11; 40
Saccorhiza polyschides	3; 6
Alaria esculenta	3
Ascophyllum nodosum	40
Ascophyllum nodosum mackaii	40
Fucus serratus	38; 40
Fucus spiralis	40
Fucus vesiculosus	38; 40
Pelvetia canaliculata	38; 40
Himanthalia elongata	11; 38; 40
Halidrys siliquosa	1

Chlorophycota

Enteromorpha indet.	38; 40
Ulva indet.	38
Cladophora indet.	38
Codium indet.	38

Lichens

Caloplaca indet.	38
Lecanora atra	38
Lichina confinis	38
Lichina pygmaea	40
Ramalina indet.	38
Verrucaria maura	38; 40
Verrucaria mucosa	38
Xanthoria parietina	38
Grey lichens indet.	38