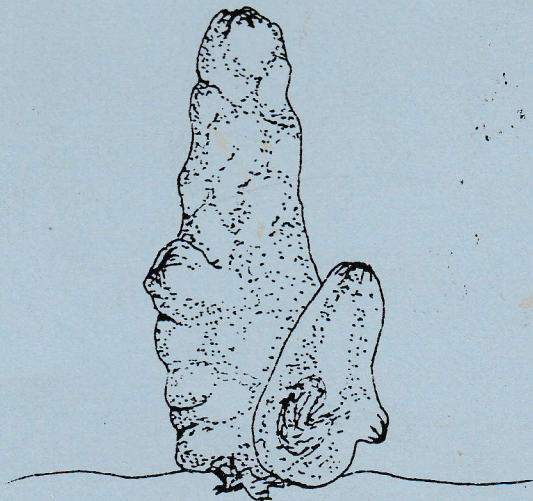


SEASEARCH SURVEY OF LOCH CRAIGNISH

Susan Gubbay
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1991



Ascidia mentula

A Report to the Nature Conservancy Council
from Marine Biological Consultants Ltd.,
9, Gloucester Road, Ross-on-Wye,
Herefordshire, HR9 5BU.

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91/SS/1

ABSTRACT

SEASEARCH survey techniques were used to collect information on the main habitat and community types in Loch Craignish on the south west coast of Scotland. Nineteen different habitat/community types were recorded during the survey, nine of which have been described by previous SEASEARCH surveys of sealochs.

The loch can best be described in three parts, a central area, a brackish lagoon and an eastern basin. In general the habitats graded from sheltered muds to coarse sand with the edges of the islands being fringed by boulders amongst sand colonised by forests of *Chorda filum* which were very dense in places. The central part of the loch was a fine mud at the head, except where the Barbreck river enters the loch. However much of the seabed consisted of a sandy mud with an extensive covering by a fine filamentous green algae, often upto 25cm deep. The lagoonal habitats were a fine glutinous mud. This was fringed by *Zostera noltii* but the central part was essentially covered by decaying organic material. *Philine aperta* was particularly common in this area. The central part of the lagoon was colonised by dense concentrations of sea cucumbers. The more sheltered eastern part of the loch was predominantly muddy with the sloping margins colonised by abundant *Ascidrella aspersa* although *Sabella pavonina* was also common. This graded into areas of fine sticky clay in the basin of the loch, colonised by *Pennatula phosphorea* although there was often no visually dominant community.

Part of the area around the entrance to the loch was also investigated. In the eastern basins the habitat was coarse sand with filamentous and foliose red algae common whereas in the more open and deeper part of the main entrance to the loch the habitats graded to mud. The bedrock areas around the entrance of the loch were fringed by *Laminaria hyperborea* forest.

Many of the habitats in the loch have been reported from other sea lochs on the west coast of Scotland. However, both the brackish lagoon and the transitional area from current exposed to sheltered in the vicinity of the mouth of the loch are worthy of more detailed investigation.

PREFACE

SEASEARCH is a survey of the sublittoral marine habitats of Great Britain. The project is run by the Marine Conservation Society (MCS) on behalf of the Nature Conservancy Council (NCC); the governments statutory advisors on nature conservation in Great Britain.

The aims of the SEASEARCH project are;

1. To gather information on sublittoral habitats and major community types at selected areas around the coast.
2. To note the presence of any human activities and man-made impacts in the areas surveyed.
3. To note areas which appear of particular interest because of their scenic value, habitat diversity and species richness.
4. To illustrate the habitats encountered with photographs.
5. To produce a report on each areas surveyed.

SEASEARCH surveys contribute to the Marine Nature Conservation Review (MNCR) of Great Britain which is being undertaken by the NCC. The MNCR will describe marine ecosystems around Great Britain from the lower limit of flowering plants, or normal tidal limits of estuaries, offshore to the 12 mile limit of territorial seas.

SEASEARCH is a 'Phase 1' survey aimed at describing the location and extent of habitats and major community types. This also provides necessary basic information to use in planning the more detailed 'Phase 2' surveys. At the same time as recording habitat types, the presence of human activities and impacts are noted, thus supplying information of value to NCC for use in assessing effects of human activities on the marine environment and in providing advice. The project SEASEARCH is designed to be undertaken by volunteer divers with an interest in natural history.

Further details of SEASEARCH can be obtained by writing to:

MARINE CONSERVATION SOCIETY, 9 Gloucester Road, Ross-on-Wye, Herefordshire, HR9 5BU.

ACKNOWLEDGEMENTS

My thanks to the team of divers whose hard work made this expedition a successful and enjoyable week despite having to dive in what was often a very dark and very muddy sea loch! For shore based support I would like to thank Mike Mills for the loan of an unmounted slide film projector and Gill Green for developing all the films on-site. Thanks also to Chris Wooldridge from the University of Wales College of Cardiff and Keith Trammer for making inflatable boats available to the expedition, to the Nature Conservancy Council for the loan of a portable compressor and Christine Howson who kindly gave me access to information from a survey of the area prior to its publication. Funding for the expedition was subsidised by the Nature Conservancy Council and I would like to thank them for their support.

Finally many thanks to Alan Davis who assisted in the planning and report writing stages of this project as well as taking on the responsibilities of Diving Officer during the survey.

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1. INTRODUCTION

The main aim of SEASEARCH is to identify and describe the major sublittoral habitat and community types at specific locations around the coast of Great Britain. The survey areas are selected by the Nature Conservancy Council (NCC) to fit in with their Marine Nature Conservation Review programme and the information is collected using volunteer divers. The results need to give a general impression of the area as well as being detailed enough to enable NCC staff to identify potential sites of marine nature conservation importance and sites in need of further investigation.

As part of the 1990 programme a one week expedition was organised to collect the required information for Loch Cragnish, a sea loch on the west coast of Scotland (Fig 1.). A photographic record of the different habitats and communities was made wherever possible to complement the dive site descriptions and this information was also passed on to the Marine Conservation Society for use in compiling a SEASEARCH Habitat Directory. The information collected by this survey has been cross-referenced to the habitat descriptions of other SEASEARCH surveys of sealochs and it is hoped that this report will, in turn, provide an expanded reference list for future SEASEARCH surveys of sea lochs.

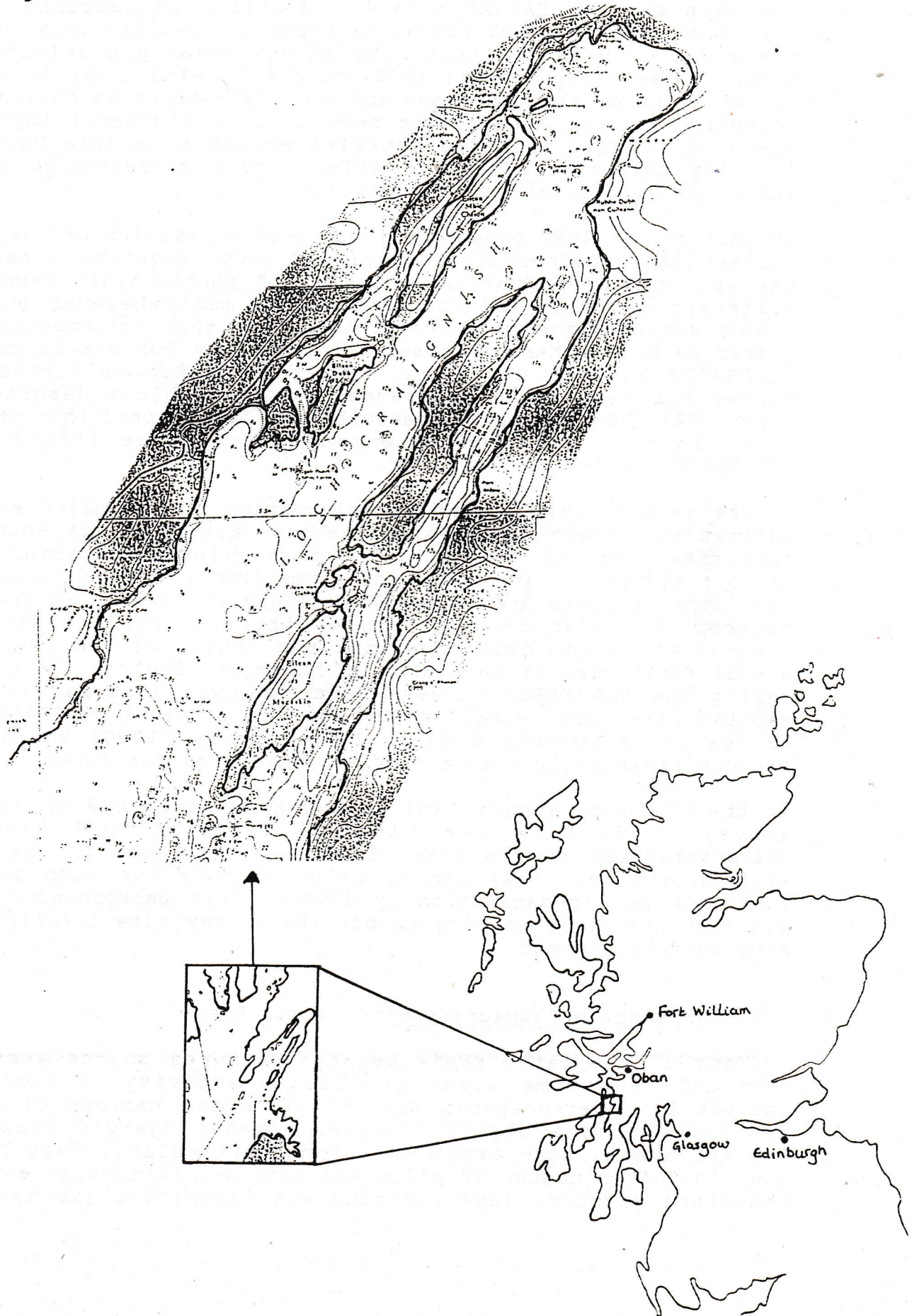
There is a limited amount of information on the major sublittoral habitat and community types in the area although some sports diving does take place in the loch. The most relevant reference material was a field report and recording forms from a 1989 NCC survey of the sea lochs of South Argyll and West Kintyre (Howson, in press). This material included descriptions of the habitats, communities and species at seven locations along the length of the loch giving a useful first view of the sorts of habitats likely to be encountered during the SEASEARCH survey. Reference was also made to the MCS Habitat Directory (Earll, 1990) and two previous SEASEARCH surveys of sea lochs (Gubbay & Nunn, 1988, Gubbay, 1990) which describe sealoch habitats in a form specially prepared for divers.

At the planning stages, and when interpreting the results of the survey, reference was made to some of the large scale characteristics of the area. These are described in the following section and were examined to help identify the most appropriate locations for investigation by divers. This background information was also useful in helping to put the survey site descriptions into some overall context.

1.1. Large Scale Characteristics of the Area

Many of the large scale coastal features on the west coast of Scotland show some signs of glacial activity. Typically these include the over-deepened basins, sills and narrows of fjord-like sea lochs or the highly indented drowned fjordic coastlines of lowland areas. Loch Cragnish is not particularly deep however it does include a number of sills and narrows. Particular emphasis was therefore given to investigating and describing the habitats and

Fig. 1. To show the site location



communities associated with these large scale features and comparing them to adjacent areas of the loch. The location of these features are shown in Figure 2 and some of the key physical characteristics of the loch are summarised in Table 1 (both from Edwards, 1986).

TABLE 1
PHYSICAL CHARACTERISTICS OF LOCH CRAIGNISH

O.S. Grid Reference	NR 780980
Chart number	2326
Loch length (km)	8.8
Tidal range (m)	2.1
Maximum depth (m)	59.0
High water area (sq.km)	19.5
Low water area (sq.km)	18.0
LW vol. (million m ³)	276.4
Watershed (sq.km)	73
Annual rainfall (mm)	1750
Runoff (M m ³ /yr)	109.0

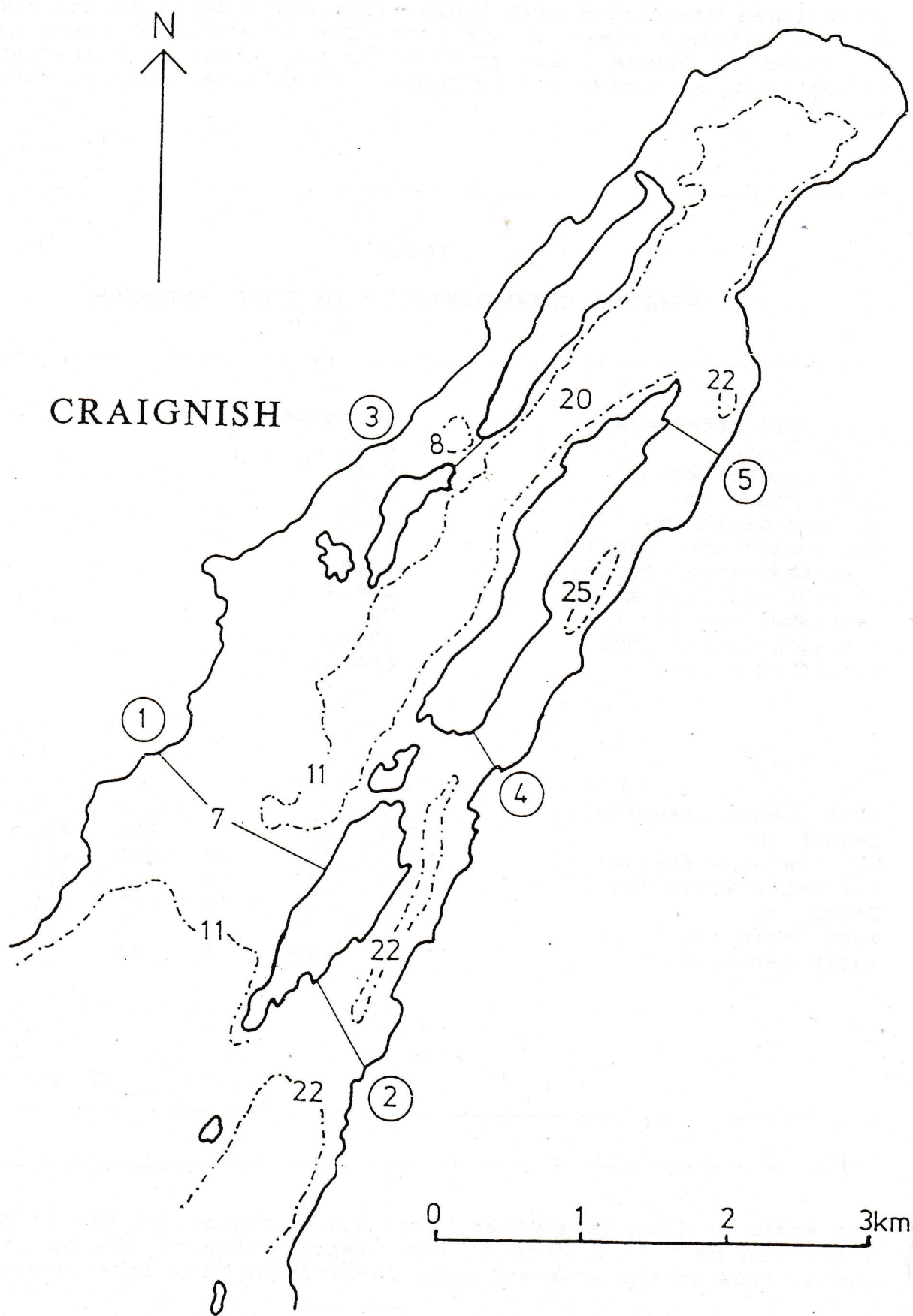
Sill data

Sill number (see Fig.2)	1	2	3	4	5
Length (m)	770	550	100	350	850
High water width (m)	1390	690	90	270	420
Low water width (m)	1370	670	70	250	400
Depth (m)	7	15	5	17	15
Mean depth (m)	5	9	*	*	*
Basin depth (m)	20	38	14	36	*

* unrecorded
(from Edwards, 1986)

The solid geology is another large scale characteristic of a region which can help to interpret the distribution of the habitats and communities in the area and make comparisons with other areas.

Fig. 2. Map showing sills from Edwards (1986)



The solid geology of the area is composed of four main rock types. Sedimentary rocks make up most of the north western shore of the loch whilst metamorphic rock dominates the opposite shore and islands. In more detail a geological map of the area shows mostly Andesitic lava & tuff on the north western side of the loch; the central area including the islands of Mhic Chrion, Dubh and Buidhe, are made up of quartzite, grit and interstratified quartzose-mica-schist, whilst Eilean Rìgh, Eilean nan Gabhar and Eilean Macaskin along with parts of the south eastern shore are mainly epidiorite, hornblende-schist and allied types. The whole area is crossed by intrusions of basalt which run from north west to south east (see Figure 3). These differences in the geology were apparent in the scenery of the area and were perhaps most striking in the narrow steep sided islands composed of metamorphic rock which stretched along the length of the loch (Fig.4). The soft sediment habitats within the loch also reflected the geology of the area as this was predominantly a very fine clay which is the end product of the weathering of schists.

Fig. 3. Map showing the solid geology of the area

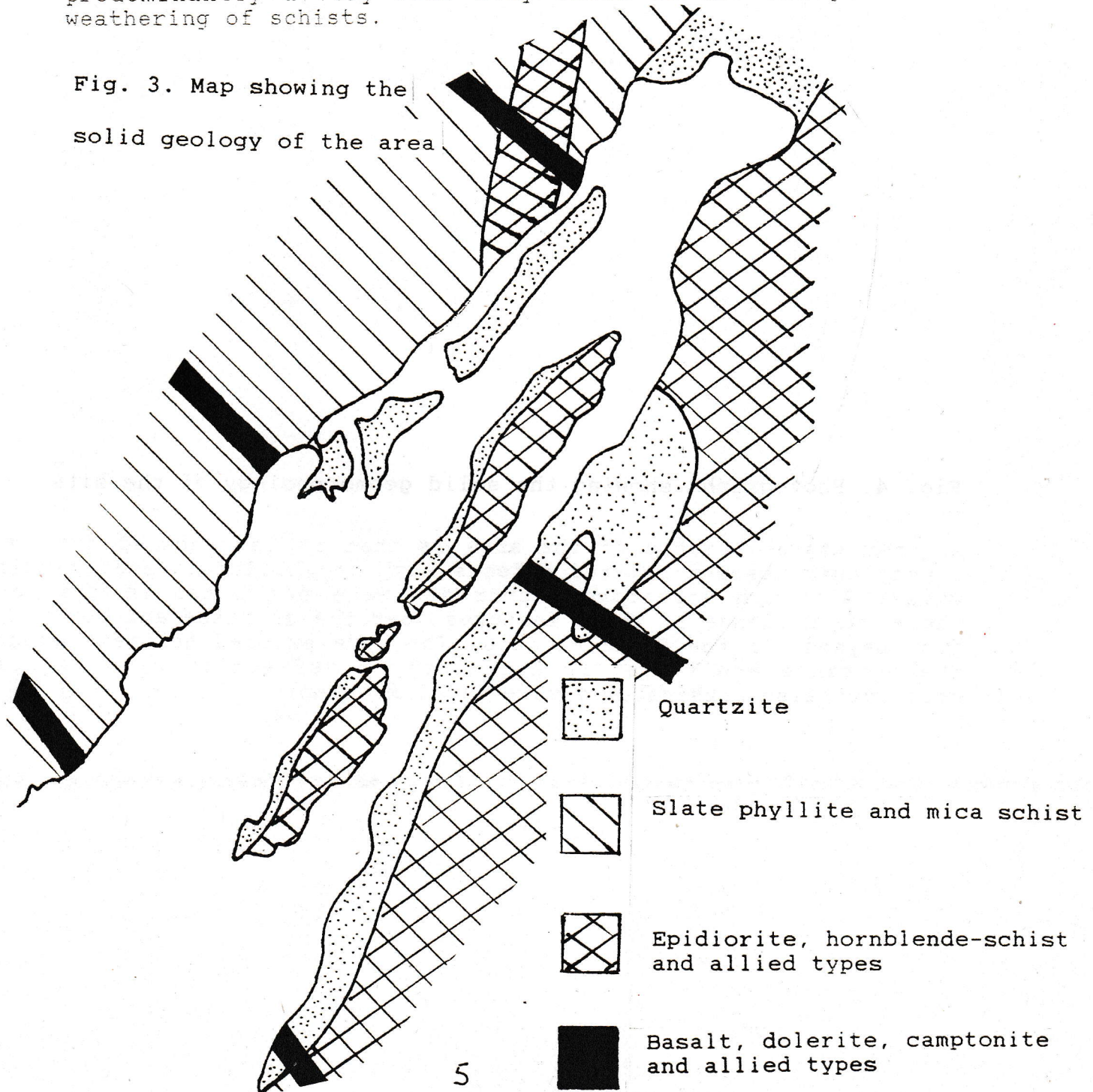




Fig. 4. Photographs showing the solid geomorphology of the site

Another characteristic of the area is that it is renowned for very strong currents and related effects such as whirlpools and standing waves. Although significant currents were not noted in the loch there was evidence of these features near the entrance and certainly just beyond, in the Sound of Jura. The more exposed habitats around the entrance are therefore not simply a reflection of more open coast but also considerably more tidal movement.

2. METHODS

The survey was carried out between the 2nd-7th September 1990 using ten divers three of whom acted as photographers. The survey methods were identical to those used in a previous SEASEARCH surveys of sea lochs (see Gubbay & Nunn, 1988) although the recording form has been modified since then. A sample of the current recording form is included as Appendix 1. All diving was carried out from inflatable boats and site location was greatly assisted by the use of echo sounders.

Team members were instructed to act as Recorders or Photographers and dived at sites indentified by the Project Leader. Recorders made notes of the different habitats and visually dominant communities encountered during the dive. This information was subsequently transcribed onto standard SEASEARCH forms (see Appendix 1) whilst referring to the SEASEARCH Habitat Guide (Earll, 1990) and previous sea loch survey reports.

Photographers were asked to take slides of each of the habitat and community types encountered during the dive. The recommended area to be covered by each photograph was approximately $4m^2$ to give an impression of the larger scale habitats such as bedrock and boulders. Natural light photographs were also helpful in this context and were therefore a valuable addition of the photographic library.

2.1. Sampling Strategy

Diving sites were selected with a view to getting an overall impression of the habitats and communities in the sealoch and to try and locate all the major habitats and communities in the area. To achieve this dives were carried out at regular intervals around the loch as well as in positions which were likely to reveal a different habitat or community to those already located during the survey. Sites were also selected with the aim of finding the boundaries between different habitat types. Many of the dives were therefore transects into the shore crossing the infralittoral/circalittoral boundary. The thirteen different site selection criteria used for the SEASEARCH survey of Loch Broom and Little Loch Broom in 1988 were used once again to identify appropriate dive sites.

SITE SELECTION CRITERIA FOR SEA LOCHS
USED IN THIS SURVEY

1. Edges of basins in sea lochs - transects into shore
2. Bottom of different basins
3. Areas of freshwater influence
4. Areas of sills or narrows
5. Either side of an area of narrows as current falls
6. Areas where currents were noted
7. Very sheltered areas at the head of lochs
8. Steep and more gently sloping edges
9. Obviously different features eg. pinnacles and reefs
10. Bays and bluffs along the margins
11. Areas of different geology
12. Different substrate types marked on the chart
13. Different aspects of islands.

2.2. Access to sites

Diving was carried out from inflatable boats which gave good access to all parts of the loch. The boats were moored in the lagoon which was approximately half way along the north western shore. This was a good base from which to reach both the inner and outer parts of Loch Cragnish. Dives were not carried out in the vicinity of fish farms most of which were near the north eastern shore of the loch (see Fig.6). Also, due to unsuitable weather conditions and the logistics of running one small capacity boat, it was not possible to investigate the outer, current exposed, mouth of the loch.

3. RESULTS

The information on completed SEASEARCH forms has been used to build up a general picture of the habitats and communities in the survey area and has been supplemented by referring to Admiralty Charts and other relevant publications. It has also been used to provide detailed descriptions of the various habitats and communities which were encountered in Loch Cragnish. The following information is provided for the area;

(1) Dive site details (summary table)

(2) A general description of the distribution of habitats and communities recorded in the survey area

(3) Approximate distribution of habitats and communities recorded in the survey area and dive site locations (map)

(The summary map is intended to provide an approximate first view of the distribution of habitats and communities in the area (Fig .). As such it is only intended to act as a guide to Phase 2 work in the area which will add to and refine this general picture.)

(4) Habitat/community types recorded at each dive site (table)

(The detailed habitat information collected during the survey is presented in section **3.4.** under the sixteen major headings used in the SEASEARCH Habitat Directory (being developed to assist recorders on SEASEARCH surveys). This is accompanied by an explanation of the coding system and photographs of the habitat types wherever possible. These provide the background information for the summary habitat/community type table in this section.)

(5) Human impact in the area (description and map).

(6) A Catalogue of the habitats recorded during the survey (descriptive text plus photographs)

3.1. Details of dive sites in Loch Craignish

The details of each dive site in Loch Craignish has been summarised below. All depths have been corrected to chart datum and the locations are shown in Figure 5.

DETAILS OF SURVEY SITES IN LOCH CRAIGNISH

SITE No.	SITE NAME	GRID REF.	DATE	MAX DEPTH (m)	RECORDER
1	S.E. of Eilean Righ	NM 797006	2.9.90	16.0	RL/GG
2	S of Port na Moine	NM 801008	2.9.90	22.0	SG/RC/EM
3	S of Eilean Macaskin	NR 783987	2.9.90	2.2	PG/BG
4	Off Benan Ardifuir	NR 787983	2.9.90	13.2	AD/CL
5	E of Eilean Dubh	NM 794023	2.9.90	9.7	RL/GG
6	S.E. Eilean Mhic Chrion	NM 803301	2.9.90	11.2	PG/BG
7	Bagh Dun Mhuilig	NM 782015	2.9.90	6.7	SG/EM
8	Sgeir Dubh	NM 788025	2.9.90	9.2	RC/CL
9	N.E. of Eilean Righ	NM 812028	3.9.90	10.5	TL/RL
10	S.of Port a Bheachan	NM 808019	3.9.90	21.5	SG/CL
11	E.of Eilean Righ	NM 805202	3.9.90	18.5	BG/RC
12	S.of Eas Mor River	NM 814028	3.9.90	21.5	AD/GG
13	Channel E.of Eilean Righ	NM 809020	3.9.90	19.5	PG/EM
14	N.E. Eilean Mhic Chrion	NM 811041	3.9.90	9.0	RL/TL
15	Rubha Dubh Nan Cuileann	NM 815035	3.9.90	12.0	SG/AD/CL
16	N.W. of Dun Arnai	NM 819043	3.9.90	15.0	PG/EM
17	S of Barbreck River	NM 823049	3.9.90	7.5	BG/RC
18	E of Druim Beithe	NR 772995	4.9.90	31.1	AD/CL
19	Port an Lionaidh	NR 766933	4.9.90	10.1	BG/GG
20	S of Bagh na Cille	NR 770995	4.9.90	21.1	TL/RL
21	S tip of Eilean Macaskin	NR 799986	4.9.90	21.1	EM/RL
22	SW tip Eilean Macaskin	NR 778988	4.9.90	21.1	SG/PG
23	W of Eilean Righ	NM 802022	4.9.90	7.1	AD/CL
24	W of Eilean Macaskin	NR 784995	4.9.90	2.1	BG/GG
25	Off Am Priosan	NR 770998	4.9.90	7.1	EM/RC
26	N of Eilean nan Gabhar	NM 792005	4.9.90	4.1	SG/PG
27	S of Eilean Macaskin	NR 785985	5.9.90	11.3	SG/PG
28	E of Eilean Macaskin	NR 791991	5.9.90	22.3	RC/EM
29	W of Creag a Bhanan	NR 792995	5.9.90	16.3	GG/BG
30	SE of Eilean nan Gabhar	NM 795000	5.9.90	16.9	RC/EM
31	E of Eilean nan Gabhr	NM 795005	5.9.90	13.9	GG/BG
32	SW of Eilean Righ	NM 794009	5.9.90	10.9	SG/PG
33	S tip Eilean Mhic Chrion	NM 797028	5.9.90	5.9	AD
34	N of Eilean Dubh	NM 795025	6.9.90	3.0	CL/AD
35	Off Carranmore	NM 798031	6.9.90	4.0	BG/EM
36	Off Carranmore	NM 798034	6.9.90	5.0	RC

DETAILS OF SURVEY SITES IN LOCH CRAIGNISH (contd.)

SITE No.	SITE NAME	GRID REF.	DATE	MAX DEPTH	RECORDER
37	S.Rubha Dubh nan Cuilean	NM 816032	7.9.90	16.1	RC/EM
38	N of Eilean Righ	NM 813033	7.9.90	16.1	CL/TL
39	NW Eilean Righ	NM 805026	7.9.90	12.1	BG/GG
40	W of Eilean Righ	NM 798017	7.9.90	11.1	SG/PG
41	Central Channel	NM 798022	7.9.90	15.1	AD/CL
42	E of Eilean Mhic Chrion	NM 805035	7.9.90	9.2	CL/TL
43	N channel to lagoon	NM 799026	7.9.90	17.2	AD/CL
44	Sgeir Dubh	NM 812038	7.9.90	9.2	SG/PG
45	S of Eilean Righ	NM 794005	7.9.90	11.2	BG/GG
46	N of Eilean Macaskin	NM 792001	7.9.90	4.2	RC/EM

3.2. General description of the habitats and communities in Loch Craignish

Loch Craignish is approximately 8.5km long. It is widest at the entrance (approx 2.8km) but narrows to around 1km wide at the head. The main freshwater input is from the Barbreck River which flows into the head of the loch but there are a number of smaller streams which discharge into the loch particularly on its eastern margin.

There are four large narrow islands along the length of the loch along with a number of smaller islands all of which are an important feature of the loch. They effectively divide Loch Craignish into three parts; a lagoon on the western edge, a more open, fairly shallow central section and a moderately deep eastern section. The habitat and community descriptions which follow deal with each of these areas in turn.

The Lagoon

The lagoon, on the western margin of the loch, is a shallow feature connected to the main body of the loch in two places. The larger channel is directly opposite the deepest part of the lagoon (recorded as 13m on the Admiralty Chart). Runoff from the adjacent land makes the lagoon a brackish water feature and during the time of the survey there was a distinct layer of freshwater on the surface.

The intertidal edge of the lagoon was fringed by a band of *Zostera noltii* which was most dense towards the southern part of the lagoon. This was anchored into a fine, glutinous, mud which was anoxic not far below the surface.

The subtidal area of the lagoon was also composed of a fine silt however it was generally covered with a loose layer of flocculent material which included fragments of decaying organic matter. The most common species was *Philine aperta* although there were also areas where *Sabella pavonina* was common. In the deeper central part of the lagoon dense clumps of small sea cucumbers covered the surface forming the dominant community (see habitat T/11). The fine mud graded into coarser sediments and finally to bedrock where the lagoon opened out into the main body of the loch. These harder surfaces were colonised by tunicates and the kelp *Laminaria saccharina*. A variable but not particularly strong current was noted in the channel connecting the lagoon to the central basin of the loch.

The Central Basin

The habitats in the central part of the loch graded from those typical of areas sheltered from wave action and currents to habitats characteristic of more exposed conditions.

Despite the very sheltered conditions at the head of the loch the main habitat consisted of angular and rounded stones and pebbles. This can be attributed to the outwashings from the Barbreck river which flows into the loch at this point. The river also makes conditions brackish at the head of the loch although this was generally in the form of pockets of freshwater rather than a distinct halocline. The pebble habitat graded into a gently sloping area of sandy mud covered with shell debris and dominated by clumps of *Ascidrella aspersa*, sometimes attached to *Modiolus modiolus*. The slope levelled out at around 11m and became more of a fine, sticky, mud where *Pennatula phosphorea* formed the visually dominant community where it occurred. This particular habitat was common in the sheltered upper and central parts of the loch. One exception was the small rocky reef, Sgeir Dubh, near the head of the loch. This was dominated by *A. aspersa* in the circalittoral zone and colonised by *L. saccharina* near the surface.

Moving towards the entrance of the loch the fine mud habitat graded into an extensive area of sandy mud. No precise boundary area between the two habitats was identified which, in any case, probably merge into each other very gradually. The sandy mud was dominated by a dense covering of filamentous green algae (see habitat S/04). This blanketed more than 90% of the seabed in places and sometimes formed a layer more than 25cm deep. Around the islands which fringed the central basin of the loch, the habitat was a coarse sand interspersed by boulders grading

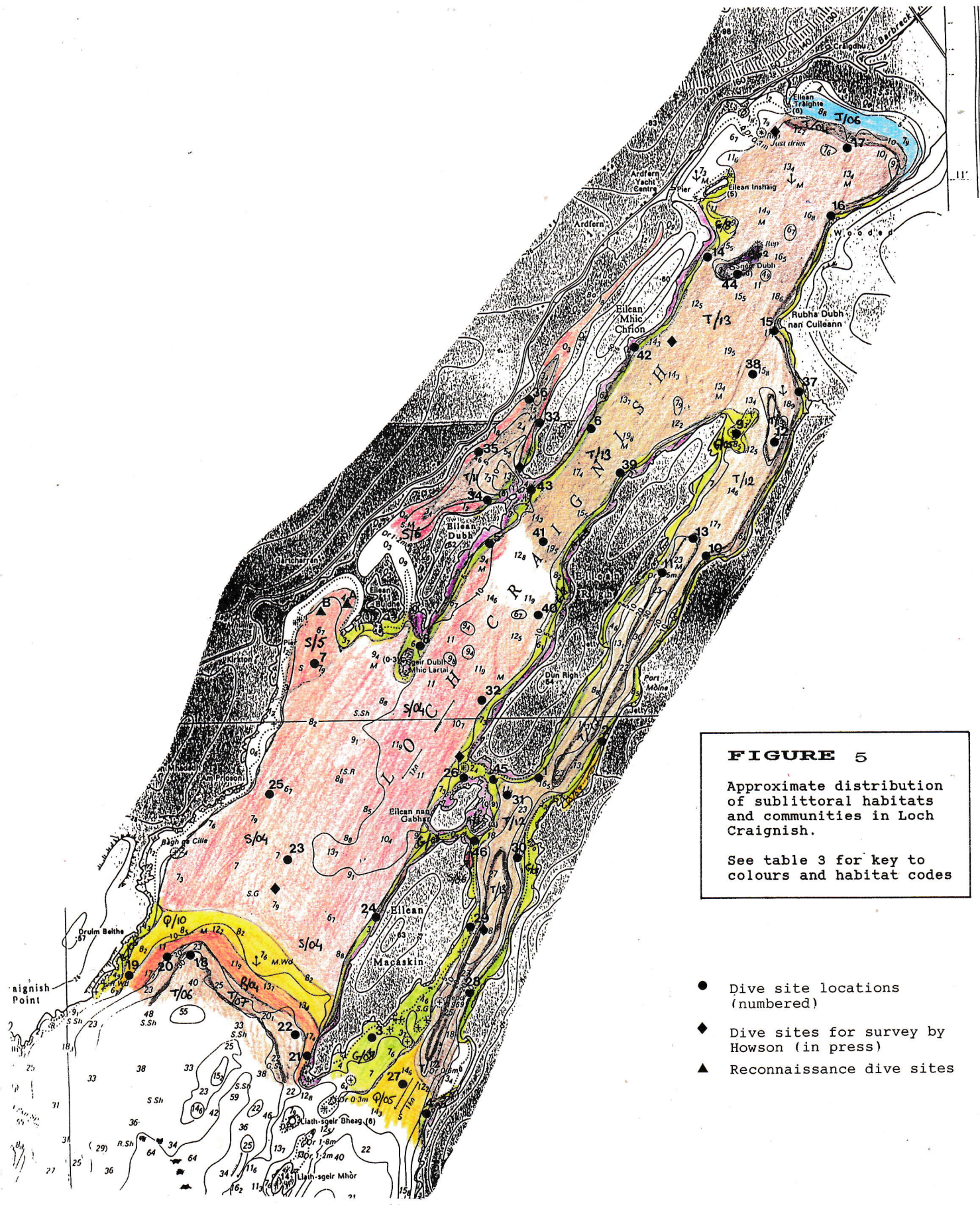


FIGURE 5
 Approximate distribution of sublittoral habitats and communities in Loch Craignish.
 See table 3 for key to colours and habitat codes

- Dive site locations (numbered)
- ◆ Dive sites for survey by Howson (in press)
- ▲ Reconnaissance dive sites

into bedrock at the islands. The dominant species in these areas reflected the changes. The coarser sand was extensively worked and colonised by *S.pavonina* and *Chorda filum* whilst silt covered specimens of the cape form of *L.saccharina* were attached to the bedrock and boulders on the sand. A small embayment on the western edge of the loch, sheltered by the island of Eilean Buidhe, was slightly different. *C.filum* was not present in this area and *L.saccharina* not particularly common. This slightly muddier area was dominated by *S.pavonina*.

The seabed around the mouth of the loch shelved fairly steeply near the southernmost tip of Eilean Macaskin. A distinct change in the main habitat types was noted in this area. The sandy mud habitat which dominated the central part of the loch graded into an area of coarser sand. With increasing depth this changed to a muddy sand colonised by *Virgularia mirabilis*, and then an area of *P.phosphorea* on fine sticky mud. The outermost habitat recorded was a fine mud slope where the surface was scattered with occasional shell debris. Although becoming more exposed to wave action in this area the increasing depth of the seabed meant that the habitats graded to finer sediments.

The eastern basin

The narrower eastern section of the loch was composed of two basins reaching depths of more than 30m. These were separated by sills at the northern tip of Eilean Righ and around Eilean nan Gabhar. Extensive areas of *C.filum* fringed the edge of the loch as well as Eilean Righ, and Eilean nan Gabhar. This graded into muddy slopes dominated by *A.aspersa* although *S.pavonina* was also common. The habitat in the deeper parts of the basin was a very fine mud which was distinctly clay like in places. Although *P.phosphorea* was noted in some parts of this habitat there were areas where no visually dominant species was recorded.

The mouth of the loch was more exposed to wave action and currents. This was reflected in the habitats and communities recorded in the area. The edges were fringed by dense *L.hyperborea* forest on bedrock and the central area was a coarse sand with shell debris and occasional boulders. *L.hyperborea* was present on the boulders with a good covering of red algae of the stipes and a rich turf of small filamentous and foliose red algae attached to the small pebbles and shell fragments.

The area just outside the entrance to the loch was not investigated during this survey because of unfavourable conditions. The preliminary report of a survey of this area (C.Howson, *in press*) does however indicate that the habitats and communities are particularly rich and diverse in this vicinity because it is a transitional zone between the sheltered habitats of the sea loch and an area exposed to strong tidal currents outside the loch.

The following table is a summary of the habitat/community types recorded at each dive site.

CODE	HABITAT TYPE	LOCATION (site Nos.)
A	Infralittoral Bedrock	
● A/01	Stepped Bedrock, <i>L.hyperborea</i>	4,21
● A/03	Stepped Bedrock, <i>L.saccharina</i> , <i>C.filum</i>	1,8,26,34,42,43
B	Circalittoral Bedrock	
B/02	Bedrock slope, <i>A.aspersa</i>	4,6,8,16,37,43,44
G	Infralittoral Small Boulders	
● G/05	Densely packed boulders, <i>L.hyperborea</i>	4,21
G/08	Boulders on muddy sand, <i>L.saccharina</i> , <i>C.filum</i> , <i>S.pavonina</i>	1,3,8,9,14,19,24,26,28, 30,37,39,40,45,46
J	Infralittoral Stones - Cobbles/Pebbles/Slates	
J/06	Pebbles on sand, fucoids	17
Q	Infralittoral Sand	
Q/03	Fine sand, <i>A.turneri</i>	2
● Q/05	Coarse sand, occasional pebbles	27
● Q/10	Medium sand, loose algae	19
R	Circalittoral Sand	
● R/04	Muddy sand, <i>Virgularia</i> beds	18,19,20
S	Infralittoral Muddy Sediments	
S/04	Sandy mud, filamentous green algae	5,19,23,24,25,32,40
S/05	Clay mud, <i>S.pavonina</i> & filamentous green algae	A,B,5,7,11,26,29
S/06	Muddy sand, <i>Zostera</i>	36
T	Circalittoral Muddy Sediments	
● T/04	Sandy mud with shell debris, <i>A.aspersa</i>	1,2,10,15,16,17,31
● T/06	Fine mud slope, occasional shell debris	1,6,18
● T/07	Fine sticky mud, worked, <i>P.phosphorea</i>	18,20,22
T/11	Flocculent mud	33,34,35,36
T/12	Clay mud, <i>S.pavonina</i> , <i>A.aspersa</i>	2,9,10,11,16,28,30, 31,33,36,37,38
T/13	Clay mud, <i>V.mirabilis</i>	2,6,10,11,12,13,14, 15,16,17,28,29,30, 39,41,42,43

● Habitats recorded from other SEARESEARCH surveys of sealsochs.

3.3. Human Impacts in the survey area

Loch Craignish is a moderately exploited loch with a variety of activities taking place. Exploitation of the loch has developed over the years, firstly as a source of income and food, and secondly as a tourist site.

The main settlement in the area is the village of Ardfern which has a small permanent population which increases dramatically in the summer accommodating tourists in both bed and breakfast type and "holiday village" type accommodation. Associated with the village of Ardfern is a marina which had approximately 90 boats moored at the time of our visit. The maximum number of boats that the marina can cope with is 100. There are also several crown moorings in the lagoon of the loch which is sheltered from the worst of the weather in the area. Two tour boats operate in the loch taking bird and seal watchers out. The disturbance caused by these two boats, the "Kingfisher" and the "Alystria", is unknown. Disturbance is probably minimal since the trips of these boats are fairly infrequent.

On Eilean Macaskin there is a field study centre which belongs to the Education Authority. The centre is used during the summer. The number of students attending the centre is unknown.

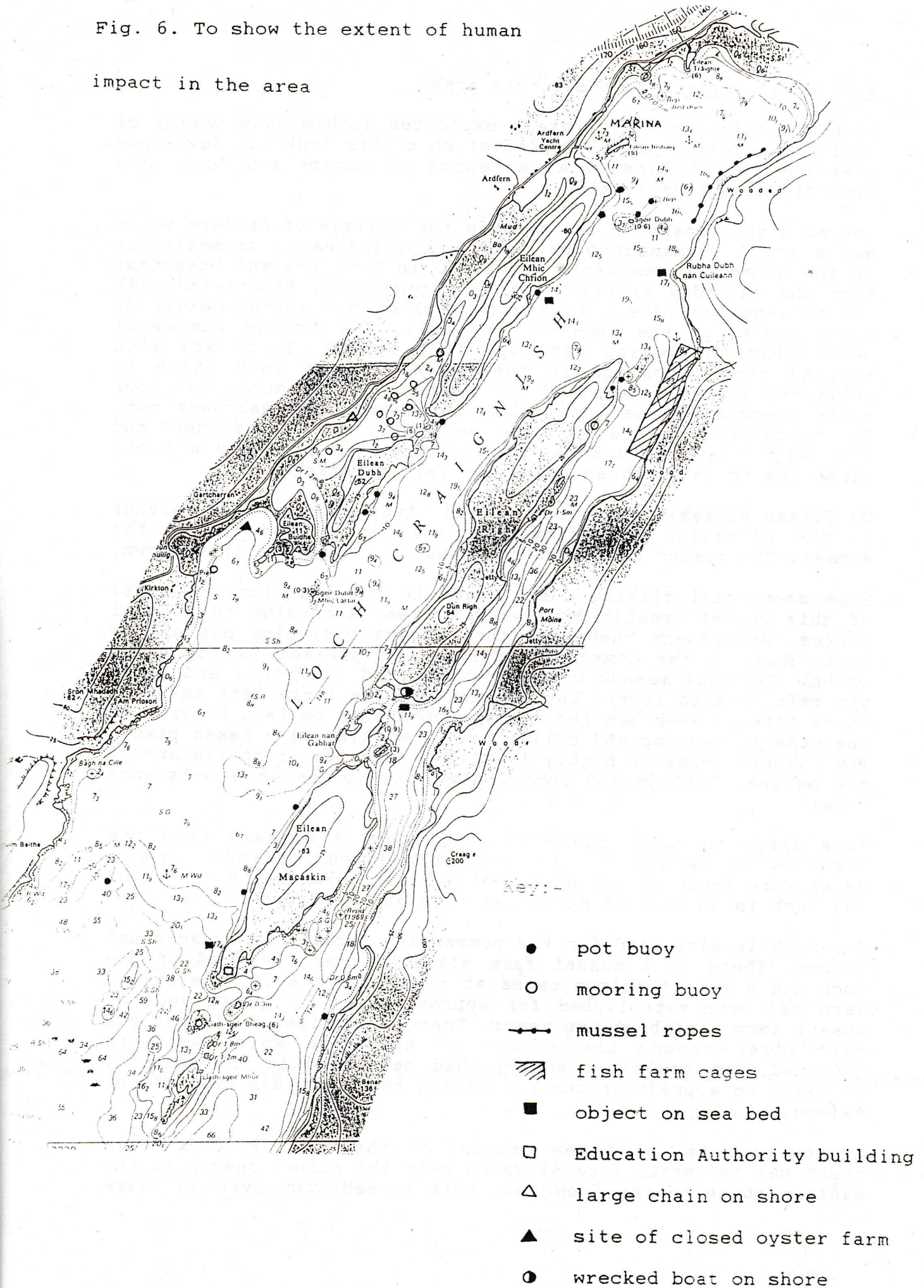
Some commercial fishing takes place in the loch but the level of this varies greatly from year to year according to a local source. At present there are three boats operating out of the loch. Most of the commercial fishing at present is for green crabs, *Carcinus maenus* which are exported to France and Spain via refrigerated lorry. Three years ago the lorry left the loch three times a week but the market appears to be less buoyant at the moment. Bagging and collection of winkles also takes place. The fishery leads to highly localised deposits of shells around the marina. Potting and long lining take place on a substance level.

Some dredging takes place in the loch. It appears that the dredging is mainly for *Nephtrops norvegicus*, scampi. Dredge marks were found at one of the dive sites towards the centre of the loch in an area of dense sea firs and *Nephtrops* burrows.

The loch is also used for the commercial farming of mussels and salmon. There is a mussel farm situated near the head of the loch and a set of salmon cages at the western side. The salmon farm has been established for approximately 6-7 years and the mussel farm for about two years. There was evidence of shot gun cartridges around the shores of the loch which we were informed, but could not verify, had been used in the shooting of seals as a predator control method to deter them from taking salmon.

Aquaculture is not a new venture on the loch. At one stage there was an oyster farm situated near the ruined church on the eastern shore of the loch, but this closed down over 50 years

Fig. 6. To show the extent of human impact in the area



ago. The reason for the closure is unknown. There are apparently still oysters present around the site of the old farm but these may simply be the shells.

Litter did not appear to be a major problem around the shores and it was only evident on the bed of the loch in three places. The items found included an unidentified metal cylinder that was thought to be a shell, a lobster claw bound up with elastic bands, an empty cuprinol can, and a brick. More litter may have been present on the seabed around the marina but no diving was done in this area.

There are proposals for future developments in the loch. These include plans for a new marina to be constructed in the lagoon to replace the crown mooring and to act as competition for the present marina. There are also plans for a housing estate. These proposed developments would possibly change the character of the area. Another possibility is that an increase in population associated with more housing could result in more septic tanks and may increase the BOD in the more enclosed parts of the loch if discharges entered the loch.

There have been many commercial ventures around the loch however, nothing has succeeded to any great degree. It appears that the location of the loch makes it unsuitable for the commercial development of the recreation industry. It is not quite remote enough to have the appeal of some areas and also it is in competition with Lochgilphead, Jura and Mull. In addition to this the loch has not been the centre of military activity as have other lochs and so it has none of the development often associated with military use.

The main impact in the loch appears to be the fish farming industry and the small scale fishery operating in the loch.

3.4 CATALOGUE OF HABITATS RECORDED DURING THE SURVEY

Nineteen habitat/community types were recorded in Loch Craignish. These have been classified under the eighteen headings listed below to be consistent with the approach used to describe the major habitat/community types recorded in previous SEASEARCH surveys of sealochs (Gubbay, 1989). The headings are not intended to be a comprehensive habitat classification system but a convenient means of collating and cross-referencing the habitat descriptions from SEASEARCH surveys. To distinguish between them each heading has been given a code letter (I and O have been omitted intentionally) (see Table 2).

TABLE 2.

Broad habitat headings used for SEASEARCH recording

<u>CODE</u>	<u>GENERAL HEADING</u>
A	Infralittoral Bedrock
B	Circalittoral Bedrock
C	Infralittoral Artificial Substrata
D	Circalittoral Artificial Substrata
E	Infralittoral Large Boulders (>1m)
F	Circalittoral Large Boulders (>1m)
G	Infralittoral Small Boulders (<1m)
H	Circalittoral Small Boulders (<1m)
J	Infralittoral Stones - Cobbles/Pebbles/Slates
K	Circalittoral Stones - Cobbles/Pebbles/Slates
L	Infralittoral Gravel
M	Circalittoral Gravel
N	Infralittoral Very Mixed Substrata - hard and soft
P	Circalittoral Very Mixed Substrata - hard and soft
Q	Infralittoral Sand
R	Circalittoral Sand
S	Infralittoral Mud
T	Circalittoral Mud

More detailed habitat descriptions have the appropriate code letter followed by a number. Numbers are assigned in chronological order and are therefore not intended to show any relationship between the different habitats. For example the first SEASEARCH habitat description which falls under the general category "Infralittoral Bedrock" has been given the reference number A/01, and the second A/02; the first description of "Circalittoral Muddy Sediments" is S/01 and the second S/02 and so on. The code letters are not identical to those used in Gubbay

(1989) as gravel and sand have now been put into separate categories. Nevertheless it is still possible to cross-reference the habitat/community types recorded in this survey with previous SEASEARCH surveys of Scottish sealochs by referring to the complete list in Table 3. The colours used to represent each main habitat type in figure 5 are also shown in Table 3.

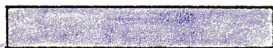
TABLE 3

HABITAT/COMMUNITY TYPES DESCRIBED BY SEASEARCH SURVEYS OF SCOTTISH SEALOCHS

COLOURS USED IN FIGURES



- A** **Infralittoral Bedrock**
 A/01 Stepped Sandstone Bedrock
 A/02 Gullied Bedrock
 A/03 Stepped Bedrock, *L.saccharina*, *C.filum*
 A/04 Gullied Bedrock *L.saccharina*
 A/05 Gullied Bedrock, pock marked



- B** **Circalittoral Bedrock**
 B/01 Stepped bedrock, *C.intestinalis*
 B/02 Bedrock slope, *A.aspersa*



- E** **Infralittoral Large Boulders**
 E/01 Occasional large boulders, *L.hyperborea*
 E/02 Dense large boulders, *L.hyperborea*



- F** **Circalittoral Large Boulders**
 F/01 Large boulder slope, *Antedon*, *Munida*



- G** **Infralittoral Small Boulders**
 G/01 Densely packed boulders, *L.saccharina*
 G/02 Occasional angular small boulders on coarse sand, kelp forest
 G/03 Angular blocks, scree slope, diatom mat.
 G/04 Rounded boulders on coarse sand and maerl
 G/05 Densely packed boulders, *L.hyperborea*
 G/06 Occasional boulders on sand
 G/07 Rounded boulders on coarse sand/maerl
 G/08 Boulders on sand, *L.saccharina*, *C.filum*, *S.pavonina*

COLOURS USED IN FIGURES



H Circalittoral Small Boulders
H/01 Rounded boulder slope, *Munida*, *Antedon*



J Infralittoral Stones - Cobbles/Pebbles/Slates
J/01 Clean cobbles, on sand, *Modiolus* clumps.
J/02 Pebble/cobble bank with occasional boulder, *L.saccharina*
J/03 Pebble/cobble bank with occasional boulder, *S.polyschides*
J/04 Angular pebbles on muddy sand *P.crispa*
J/05 Pebbles on shell sand
J/06 Pebbles on sand, fucoids



K Circalittoral Stones - Cobbles/Pebbles/Slates
K/01 Pebble clumps on muddy sand, *Limaria hians* bed.
K/02 Cobbles & pebbles on shell sand



L Infralittoral Gravel
L/01 Sandy shell gravel with some pebbles



N Infralittoral Very Mixed Substrata
N/01 Boulders, pebbles & sand



P Circalittoral Very Mixed Substrata
P/01 Boulders, pebbles & sand



Q Infralittoral Sand
Q/01 Coarse sand covered by continuous bed of maerl
Q/02 Coarse sand with intermittent, living and dead maerl
Q/03 Sandy mud, filamentous green algae
Q/04 Muddy sand *Zostera*
Q/05 Coarse sand with occasional pebbles
Q/06 Coarse sand with shell debris algal debris, well worked.
Q/07 Sand with occ.boulders & exposed bedrock.
Q/08 Coarse sand with occ.boulder, maerl
Q/09 Clean sand, frequent cobbles, algal tufts
Q/10 Medium sand, loose algae
Q/11 Muddy sand, shell debris, maerl, *Virgularia*
Q/12 Muddy sand, loose algal debris
Q/13 Clean, coarse, rippled sand, *Zostera*
Q/14 Muddy sand, maerl
Q/15 Sandy mud, filamentous green algae
Q/16 Fine sand, *A.turneri*

COLOURS USED IN FIGURES



- R Circalittoral Sand**
 R/01 Clean shell sand
 R/02 Clean coarse sand, shell debris
 R/03 Shell sand with scattered pebbles and cobbles
 R/04 Muddy sand, *Virgularia* beds
 R/05 Coarse shelly sand waves



- S Infralittoral Muddy Sediments**
 S/01 Sandy mud with algal mat
 S/02 Mud, *P. crista*
 S/03 Silty mud, *Modiolus*, *Antedon*
 S/04 Sandy mud, filamentous green algae
 S/05 Clay mud, *S. pavonina* & filamentous green algae



- T Circalittoral Muddy Sediments**
 T/01 Muddy slope, with small boulders, *Munida* dominated.
 T/02 Silty mud with occasional stones and boulders, *Munidia* and *Ascidella*
 T/03 Muddy slope with extremely abundant shell debris
 T/04 Sandy mud with shell debris and pebbles, *Ascidella* dominated
 T/05 Silty mud with shell debris, *Aequipecten*
 T/06 Fine mud slope with occasional shell debris
 T/07 Fine sticky mud, worked surface, *Pennatula* beds.
 T/08 Slightly worked sandy mud
 T/09 Sandy mud, occasional large boulder
 T/10 Silty mud, algal debris
 T/11 Flocculent mud
 T/12 Clay mud, *S. pavonina*, *A. aspersa*
 T/13 Clay mud, *V. mirabilis*

The following section gives a more detailed description of the habitat/community types recorded in Loch Craignish. A photograph is included wherever possible to give a general impression of the type of habitat being described. The text also cross-refers to previous SEASEARCH reports where the habitat has been described before.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: A/01

HABITAT TYPE: A: Infralittoral Bedrock

SITE TYPE: Stepped bedrock, *Laminaria hyperborea*

LOCATION (site Nos.): 4,21

DEPTH: 0-4m

VISUALLY DOMINANT COMMUNITY: *L.hyperborea* kelp forest

SITE DETAILS

Situation: Sea loch entrance
Salinity: Fully marine
Wave exposure: Moderately exposed
Tidal streams: None noted
Geology:

HABITAT DETAILS

Zone: Infralittoral
Substratum: Bedrock
Modifiers:
Features: Ledges

PHOTOGRAPH;

This habitat has been described from previous SEASEARCH surveys (see H25 in Gubbay & Nunn, 1988 and habitat A/01 in Gubbay, 1990). It consisted of stepped bedrock with ledges, vertical and horizontal faces. The dominant community type was *L.hyperborea* which formed a dense kelp forest in places but was interspersed with the occasional *L.saccharina*. In common with previous reports of this habitat it was reported around the entrance to the sealoch. One noticeable difference in the dominant community however was that the sea squirt *Ascidiella aspersa* was quite common. Apart from this *Echinus esculentus* and *Carophyllia smithi* were also a feature of the community as with previous records of this habitat/community.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: A/03

HABITAT TYPE: A: Infralittoral Bedrock

SITE TYPE: Stepped bedrock, *Laminaria saccharina*, *Chorda filum*

LOCATION (site Nos.): 1, 8, 26, 34, 42, 43

DEPTH: 0-7m

VISUALLY DOMINANT COMMUNITY: *L. saccharina*, *C. filum*

SITE DETAILS

Situation: Sea loch
Salinity: Fully marine
Wave exposure: Sheltered
Tidal streams: None noted
Geology:

HABITAT DETAILS

Zone: Infralittoral
Substratum: Bedrock
Modifiers: *E. esculentus*
Features:

PHOTOGRAPH;

This habitat has been described by a previous SEASEARCH survey (see A/03 in Gubbay, 1990). It consisted of stepped bedrock with *L. saccharina* and some *Chorda filum* forming the dominant community. There were occasional *Echinus esculentus* amongst the kelp however seasquirts were particularly common (mostly *Ascidella aspersa* but also *Ascidia mentula*). There was a light covering of silt on the bedrock and kelp surfaces at some sites. This habitat was recorded around the sheltered margins of the sealoch.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: B/02

HABITAT TYPE: B: Circalittoral Bedrock

SITE TYPE: Bedrock slope, *Ascidiella aspersa*

LOCATION (site Nos.): 4,6,16,37,43,44

DEPTH:0-7m

VISUALLY DOMINANT COMMUNITY: *A. aspersa*

SITE DETAILS

Situation:Sea loch
Salinity: Fully marine
Wave exposure:Sheltered
Tidal streams:None noted
Geology:

HABITAT DETAILS

Zone: Circalittoral
Substratum: Bedrock
Modifiers:
Features:

PHOTOGRAPH; Paul Glendell



This habitat was recorded near the head of the loch in areas sheltered from wave action and currents and consisted of near vertical areas of bedrock. There were some small overhangs, cracks and crevices as well as the occasional small ledge. The bedrock walls were extensively covered by seasquirts. These were mostly *A. aspersa* but also *A. mentula* and *C. parallelogramma*. There was a light covering of silt on the rock surfaces and the occasional *E. esculentus* was noted on the reef at site 44.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: G/05

HABITAT TYPE: G: Infralittoral Small Boulders

SITE TYPE: Densely packed boulders, *Laminaria hyperborea*

LOCATION (site Nos.): 4,21

DEPTH:4-10m

VISUALLY DOMINANT COMMUNITY: *L.hyperborea*

SITE DETAILS

Situation:Sea loch entrance
Salinity: Fully marine
Wave exposure:Mod.exposed
Tidal streams:None noted
Geology:

HABITAT DETAILS

Zone: Infralittoral
Substratum: Boulders
Modifiers:
Features: Sandy patches

PHOTOGRAPH; Gil Green



This habitat has been described by a previous SEASEARCH survey (see habitat G/05 in Gubbay, 1990). It was found around the margins of the entrance to the sea loch and consisted of densely packed angular boulders interspersed with some patches of sand. The dominant community was *L.hyperborea* kelp forest which formed a dense covering. There were also some *L.saccharina* and *C.filum* strands amongst the kelp. Red algae were abundant below the kelp canopy and *C.smithii* and *A.aspersa* were also common near the entrance. The photograph shows this habitat inside the loch where *C.filum* was more common.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: J/06

HABITAT TYPE: J: Infralittoral Stones - Cobbles/Pebbles/Slates

SITE TYPE: Pebbles on sand, fucoids

LOCATION (site Nos.): 4,21

DEPTH: 0-3m

VISUALLY DOMINANT COMMUNITY: fucoids, filamentous green algae

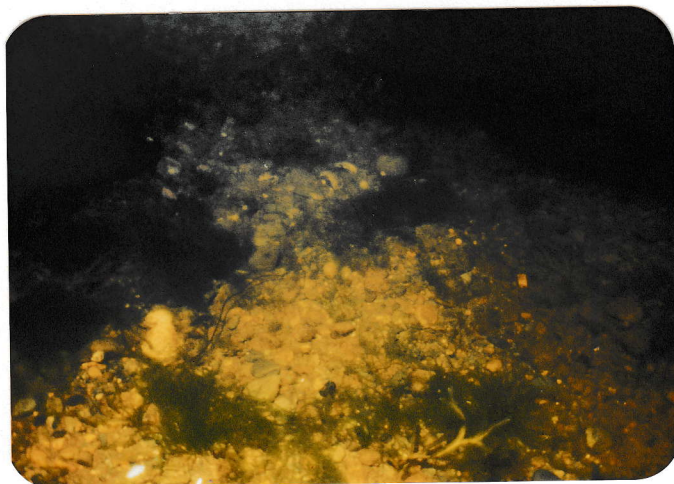
SITE DETAILS

Situation: Sea loch head
Salinity: Brackish
Wave exposure: Sheltered
Tidal streams: None noted
Geology:

HABITAT DETAILS

Zone: Infralittoral
Substratum: Pebbles
Modifiers:
Features:

PHOTOGRAPH; Ron Crosby



This habitat was recorded from the sheltered head of the loch near the outflow of the Barbreck River. A freshwater influence was very noticeable but this occurred in pockets rather than as a distinct halocline. The habitat looked similar to a stream bed in an area of moderate water flow. Angular and rounded pebbles with some gravel covered upto 90% of the seabed but this graded into more patchy cover away from the head of the loch. The pebbles were on a bed of sandy mud and were colonised by fucoids and green algae.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: Q/03

HABITAT TYPE: Q: Infralittoral Sand

SITE TYPE: Fine sand, *Aspherococcus turneri*

LOCATION (site Nos.): 2

DEPTH: 3m

VISUALLY DOMINANT COMMUNITY: *Aspherococcus turneri*

SITE DETAILS

Situation: Sea loch
Salinity: Freshwater influence
Wave exposure: Sheltered
Tidal streams: None noted
Geology:

HABITAT DETAILS

Zone: Infralittoral
Substratum: Fine sand
Modifiers:
Features:

PHOTOGRAPH; Ron Crosby



This habitat was recorded in a sheltered part of the loch near the runoff from a small stream. The sediment consisted of a very gently sloping seabed of fine sand. The dominant community was *A. turneri* which covered between 80-100% of the surface. Occasional clumps of *A. aspersa* and *S. pavonina* were found amongst the brown alga.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: Q/05

HABITAT TYPE: Q: Infralittoral Sand

SITE TYPE: Coarse sand, occasional pebbles

LOCATION (site Nos.): 27

DEPTH: 12m

VISUALLY DOMINANT COMMUNITY: filamentous red algae.

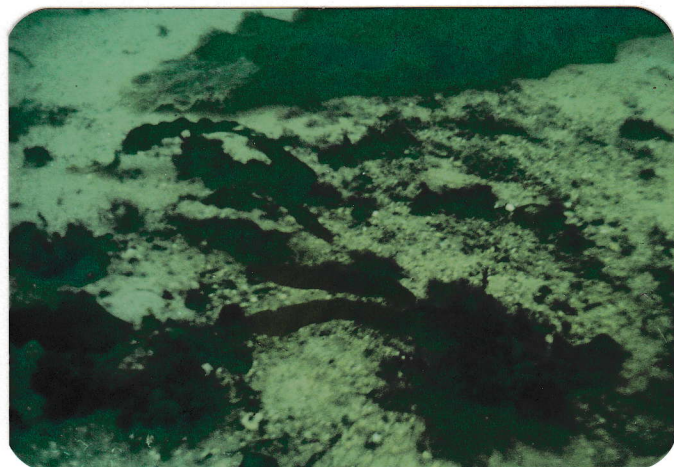
SITE DETAILS

Situation: Sea loch entrance
Salinity: Fully marine
Wave exposure: Mod. exposed
Tidal streams: 1 knot charted
Geology:

HABITAT DETAILS

Zone: Infralittoral
Substratum: Coarse sand/pebbles
Modifiers:
Features:

PHOTOGRAPH; Paul Glendell



This habitat has been recorded by previous SEASEARCH surveys (see habitat H/12 in Gubbay & Nunn 1988 and habitat N/05 in Gubbay, 1990). It was observed at the entrance to the sea loch in an area subject to some tidal currents. The habitat consisted of level, coarse sand with shell fragments and pebbles as well as the occasional boulder. *L. hyperborea* was present on the boulders with a good covering of red algae on the stipes as well as some *Alcyonium digitatum*. There was a rich turf of small filamentous and foliose red algae attached to the small pebbles and shell fragments on the surface of the coarse sand. Large clumps of *Scinia turgida* were particularly conspicuous and the occasional *Echinus esculentus* was observed in this habitat.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: Q/10

HABITAT TYPE: Q: Infralittoral Sand

SITE TYPE: Medium sand, loose algae

LOCATION (site Nos.): 19

DEPTH: 12m

VISUALLY DOMINANT COMMUNITY:

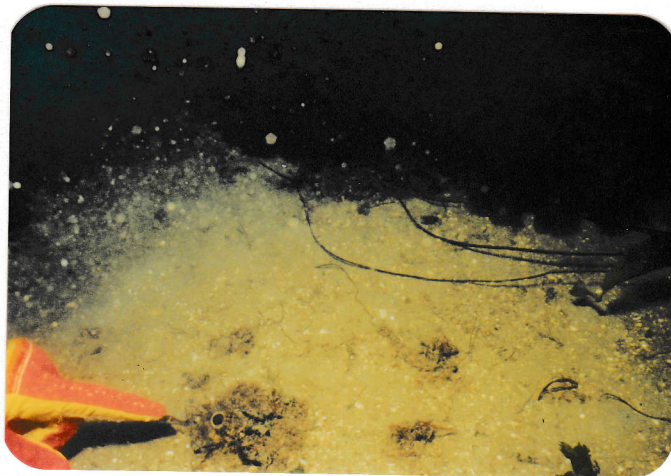
SITE DETAILS

Situation: Sea loch
Salinity: Fully marine
Wave exposure: Sheltered
Tidal streams: None noted
Geology:

HABITAT DETAILS

Zone: Infralittoral
Substratum: Medium sand
Modifiers:
Features:

PHOTOGRAPH; Gil Green



This habitat has been recorded by a previous SEASEARCH survey (see habitat N/10 in Gubbay, 1990). A flat or very gently sloping medium sand habitat whose predominant feature was a scattering of both loose and attached algae. These included *Ulva lactuca* the occasional *Laminaria saccharina* (cape form), *Chorda filum* and loose filamentous red algae.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: R/04

HABITAT TYPE: R: Circalittoral Sand

SITE TYPE: Muddy sand, *Virgularia mirabilis*

LOCATION (site Nos.): 20,21

DEPTH:15-25m

VISUALLY DOMINANT COMMUNITY: *Virgularia mirabilis*

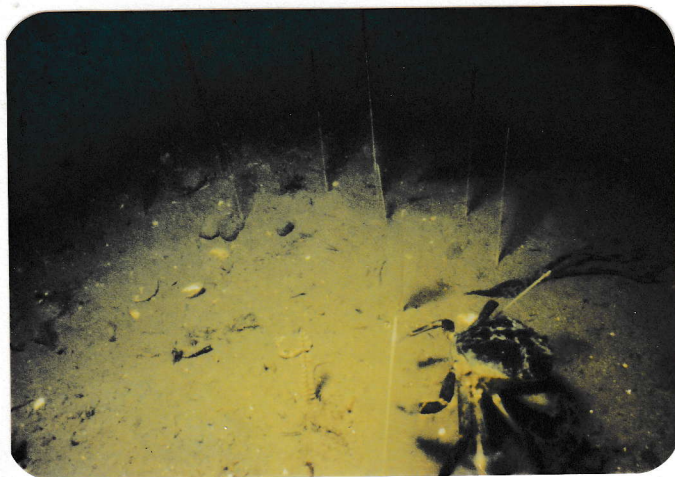
SITE DETAILS

Situation:Sea loch
Salinity: Marine
Wave exposure:Sheltered
Tidal streams:Noticeable
Geology:

HABITAT DETAILS

Zone: Infralittoral
Substratum:
Modifiers:
Features:

PHOTOGRAPH; Gil Green



This habitat has been described by previous SEASEARCH surveys (see Habitat P/04 in Gubbay, 1990 and Habitat H4 in Gubbay & Nunn, 1988). It was observed on areas of sloping seabed near the entrance of the loch at depths of upto 25m. The habitat consisted of a muddy sand which was worked into burrows and mounds, most noticeable by *Nephrops norvegicus* at site 20. There was a scattering of shell debris on the surface and the visually dominant community was *Virgularia mirabilis* which was particularly dense at site 20 (more than 10/m²). This habitat was distinctly different from Habitat T/13 despite *V.mirabilis* being the visually dominant species in both cases. The difference was in the sediment type which was more clay like in Habitat T/13.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: S/04

HABITAT TYPE: S: Infralittoral Muddy Sediments

SITE TYPE: Sandy mud, filamentous green algae

LOCATION (site Nos.): 5,19,23,24,25,32,40 DEPTH: 5-10m

VISUALLY DOMINANT COMMUNITY: filamentous green algae

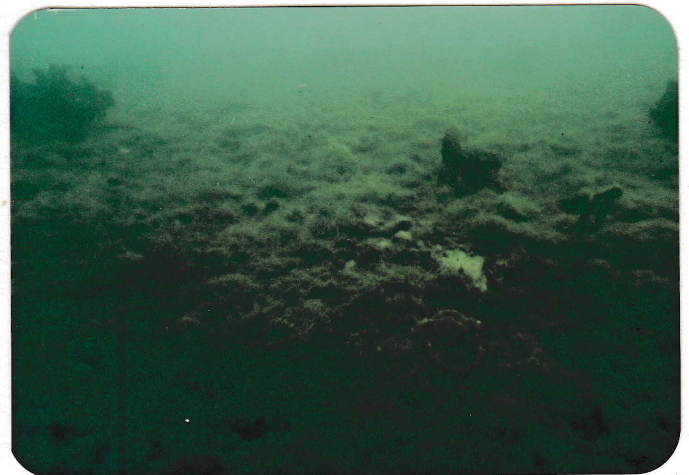
SITE DETAILS

Situation: Sea loch
Salinity: Normal
Wave exposure: Sheltered
Tidal streams: None noted
Geology:

HABITAT DETAILS

Zone: Infralittoral
Substratum: Sandy mud
Modifiers:
Features:

PHOTOGRAPH; Paul Glendell



This habitat was common in the central part of the loch. It consisted of a firm sandy mud, worked into occasional mounds and burrows. There were shell fragments on the surface but this was hidden by an almost complete covering of a fine, branching, filamentous green algae (unidentified). This formed a layer more than 25cm deep in places. Small orange sponges were quite common on the algae and *Suberites carnosus* was seen on the sediment. Other algae noted in amongst the unidentified species were *Phyllophora crispa*, small *Laminaria saccharina* and strands of *Chorda filum*. Hermit crabs were common and *Eupolyornia nebulosa* occasional in this habitat.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: S/05

HABITAT TYPE: S: Infralittoral Muddy Sediments

SITE TYPE: Clay mud, *Sabella pavonina*, filamentous green algae

LOCATION (site Nos.): 5,7,11,26,29

DEPTH: 6-10m

VISUALLY DOMINANT COMMUNITY: *Sabella pavonina*

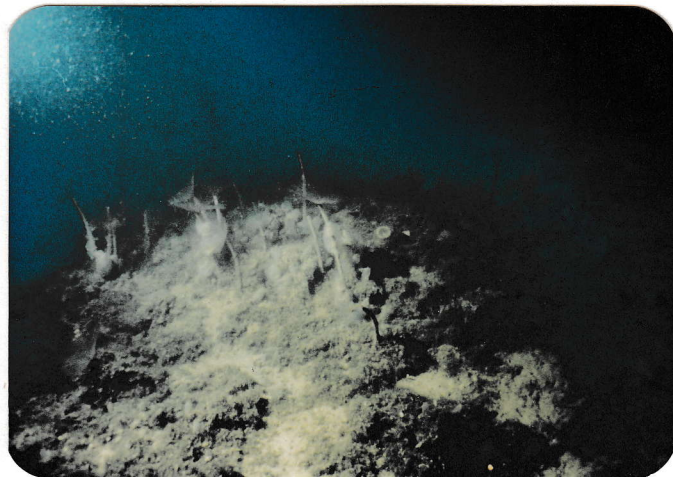
SITE DETAILS

Situation: Sea loch
Salinity: Some F.W. influence
Wave exposure: Sheltered
Tidal streams: None noted
Geology:

HABITAT DETAILS

Zone: Infralittoral
Substratum: Clay mud
Modifiers: *A. marina*
Features: Mounds, burrows

PHOTOGRAPH; Ron Crosby, Paul Glendell



A flat or gently sloping habitat of distinctly clay-like mud with some shell debris and pebbles on the surface. This was extensively worked by *Arenicola marina*, *Eupolyornia nebulosa*, *Carcinus maenus* and *Liocarcinus depurator*. The visually dominant community was *Sabella pavonina* which occurred at densities of more than 8/m². A diatom mat was visible on the surface of the sediment at some sites whilst 'Trailliella' was recorded at others. An anoxic layer was present not far beneath the surface at the reconnaissance dive sites. Patches of *Beggiatoa* were also recorded in this habitat along with unattached green algae, silt covered *Laminaria saccharina* and the occasional strand of *Chorda filum*. Small flat fish and sand gobies were abundant. This habitat often graded into habitat G/08.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: S/06

HABITAT TYPE: S: Infralittoral Muddy Sediments

SITE TYPE: Fine mud, *Zostera*

LOCATION (site Nos.): 36

DEPTH: 0-1m

VISUALLY DOMINANT COMMUNITY: *Zostera noltii*

SITE DETAILS

Situation:Lagoon
Salinity: Brackish
Wave exposure:Sheltered
Tidal streams:None noted
Geology:

HABITAT DETAILS

Zone: Intertidal/Infralittoral
Substratum: Fine mud
Modifiers:
Features:

PHOTOGRAPH;



This habitat was very similar to T/11. It consisted of a fine mud with an anoxic layer very close to the surface. The visually dominant species was *Zostera noltii*. This habitat fringed the edge of a brackish lagoon which was connected to the main body of the loch by a narrow channel. There was a distinct layer of freshwater on the surface of the lagoon. Much of this habitat was exposed during the extremely low spring tides as the survey coincided with the autumn equinox.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: T/04

HABITAT TYPE: T: Circalittoral Muddy Sediments

SITE TYPE: Sandy mud with shell debris, *A.aspersa*

LOCATION (site Nos.): 1, 2, 10, 15, 16, 17, 31 DEPTH: 6-10m

VISUALLY DOMINANT COMMUNITY:

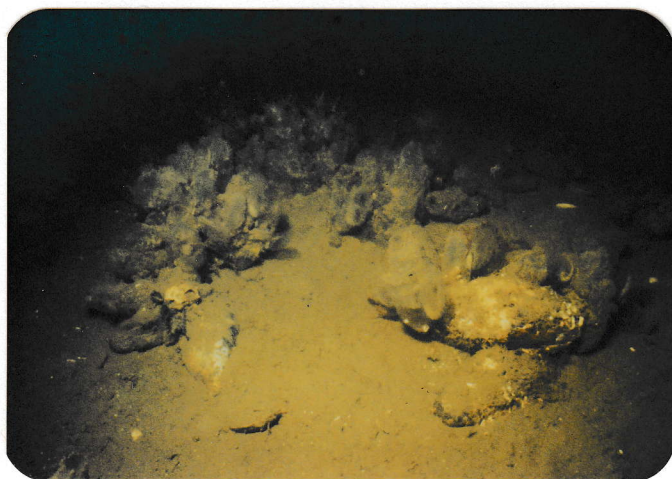
SITE DETAILS

Situation: Sea loch
Salinity: Fully marine
Wave exposure: Very sheltered
Tidal streams: None noted
Geology:

HABITAT DETAILS

Zone: Circalittoral
Substratum: Sandy mud
Modifiers:
Features: Shell debris, pebbles

PHOTOGRAPHS; Gil Green, Ron Crosby



This habitat has been recorded by a previous SEASEARCH survey (see habitat H5 in Gubbay & Nunn, 1988). It consisted of a sandy mud slope and occurred around the margins of the sealoch. The most conspicuous feature at sites 1, 2 and 17 was the abundant shell debris on the surface of the mud. At site 17 (see above photo) this may be due to sorting by the outflow of the Barbreck River. There was also a scattering of small stones on the surface. Clumps of *Asciidiella aspersa* were common and at sites 10 & 17 these were attached to living *Modiolus modiolus*.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: T/06

HABITAT TYPE: T: Circalittoral Muddy Sediments

SITE TYPE: Fine mud slope, occasional shell debris

LOCATION (site Nos.): 1,6,18 DEPTH:10-12,25m

VISUALLY DOMINANT COMMUNITY:

SITE DETAILS

Situation: Sea loch
Salinity: Fully marine
Wave exposure: Sheltered
Tidal streams: None noted
Geology:

HABITAT DETAILS

Zone: Circalittoral
Substratum: Fine mud
Modifiers:
Features: Shell debris

PHOTOGRAPHS; Paul Glendell



This habitat has been recorded by a previous SEASEARCH survey (see habitat H2 in Gubbay & Nunn, 1988). Although very similar to habitat T/04 (which it often graded into) this has been recorded as a separate habitat as shell debris was not nearly as abundant nor was the occurrence of *Ascidella aspersa*, both of which were the characteristic features of habitat T/04. It was a soft mud habitat with some shell debris on the surface.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: T/07

HABITAT TYPE: T: Circalittoral Muddy Sediments

SITE TYPE: Fine mud, worked, *Pennatula phosphorea*

LOCATION (site Nos.): 18, 20, 22

DEPTH: 19-26m

VISUALLY DOMINANT COMMUNITY: *P.phosphorea*

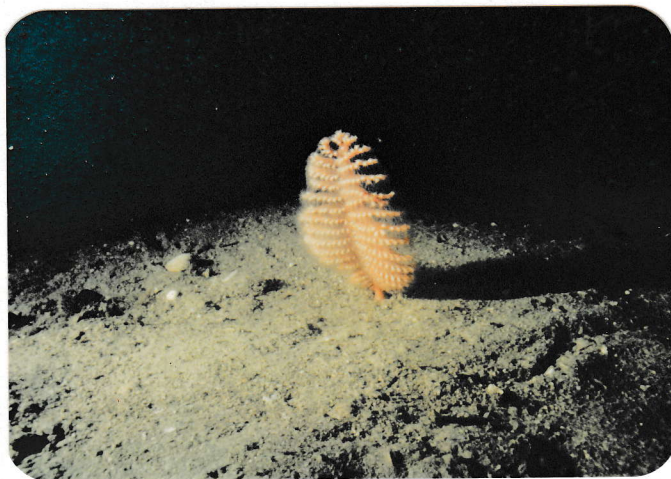
SITE DETAILS

Situation: Sea loch
Salinity: Fully marine
Wave exposure: Sheltered
Tidal streams: some
Geology:

HABITAT DETAILS

Zone: Circalittoral
Substratum: Fine mud
Modifiers: *N.norvegicus*
Features: Burrows

PHOTOGRAPHS; Paul Glendell



This habitat has been recorded by previous SEASEARCH surveys (see habitat H1 in Gubbay & Nunn, 1988 and R/07 in Gubbay, 1990). It consisted of a generally flat area of fine mud which was worked into burrows by *N.norvegicus* in places and colonised by occasional *P.phosphorea*. *Virgularia mirabilis* was also noted in this habitat. The sediment was a distinctly sticky clay but there was also some shell debris on the surface.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: T/11

HABITAT TYPE: T: Circalittoral Muddy Sediments

SITE TYPE: Flocculent mud

LOCATION (site Nos.): 33,34,35,36 DEPTH: 5m

VISUALLY DOMINANT COMMUNITY:

SITE DETAILS

Situation:Lagoon
Salinity: Brackish
Wave exposure:Very sheltered
Tidal streams:None noted

HABITAT DETAILS

Zone: Circalittoral
Substratum: Fine mud
Modifiers: *P.aperta*
Features:

PHOTOGRAPHS; Ron Crosby, Paul Glendell



This habitat was found in a brackish lagoon which was connected to the main body of the loch by a narrow channel. The substrate was an extremely fine, flocculent mud, described by the divers as "wobbly and having the texture of Swarfega"! There was decaying organic material on the surface, some of it recognisable as seagrass leaves, and the occasional very small stones. The most common species was *Philine aperta* however there were areas where *Sabella pavonina* was frequent. Small groups of *Sagartiogeton laceratus* were also recorded. The most notable feature of this habitat was the patchy occurrence of large numbers of sea cucumbers (reddish brown, upto 6cm long). These occurred in clumps, on the surface of the sediment. They have not been identified but are shown in the photograph above.

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: T/12

HABITAT TYPE: T: Circalittoral Muddy Sediments

SITE TYPE: Clay mud, *Sabella pavonina*, *Ascidiella aspersa*

LOCATION (site Nos.): 2,9,10,11,16,28,30,31, DEPTH: 15-20m
33,36,37,38

VISUALLY DOMINANT COMMUNITY: *Sabella pavonina*

SITE DETAILS

Situation: Sea loch
Salinity: Marine
Wave exposure: Very sheltered
Tidal streams: None noted

HABITAT DETAILS

Zone: Circalittoral
Substratum: Mostly clay
Modifiers:
Features:

PHOTOGRAPHS; Ron Crosby



A flat or gently sloping fine mud habitat which had the consistency of clay. Although there were a scattering of pebbles and shell fragments on the surface it was predominantly a fine mud. There was not much working of the sediment although some tracks (*Philine aperta*, *Ophiura texturata*, *Buccinum undatum*) were visible. *Sabella pavonina* was common in this habitat and formed the visually dominant community although there were also clumps of *Ascidiella aspersa* and the occasional *Virgularia mirabilis*. This habitat was similar to S/05 but was in the circalittoral zone. Although generally found in the deeper parts of the loch this habitat was also reported from the shallow brackish lagoon

SOUTH WEST SCOTLAND

SURVEY SITE: LOCH CRAIGNISH

HABITAT CODE NUMBER: T/13

HABITAT TYPE: T: Circalittoral Muddy Sediments

SITE TYPE: Clay mud, *Virgularia mirabilis*

LOCATION (site Nos.): 2,6,10-17, 28,29,30, DEPTH:12-22m
39,41,42,43.

VISUALLY DOMINANT COMMUNITY: *Virgularia mirabilis*

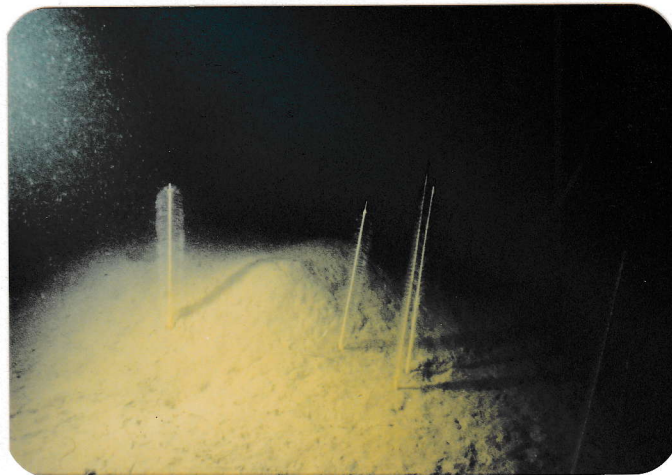
SITE DETAILS

Situation: Sea loch
Salinity: Normal
Wave exposure: Very sheltered
Tidal streams: None noted

HABITAT DETAILS

Zone: Circalittoral
Substratum: Clay
Modifiers: *N. norvegicus*
Features: Burrows, mounds

PHOTOGRAPH; Paul Glendell



Flat or very gently sloping areas of seabed consisting of a clay mud. At some sites the clay was sticky enough to be pressed into a ball underwater. *V. mirabilis* was the visually dominant species in this habitat although not present at all the sites. The seapen was most often found at densities of upto $7/m^2$ although, at one site (41), it was estimated to occur at a density of around $25/m^2$. The surface was occasionally worked into burrows by *Nephtys norvegicus* and crossed by tracks. Some shell debris was also scattered on the surface. Dredge marks across the seabed were noted at one site (41) but there was no obvious damage to the large numbers of *V. mirabilis* at that site.

4. REFERENCES

Earll, R.C. (1990) SEASEARCH Habitat Directory. Marine Conservation Society.

Edwards, A. (1986) Scottish Sea Lochs; A Catalogue. SMBA/NCC. 110pp

Gubbay, S. (1990) SEASEARCH survey of Gruinard Bay, Loch Ewe and Loch Gairloch. Marine Conservation Society.

Gubbay, S. & Nunn, J (1989) SEASEARCH survey of Loch Broom & Little Loch Broom. Marine Conservation Society.

Howson, C. (in press) Marine Nature Conservation Review Surveys of Scottish Sea Lochs. The Sea Lochs of South Argyll and West Kintyre.



SEASEARCH

Marine Nature Conservation Review



Side one:

SITE NAME:.....
 SITE NUMBER:.....
 DISTRICT/AREA:.....
 DATE OF SURVEY:.....
 TIME OF DIVE:..... START:..... END:.....
 DURATION OF DIVE:.....
 DEPTH RANGE:..... (sea level/chart datum*)
 SITE LOCATION:..... (OS grid ref./lat.long*)
 *delete as necessary.

MAP OF AREA: Photocopy or sketch, please mark in transect lines.

NAME OF RECORDER:.....
 ADDRESS OR EXPEDITION NAME:.....
 ***REASON FOR SITE SELECTION:.....
 ***OBJECTIVES OF DIVE:.....
 ***WERE THESE OBJECTIVES ACHIEVED?:.....
 WAS ANY OTHER INFORMATION COLLECTED?:.....
 IF YES PLEASE OUTLINE BRIEFLY:.....
 WHERE CAN THIS INFORMATION BE FOUND?:.....
 PROJECT LEADERS COMMENTS:

TICK HERE IF THIS FORM HAS BEEN CHECKED BY THE PROJECT LEADER AND IS COMPLETE:.....

*** to be completed by the project leader.

Side two: To be filled in by the recorder.

EXPEDITION:.....
SITE NAME:.....
SITE NUMBER:.....
GRID REF. OR LAT./LONG.:.....

SITE DESCRIPTION:

Please describe the main features encountered during the dive. Include in this description the dive profile, the main habitat types, (rock, sediment, plants), and the main community types. Note the dominant species. Give a description of each habitat type. If necessary an extra sheet can be included and will be provided if asked for.

YOUR ASSESSMENT OF THE SITE:

Please give your personal assessment of the site. Were there any features of special interest? Was the scenery interesting? Was the habitat diverse or was it dominated by a single species? What was the visibility like? Was there any evidence of human impact on the area?

Side three: To be completed by the recorder.

SITE NAME:.....

SITE NUMBER:.....

SKETCH SHEET:

Please sketch of the dive profile to illustrate the features of the seabed. Draw in any habitats, communities, or peculiar features. Use more than one sheet if necessary. Please be careful to mark depth in metres, and give a compatible distance scale. If any evidence of stratification was seen please mark it on your sketch. Make your sketch as simple as possible, we are not looking for an artists impression of the seabed.

Side four: To be filled in as completely as possible. Please tick if known, if not known please indicate.

PHYSIOGRAPHIC FEATURES.....

open coast
straits/sounds/narrows
shallow rapids
enclosed coasts
saline lagoon

SALINITY.....

normal
variable
low

WAVE EXPOSURE.....

extremely exposed
very exposed
exposed
moderately exposed
sheltered
very sheltered
extremely sheltered

MAX. TIDAL STREAM STRENGTH.....

very strong (>6kn)
strong (3-6kn)
moderately strong (1-3kn)
weak (<1kn)
very weak (neg.)
uncertain

GEOLOGY.....

Hard	Igneous
	Chert/Flint
	Slate
	Sand/Mudstone
Medium	Limestone
Friable	Slate/Shale
Soft	Sand/Mudstone
	Chalk
Very Soft	Clay
Not Known	

STRATIFICATION.....

Thermocline
Halocline
Not stratified
Not known

PUBLIC ACCESS.....

Easy/Difficult/Very difficult

SITE DESIGNATION.....

Marine Nature Reserve
Voluntary Marine Nature Reserve
Proposed Marine Nature Reserve
Marine Consultation Area
National Nature Reserve
Wildlife Trust Reserve
Local Nature Reserve
RSPB Reserve
Site of Special Scientific Interest
Ramsar Site
Special Protection Area
National Trust
Ministry of Defence
Area of Outstanding Natural Beauty
National Scenic Area
Heritage Coast
World Heritage Site

USAGE AND IMPACTS.....

Fishing	netting
	trawling
	angling
	potting
Collection	bait digging
	shellfish
	algae
Boulder turning for peelers	
Extraction	sand/gravel
	maerl
	oil/gas
Aquaculture	finfish
	shellfish
	algae
Coastal defence	seawalls
	dredging
	groynes
Land claim	
Military use	
Sewage discharge	
Waste dumping	
Industrial discharge	
Litter and debris	
Oil/tar/chemicals	
Education/scientific study	
Recreational	facilities
	resort
	marina
	beach
	water sports
	dive site
Mooring/beaching/launching	