Gower Seasearch

1995

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marineseen
for
Countryside Council
for Wales

Synopsis

- This report has been produced as part of the Seasearch project to provide feedback on the results of 24 Seasearch dives along the Gower Coast in South Wales in 1995 between Worms Head and the Mumbles. There is little information on rocky subtidal habitats and communities from this coast except that from a Field Studies Council survey in June 1978 (Hiscock, 1979).

- This is a non-technical report, which compiles the findings of the Seasearch dives. Location maps showing the dive sites are presented together with summary descriptions and detailed species lists for each site. Observations or features of interest encountered during the dives are noted. Diagrams showing the distribution of habitats and communities encountered during dives are given in several instances.

- A summary description of the area covered by the survey has been written on the basis of the information from the dives. Most of the survey area was limestone rock forming shallow subtidal reefs, which fringed the coast. Other than this, the majority of the seabed was sandy sediment. The main underwater features recognised from the survey were a series of limestone ridges and gullies between the Mumbles and Pwlldu Head with rich seaweed and animal turfs, sand inundated seaweed communities in the shallow water of Oxwich Bay, the wrecks of the Strombus and Oxwich Bay and the mussel dominated seabed between Port-Eynon and Worms Head.

- At total of 38 plant species and 171 species of animal were recorded during the survey. Species observations included a record of the Devonshire Cup-Coral (*Caryophyllia smithii*), the first from the Gower and the nationally scarce orange and black spotted nudibranch (*Thecacera peregrina*). The results of this study are considered briefly in relation to the findings of a Field Studies Council survey in 1979.

- The Seasearch methodology is discussed briefly in relation to the findings reported in this document.

- Recommendations for further work are given in the light of the findings of this study.

Reference: Bunker, F.StP. D and Hart, S., 2002. Gower Seasearch 1995. A report to the Countryside Council for Wales from MarineSeen, Estuary Cottage, Bentlass, Hundleton, Pembrokeshire, Wales UK SA71 5RN.

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1 Introduction

Seasearch is a project where volunteer divers record information about the seabed and the marine life associated with benthic habitats. It is designed to provide baseline information on the basic description and mapping of near-shore sublittoral habitats. The Seasearch project was devised in the mid-1980's by the Marine Conservation Society (MCS) and the Nature Conservancy Council (now the Joint Nature Conservation Committee, JNCC). Seasearch dives have largely been organised by MCS, JNCC, the country conservation agencies (English Nature (EN), Countryside Council for Wales (CCW) and Scottish Natural Heritage (SNH)) and county Wildlife Trusts. Seasearch projects have so far been undertaken off the coasts of Sussex, Dorset, Jersey, Isles of Scilly, North Cornwall, Lundy, south, west and north Wales, Morecambe Bay, islands and lochs of Scotland (see Appendix 1).

Seasearch is currently being developed by a Seasearch National Steering Group established in December 1999 and including a range of organisation members MCS, (EN, CCW, SNH, JNCC, Environment Agency (EA), Professional Association of Diving Instructors (PADI), British Sub Aqua Club (BSAC), Sub Aqua Association (SAA), Marine Biological Association (MBA, MarLIN) Nautical Archaeology Society (NAS), and The Wildlife Trusts (TWT), and individual experts (e.g. Robert Irving, Paul Kay, Chris Wood).

The aim of this group is to provide direction and oversee the development of a national Seasearch project, which increases our knowledge of the UK marine environment and contributes towards its conservation through participation of SCUBA divers.

The proposed objectives for the national Seasearch project are to:

- Gather information on UK seabed habitats and associated wildlife through participation of SCUBA divers
- Provide standardised training to enable SCUBA divers to participate in Seasearch
- Ensure the quality of data gathered is controlled
- Make available the data collected through Seasearch
- Raise awareness of the diversity of UK marine life and its environment through participation of SCUBA divers and dissemination of information

This report follows a template devised for the production of future Seasearch reports. The production of this report has been funded by the Countryside Council for Wales.

This report summarises the findings of Seasearch survey dives carried out from along the Gower coast of south Wales. These dives ranged from Limeslade (just west of the Mumbles) in the east, to east of Common Cliff (east of Worm Head) in the west (Figure 1).

1.1 The Gower Coastline

The Gower coastline is one of the most varied in the UK. Carboniferous limestone cliffs border the southern coast, with caves, sheltered inlets and, huge expanses of flat sand plus ancient woodlands. In the Burry Inlet area (adjacent to, but away from the Seasearch sites) there are extensive sediment flats and marsh habitats. The diversity of Gower's coastline's habitats and its unspoiled nature lead to the peninsula being designated the UK's first 'Area of Outstanding Natural Beauty' in 1956.

The National Trust owns much of the coastal land and they give access to the coastline and maintain and manage footpaths, this allows the landscape to be visited and yet also be conserved. Other organisations concerned with the conservation of the area are the Countryside Council for Wales, the Glamorgan Wildlife Trust and the Gower Society.

The Gower has a number of sites, which have been designated for conservation protection. To the west there is Whiteford Burrows and Gower Coast National Nature Reserves; Rhossili Down Site of Special Scientific Interest; Hardings Down camps Scheduled Ancient Monument; Cheriton, Llangennith, Llanmadoc, Port-Eynon and Rhossili Conservation Areas. Cefn Bryn is almost entirely within the Cefn Bryn Common Site of Special Scientific Interest.

The Carmarthen Bay and Estuaries candidate Special Area of Conservation includes part of the Gower. It extends from Tenby and Caldey Island in the west along Carmarthen Bay and eastwards almost to Oxwich Point (including the Burry-Loughor and Taf–Tywi-Gwendraeth estuaries).

Oxwich Bay is a National Nature Reserve (designated in 1963 and now managed by the Countryside Council for Wales), which has one of the richest varieties of coastal habitat in Britain. The reserve is between two limestone woodlands and covers the coastline. There is a diversity of habitats including limestone woodland, salt marsh, freshwater marsh and sand dunes and impressive limestone geological features. The foreshore, dunes, marshes and woodlands hold many species, particularly flowers, birds and insects. Over six hundred kinds of flowering plants alone have been found. A range of management regimes sustain the wildlife, including mowing, cutting, grazing. The reserve is easy to explore via footpaths and is used for educational field studies. Oxwich Bay is backed by the imposing Old Red Sandstone hill of Cefn Bryn, a landmark of the Gower.

Oxwich was once a port, exporting limestone quarried from the headland of Oxwich Point. The village is quiet, coming alive during the summer months when tourists flock to the areas numerous holiday and caravan parks.

Between Oxwich Bay and the Mumbles, the limestone coast continues with rocky headlands and the sandy embayments at Pwlldu Bay, Caswell Bay and Langland Bay.

To the east of the survey area, Mumbles is a busy seaside resort that divides Swansea Bay from the Gower.

Information for this section was obtained principally from the web sites of the Countryside Council for Wales (www.ccw.gov.uk) and Explore Gower (www.explore-gower.co.uk)

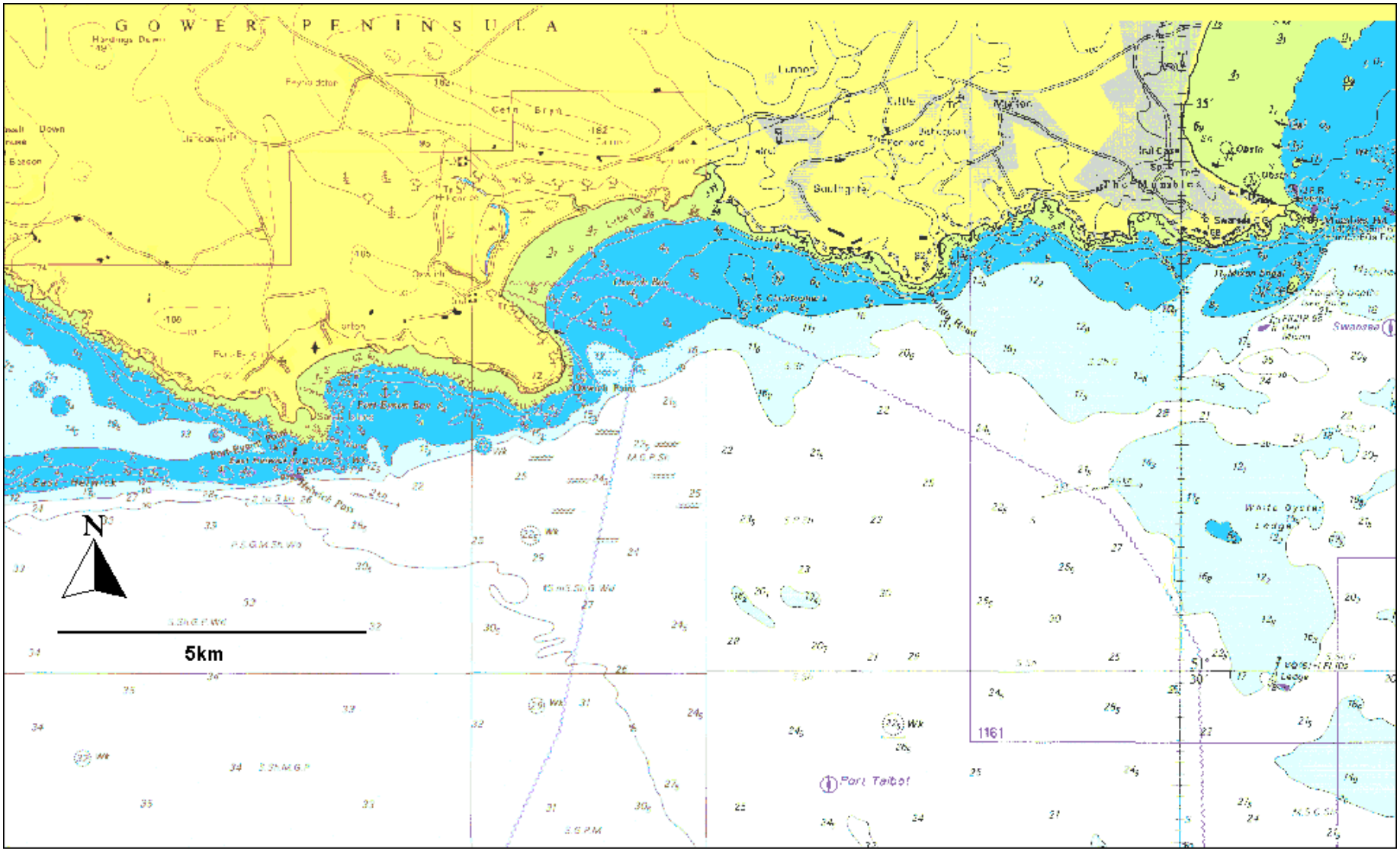


Figure 1 Admiralty Chart showing the area covered during Gower Seasearch 1995

1.2 Understanding the Landscape

350 million years ago, Britain lay close to the equator and had a tropical climate. The Gower was then a huge estuary formed of Devonian Old Red Sandstone, which had strata bent into great folds that created hills and valleys. The Carboniferous limestone we see today was formed elsewhere 345 million years ago from the fossilised calcareous remains of now extinct sea creatures.

280 million years ago intense Armorican earth-movements brought a thick layer of the Carboniferous limestone over the area to cover the sandstone. A wholesale change in the topography of South Wales occurred with the large Devonian rivers and estuaries changing to a warm shallow seas abounding with coral reefs. The limestone was forced to fit into the hilly sandstone contours and this created structural weaknesses in its strata, which have been eroded over time to expose the sandstone beneath. This explains why the Gower's higher ground at Rhossili Dows, Cefn Bryn, Ryer's Down and Harding Down are formed from the more ancient rock of Devonian Old Red Sandstone

Rivers which crossed South Wales deposited mud and sand in the limestone valleys forming Millstone Grit and this has been eroded to form the bays of Oystermouth, Oxwich and Port-Eynon to form the bays and sandy beaches of today. At that time, South Wales was an immense forested swampland and on the northeast of the peninsula deposits of coal were laid down diagonally from Blackpill, near Mumbles to Llanrhidian. Like the Millstone Grit, the sea easily eroded these seams to form the Burry Estuary to the north and Swansea Bay to the south.

Geological features of interest along today's Gower coast include a richness of fossils in the limestone, including large solitary corals, lampshells and crinoids that once inhabited the coral seas of the past. The sea has exposed weaknesses in the limestone rock to form caves of many different shapes and size and these contain clues to the areas past from animal remains. The 'Bone Caves' contain skeletal remains of extinct animals such as the straight-tusked elephant, mammoth, soft-nosed rhinoceros, cave bear, and others such including hippopotamus, wolf and lion.

Today the underlying rock yields soils of varying types; Old Red Sandstone, Millstone Grit or Coal give rise to impoverished soils whereas Limestone yields rich soils and so greater wealth of flora and fauna.

1.3 Marine Biology

The Intertidal Survey Unit visited several shores along the Gower Coast during the late 1970's and considered the area to be of primary marine biological importance (Powell *et al.,* 1979).

The only published studies relating to the rocky subtidal are those by the Field Studies Council team in June 1978 where 21 sites were dived between Worms Head and Mumbles head (Hiscock, 1979). This study describes a coast with a shallow downward extent of rock along most of the coastline with sediments in deeper water. An exception to this is in the area of Oxwich Point where extensive rocky reefs extend deep. Most of the coastline is of fairly uniform exposure to wave action and tidal streams with the exception of the Oxwich Bay area.

In this study over 66 species of seaweed and 121 species of animals were recorded and features of interest were highlighted. The influence of the Bristol Channel and its turbid, silt-laden waters was considered to exert a major influence on the types of seabed communities present. Because of decreased light penetration (caused by an increase in silt load in the water column), seaweeds do not grow very deep with kelp extending down to only 1m below chart datum (compared with 10m in west Pembrokeshire). Turbid waters are often rich in food and some species thrive in these conditions and become more numerous than usual. Turbid water or silt tolerant species found in large numbers around the Gower included the edible mussel (*Mytilus edulis*), the subtidal reef sandworm (*Sabellaria spinulosa*), the limestone tentacle worm (*Polydora* sp.), tiny ghost shrimps (Caprellidae) and common mud tube shrimps (Jassidae). The scientific interest in the site was considered mainly to relate to the existence of turbid water and silt tolerant communities, which were fairly rich in species composition and with high biomass. Some groups of animals, particularly sea mats (Bryozoa) and the starfish and their relatives (Echinoderms) were considered to be low in abundance and number of species. It was suggested that these groups could not tolerate the turbid and silty conditions.

A comparison of the marine communities found along the Gower with those to the west off south Pembrokeshire and the Islands is interesting. To the west there is less turbidity and silt, seaweed is more abundant, grows deeper and there are generally more species present in all groups (especially sea mats and starfish).

Part of the study area is included in the Carmarthen Bay and Estuaries candidate Special Area of Conservation which extends as far east as Oxwich Point. The following description of this area is an extract from the UK Marine SACs Project web site (www.ukmarinesac.org.uk).

“The Carmarthen Bay and Estuaries was proposed because of the importance of its saltmarshes, estuaries, large shallow inlets and bays, subtidal sandbanks and intertidal mudflats and sandflats. Its cSAC status also reflects an important population of twaite shad. Allis shad, river lamprey, sea lamprey and otter are also here in significant numbers. The estuaries of the Burry-Loughor and Gwendraeth-Taf-Tywi display a varied range of habitats, from muddy sediments to sand and gravel mixtures, from saltmarsh to transition zones (such as sand dunes) with land-based habitats.”

“The Helwick Bank, a long, shallow subtidal sandbank, is unusual in being highly exposed to wave and tidal action. The animal communities here are therefore adapted to high levels of disturbance. Other extensive areas of sediment in relatively shallow waters within Carmarthen Bay support an interesting range of species (including bivalves, shrimp-like amphipods and worms), many of which spend most of their time wholly or partly buried in the sediment. These areas are also significant in providing a rich food source for birds and fish. ”

“Large stretches of the intertidal sandflats and mudflats of the Burry Inlet and Loughor, Taf, Tywi and Gwendraeth estuaries are dominated by bivalves. Cockles, along with other bivalves, amphipods and worms, are abundant in stretches of fine sand. In muddier sediments the sand gaper, peppery furrow shell and mud snail as

well and cockles are also found in larger numbers. The lower Loughor Estuary is one of the few places in the UK where the worm *Ophelia bicornis* has been found."

"The saltmarshes are particularly significant. The most extensive in Wales, they cover over 2000 hectares and include good examples of both grazed and ungrazed saltmarsh as well as populations of the nationally scarce marsh-mallow. At the saltmarsh's seaward extremity there are open stands of glasswort, one of the complete sequence of saltmarsh vegetation to be found here. "

"The estuaries, which support fish, shellfish and many other invertebrates, are especially noted for their large numbers of over wintering waders and wildfowl."

1.4 Human Use

The Gower area is important for tourism with Oxwich Bay being a major holiday beach for the area. Other popular tourist beaches include Porth Eynon Bay to the east and Threecliff Bay, Pebble Bay, Caswell Bay and Langland Bay to the east.

Current inshore fisheries information has been supplied by Phil Coates (South Wales Sea Fisheries Committee). Inshore fisheries are well established in the area with boats launching mainly from Burry Port, Swansea and Oxwich Bay. Potting for lobsters, edible crabs and velvet swimming crabs occurs in inshore rocky areas and trawling for plaice, sole, whiting, cod and ray occurs offshore. Netting for bass takes place with both fixed and drift netting and there is bottom set netting in winter using small mesh (100 – 150 mm) nets to catch sole, cod and whiting. Offshore, tangle nets are deployed for ray and turbot. At the time of writing there are two 'Several Orders' in place for the development of mussel cultivation in Swansea Bay.

Local field studies centres use the shores and coastline for educational purposes and outdoor pursuits such as coasteering and canoeing.

Much of the hinterland of this coast is used for agriculture with the limestone rich soils providing ideal conditions for dairy cattle and crop growing.

2 Methods

The precise recording methodology of Seasearch has varied over the time of this study as three different versions of the recording forms were produced. Despite this, the basic recording methodology has been the same and is that outlined in the Seasearch Starter Pack by SNH (1995).

2.1 Training

A degree of training prior to a Seasearch event was essential to ensure consistency in the way data was collected. In several instances, Seasearch training took the form of a lecture to the local diving club or specially run training day or weekend.
The minimum training in all cases was a briefing on precisely how recording should be undertaken on the day of a Seasearch event prior to diving.

All divers who registered interest in attending an organised event were given copies of the Seasearch Starter Pack prior to the date.

2.2 Organising and Undertaking Seasearch Dives

Boats from Swansea marina accessed all sites described in this survey. Divers worked in pairs with each pair being designated a site with the aim being to cover as wide an area of coastline as possible.

The divers in each pair would take with them a recording slate and pencil and record the information required by the Seasearch forms. An example of the simple (and most successful) one page version of the forms used is given in Appendix 1. The main procedures for Seasearch dive recording are as follows (for details of the recording techniques refer to the Seasearch Starter Pack (SNH 1995)):

- The divers divided their site into major habitats such as kelp forest, kelp park, gravel and pebbles, etc.
- A description of each habitat was recorded together with depth limits and any species information the divers were able to provide.
- Positions of each dive were fixed with the help of charts and / or GPS units and dive times recorded by personnel in the boats.
- Following the dive, forms were filled in with the information gathered and participants were encouraged to draw sketches to depict the main features of the seabed.
- Recorded depths were adjusted to chart datum using tidal corrections for the Mumbles as calculated by the computer program Tidecalc (Ministry of Defence Hydrographic Office, 1991).
- Diving was planned around slack water times.

2.3 Data analysis and Quality Control

The Gower Seasearch project was greatly helped by the participation and help from several professional marine biologists. When possible, marine biologists were paired with club divers and forms were completed together. This was a good way of ensuring accurate data recording but was not possible for all dives. Identification guides were provided on site to help with the writing up of forms and guidance on naming species was provided by the co-ordinator (Suzanne Hart).

Forms were mostly completed immediately after dives and forms were checked before participants left. This helped sort out anomalies in the data that were obvious and ensured forms were completed.

On writing this report, the author has used his judgement and experience of the area in accepting or rejecting species identifications. Where doubts over the naming of species occur, this has been indicated in the appropriate sections of this report.

2.4 Species Names

Common names of plants and animals have been used throughout this text in order to make the work accessible to non-scientific readers. Problems with using common names are that they vary regionally and do not exist for all species. For this reason Latin names have been put in brackets after the common name (following the nomenclature of the MCS species directory; Howson and Picton,1999).

The following protocol was used in the use of common names in this text:

- The primary source of common names was the official CCW list (Roberts, S. 2001).
- If the name was not present in the above, the Marine Conservation Society Guide to Inshore Marine Life (Erwin and Picton, 1987) was consulted.
- If the name was not present in either of the above the following authoritative texts were consulted eg Sea anemones (Gosse, P.H., 1860) and Crabs (Ingle, 1980).
- If no name could be found, then the author made up a name, which appropriately described the animal (from a latin derivation of appropriate). A list was drawn up for the Stackpole Quay Seasearch report (Bunker, 2001) using these protocols. This list was used and added to for Gower Seasearch.

A glossary of common and equivalent Latin names is given in Appendix 2.

3 Results

A summary description of each site dived is included in this section and the best sketches drawn by divers have been included. The study area naturally divides into three; the limestone coast between the Mumbles and Pwlldu Head, Oxwich Bay (between Pwlldu Head and Oxwich Point) and Port-Eynon Head to Worms Head.

Positions of the dive sites are shown in Figures 10, 15 and 19 and detailed species lists for each dive are given in Appendix 3. Tables giving details of dive site positions etc are given in Appendix 4. The original 'raw' data sheets are held by CCW.

Site Information Mumbles Head to Pwlldu Head

This section summarises the findings of 9 Seasearch dives carried out in 1995 between Mumbles Head and Pwlldu Head. The locations of the dives are shown in Figure 9.

3.1.1 Site 11/95: East of Swigg Buoy (51.56675°N, 3.934917°W)

Surveyed 24/06/95 by Dale Rostron

Physical Environment

This site was studied between 4.7 m and 6.7 m below chart datum. The seabed substratum was a stable large and small boulder and cobble habitat. The seabed was generally flat with some areas of pebbles and had little silt.

This site is exposed to wave action and tidal streams.

Habitat / Community Types

One habitat / community type was described:

1. Communities were quite diverse but did not change much over the distance of the dive. Encrusting sponges were found on top as well as underneath boulders and cobbles while some large growths of the breadcrumb sponge (*Halichondria panicea*) and the branched holey sponge (*Haliclona oculata*) occurred on top. A coating of the spike barnacle (*Balanus crenatus*) was present beneath the sea firs. Fish present included a rockling (species not recorded), the black goby (*Gobius nigra*), a corkwing wrasse (*Ctenolabrus rupestris*) and also many pea crabs (*Pisidia longicornis*) and velvet swimming crabs (*Necora puber*) amongst boulders. Sea slugs include large numbers of the red and black streaked doto (*Doto duneri*) laying eggs on the downy sea fir (*Kirchenpaueria pinnata*) and also many large sea lemons (*Archidoris pseudoargus*).

Observations / Features of Interest

The large sponge growths and presence of large numbers of the red and black streaked doto (*Doto duneri*) are of interest.

4.7 to 6.7 m below chart datum

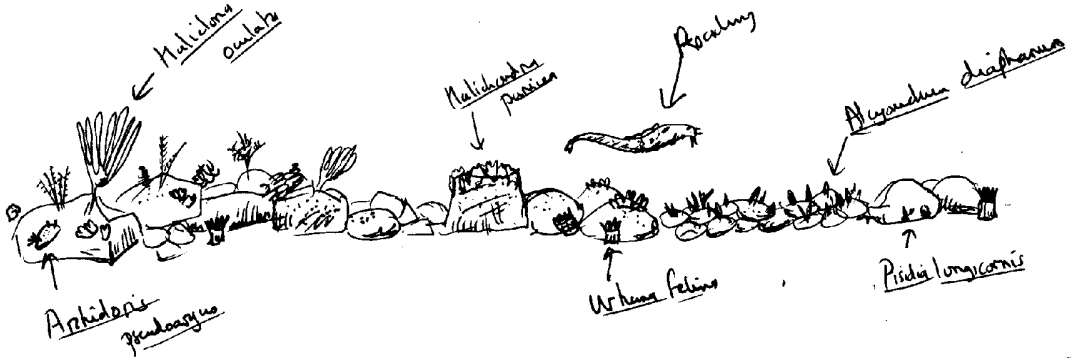


Figure 2 Sketch to show the habitats encountered at site 11/95 (by Dale Rostron).

3.1.2 Site 12/95: Strombus Wreck (51.576667°N, 3.416667°W)

Surveyed 24/06/1995 by Kate Lock

Physical Environment

The site was studied between 2.4 m and 4.4 m below chart datum. Wreckage of the "Strombus" was strewn over a seabed of sand and broken shell.

The site is exposed to wave action and tidal streams.

Habitat / Community Types

Two habitat / community type were described:

1. Wreckage was encrusted with attached animals but no plants. A few sponges were present including the breadcrumb sponge (*Halichondria panicea*), unidentified encrusting sponges, the spiny antler sponge (*Raspailia hispida*), the white spiky sponge (*Dysidea fragilis*) and the white hedgehog sponge (*Polymastia mamillaris*). Both straight and branched antenna sea firs (*Nemertesia antennina* and *Nemertesia ramosa*) were present together with a few dead man's fingers (*Alcyonium digitatum*) and also plumose anemones (*Metridium senile*) and other anemones including (*Actinothoe sphyrodeta*) and the dahlia anemone (*Urticina felina*). Effects of scour were apparent from the presence of jelly fingers (*Alcyonium diaphanum*) and horn wrack (*Flustra foliacea*). Other conspicuous species included the feather star (*Antedon bifida*) and the lobster (*Homarus gammarus*). Sea slugs include the sea lemon (*Archidoris pseudoargus*) and the black spotted doto (*Doto pinnatifida*).

2. Species on the shell sand included the stalked sea fir (?*Corymorpha nutans*), the sand mason worm (*Lanice conchilega*), the grey gurnard (*Eutrigla gurnardus*) and sand gobies (Gobiidae indet.).

Observations / Features of Interest
The presence of a wide variety of species on the wreck and an otherwise macro fauna impoverished sea bed is of interest at this site. The presence of the stalked sea fir (*Corymorpha nutans*) at the site is also of interest.

3.1.3 Site 7/95: Langland Bay A (51.563217°N, 3.998233°W)

Surveyed 24/06/1995 by Iain Park and Sarah Hughes

Physical Environment
This site was studied between 3.2 m above chart datum to 1.8m below chart datum. The seabed was formed by creviced bedrock dissected into gullies 2m deep or more, which were scoured at the base by pebbles in shallow depths and sand deeper.

This site is exposed to wave action and tidal streams.

Habitat / Community Types
Three habitat / community types were described:

1. Intertidal rocks at 3.2m above chart datum dominated by limpets (*Patella* sp.), and barnacles with green algae.

2. At approximately 0m, gully tops were dominated by the saw wrack (*Fucus serratus*) which was covered in white encrusting sea mats and a turf of red seaweeds. Gully sides bore plants of the northern kelp (*Laminaria hyperborea*) with a dense turf of red seaweeds, bryozoa and tunicates beneath. Clearings in the turf were colonised by barnacles (*Balanus crenatus*). Other species present included the swimming crab (*Necora puber*) in crevices and small wrasse.

3. At 1.8m below chart datum, the gullies were deep, wide and filled with rippled sand. Rock surfaces were covered in a thick turf of red seaweeds with sponges, bryozoans and tunicates. No kelps were present.

Observations / Features of Interest
The algal and faunal turf communities at this site deserve further study.

3.1.4 Site 8/95: Langland Bay B (51.563241°N, 3.99921°W)

Surveyed 24/06/1995 by Peter Taylor and Emma Taylor

Physical Environment
This site was studied between 0.1m and 6.4m below chart datum with a seabed formed from rock gullies filled with coarse sand and shell.

This site exposed to wave action and tidal streams.
Habitat / Community Types
One habitat / community type were described:

1. The top of the bedrock ridges were dominated by the northern kelp (*Laminaria hyperborea*) whereas the gully sides bore a turf of red seaweeds mixed with

bryozoans, sponges, sea firs and sea squirts. Red seaweeds included the red wedge weed (*Callophyllis laciniata*) and cock's comb (*Plocamium cartilagineum*). Animals included the golf ball sponge (*Tethya aurantium*), the white spiky sponge (*Dysidea fragilis*) and the guarded flask sponge (*Scypha ciliata*), the straight antenna sea fir (*Nemertesia antennina*) and several sea slugs including (*Thecacera peregrina*). Bryozoans included *Bugula* sp. and the sea squirt (*Botryllus schlosseri*) was recorded. Fish were a feature of this habitat and included the dogfish (*Scyliorhinus canicula*), the tompot blenny (*Parablennius gattorugine*) and wrasse (no species listed).

Observations / Features of Interest

The rich flora and faunal turf of this site merits further description and the record of the orange and black spotted sea slug (*Thecacera peregrina*).

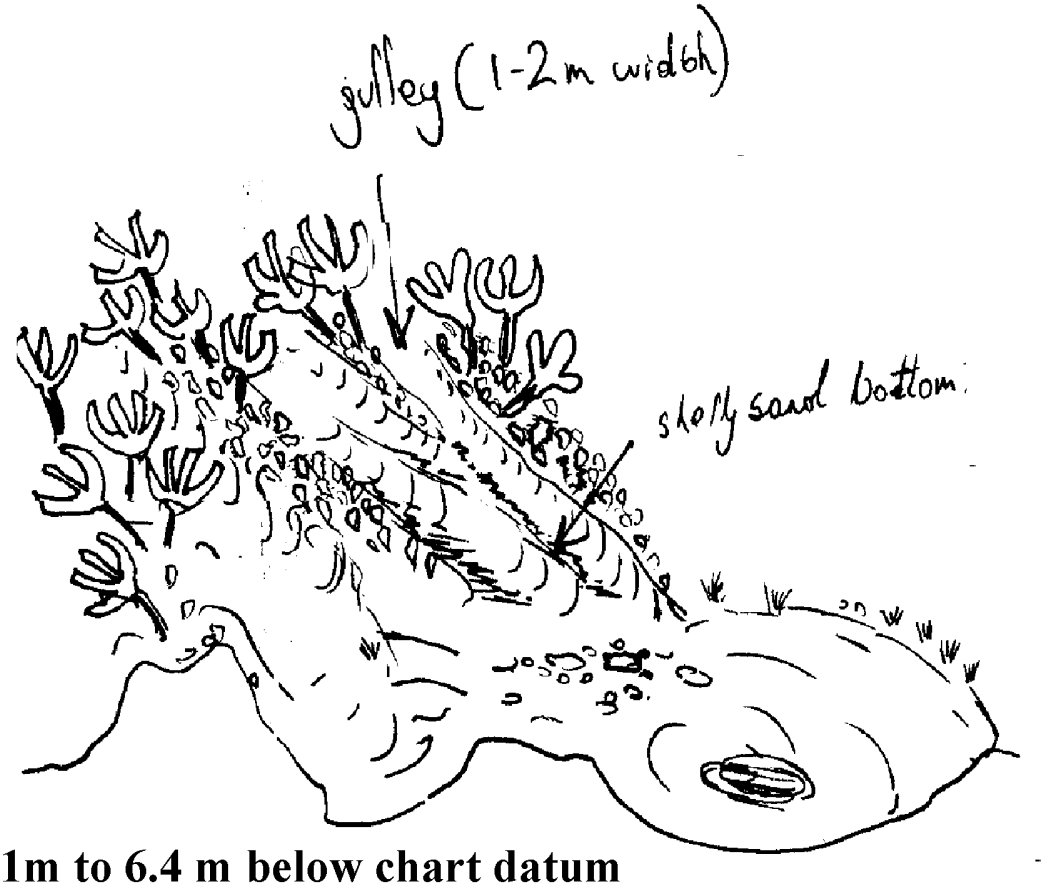


Figure 3 Sketch to show the habitats encountered at Site 8/95 (by Peter and Emma Taylor).

3.1.5 Site 10/95: Doctors Mine A (51.563222°N, 3.997176°W)

Surveyed 24/06/1995 by Paul Kay and Lucy Gilkes

Physical Environment

This site was studied between 0.9m above chart datum to 3.1m below chart datum. Parallel bedrock ridges ran offshore between which were deep narrow gullies with sandy bottoms. In places the rock overhung to form shallow caves.

This site is exposed to wave action and tidal streams.

Habitat / Community Types

Three habitat / community types were described:

1. Barren sand between bedrock outcrops, no species were observed.

2. Top surfaces of bedrock were characterised by short (0.5 m long) plants of the northern kelp (*Laminaria hyperborea*) under which was a turf of red and green algae.

3. The gully sides between 0.9 m above chart datum and 2.6 m below chart datum, bore a turf of seaweeds and attached animals. Seaweeds included the cock;s comb (*Plocamium cartilagineum*). Animals included a variety of sea squirts including the star sea squirt (*Botryllus schlosseri*), the light bulb ascidian (*Clavelina lepadiformis*) and the no spot club sea squirt (*Morchellium argus*). Other animals included sponges, sea firs (including *Nemertesia antennina*), small colonies of dead man's fingers (*Alcyonium digitatum*) and dahlia anemones (*Urticina felina*). Crustacean were recorded from crevices including the edible crab (*Cancer pagurus*), the velvet swimming crab (*Liocarcinus puber*) and the lobster (*Homarus gammarus*) plus the tompot blenny (*Parablennius gattorugine*). The distorted scallop (*Chlamys distorta*) was found under overhangs.

Observations / Features of Interest

The variety of habitats and rich flora and faunal turf of this site merits further description.

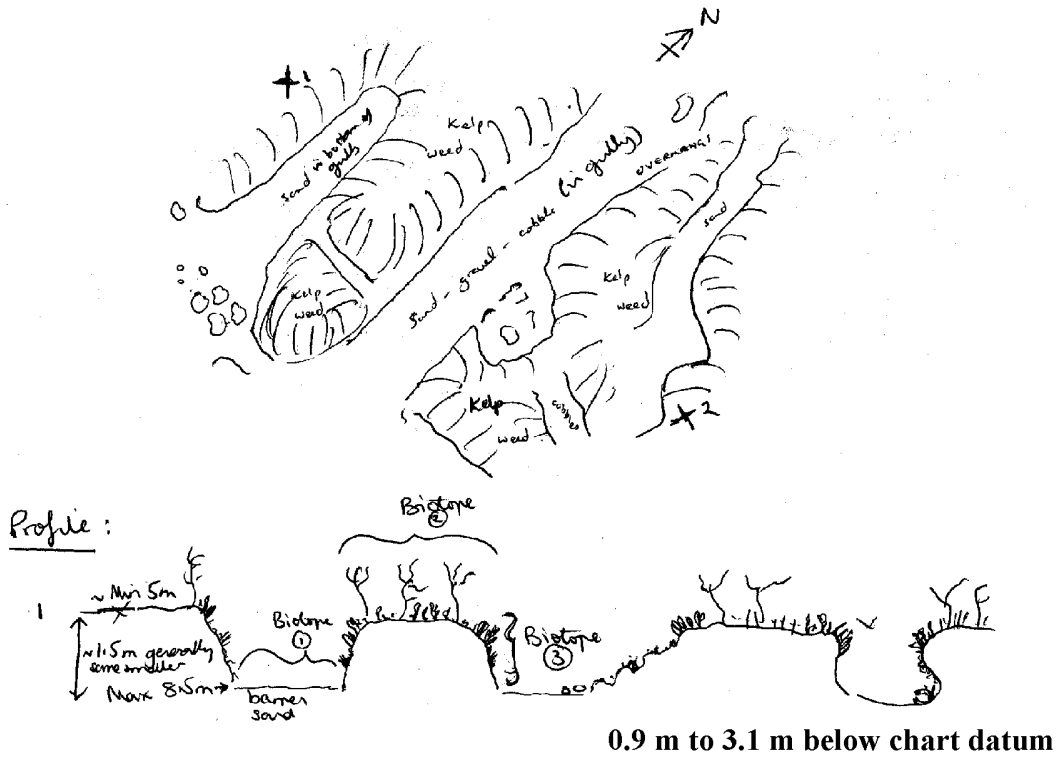


Figure 4 Sketch to show the habitats encountered at Site 10/95 (by Paul Kay and Lucy Gilkes).

3.1.6 Site 9/95: Doctors Mine B (51.563178°N, 4.000518°W)

Surveyed 24/06/1995 by Alistair Law

Physical Environment
This site was studied between 0.1 m and 3.3 m below chart datum. Parallel bedrock ridges ran offshore between which were deep narrow gullies with sandy bottoms and some very large boulders.

This site is exposed to both wave action and tidal streams.

Habitat / Community Types
One habitat / community types was described:

1. Sparse cover of the kelp (*Laminaria hyperborea*) below which were many varieties of the red seaweeds, pink paint weed (Corallinaceae indet.), the boring sponge (*Cliona celata)* and a possible sighting of the yellow stag horn sponge (*Axinella dissimilis*).

Observations / Features of Interest
The possible record of the yellow stage horn sponge (*Axinella dissimilis*) at this site is of interest.

3.1.7 Site 22/95: West of Caswell Bay B (51.566374°N, 4.039896°W)

Surveyed 22/06/1995 by Kate Lock and Iain Park

Physical
Environment
The depth of this site was surveyed from +3.9m above chart datum to 0.9m below chart datum. The seabed descended from bedrock in the intertidal to just below chart datum after which a boulder slope descended to a plateau of rock with scattered boulders.

This site is exposed to wave action and a moderate tidal flow.

Habitat / Community Types
Three habitat / community type were described:

1. The intertidal bedrock was described as being characterised by ‘the usual intertidal species’ including the edible mussel (*Mytilus edulis*) and the seaweeds sea lettuce (*Ulva* sp.) and laver bread (*Porphyra* sp.). A shoal of whiting (*Merlangius merlangus*) was also noted.

2. The sublittoral fringe and shallow subtidal was colonised by the northern kelp (*Laminaria hyperborea*) and the sugar kelp (*Laminaria saccharina*). The kelp fronds bore kelp sea mat (*Membranipora membranacea*), which was being grazed by large numbers of the yellow lined kelp sea slug (*Polycera quadrilineata*). A variety of animals were recorded from the kelp forest

including the breadcrumb sponge (*Halichondria* panicea), the straight antenna sea fir (*Nemertesia* antennina), white Christmas tree sea mat (*Bugula plumosa*) and 'various sea squirts'. A shoal of Pollack (*Pollachius pollachius*) was noted swimming around this habitat.

3. A red seaweed turf covered the level bedrock at - 0.9m and included the following species: flat tentacle weed (*Calliblepharis ciliata*), iridescent ruffle weed (*Cryptopleura ramosa*), cocks comb (*Plocamium cartilagineum*), Irish moss (*Chondrus crispus*) and dulse (*Palmaria palmata*). A variety of animals were present in amongst the algal turf including: the guarded flask sponge (*Scypha ciliata*), the white spiky sponge (*Dysidea fragilis*), the velvet dome sponge (*Suberites carnosus*), white hedgehog sponge (*Polymastia mamillaris*), the straight antenna sea fir (*Nemertesia antennina*), the sandy creeplet anemone (*Epizoanthus couchii*), the star sea squirt (*Botryllus schlosseri*), the light bulb sea squirt (*Clavelina lepadiformis*), and the orange spot club sea squirt (*Aplidium punctum*). Mobile animals included the spiny spider crab (*Maia squinado*) and the lobster (*Homarus gammarus*).

   The boulders present were scoured and dominated by barnacles and tubeworms.

Observations / Features of Interest

The flora and faunal turf of habitat/community type 3 merits further description.

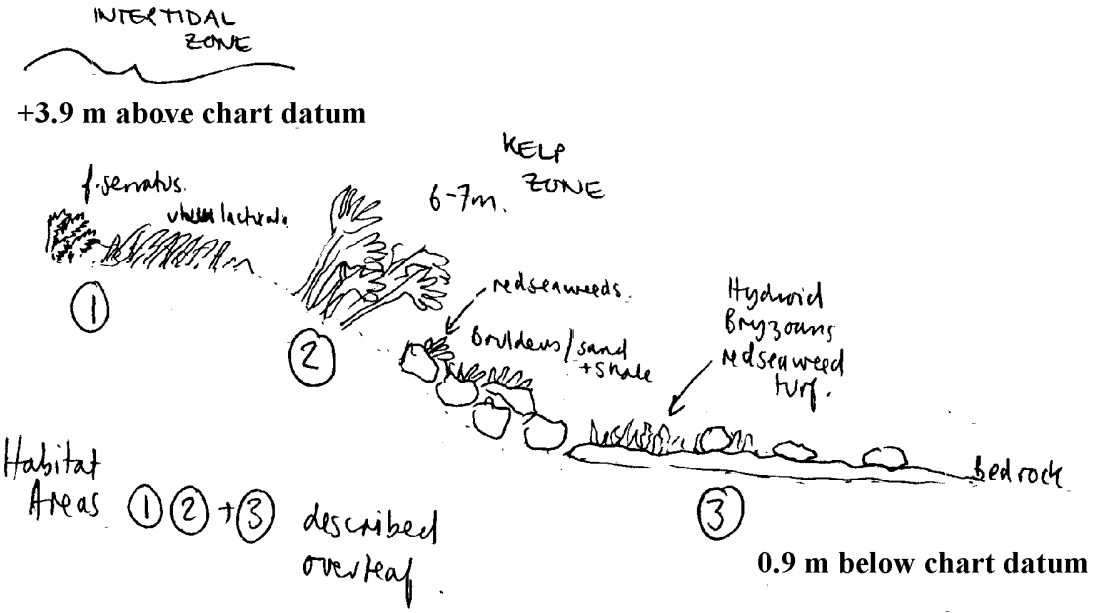


Figure 5 Sketch to show the habitats encountered at Site 13/95 (by Kate Lock).

3.1.8 Site 19/95: West of Caswell Bay A (51.564816°N, -4.045133°W)

Surveyed 25/06/1995 by Amanda Holloway and James Perrins

Physical Environment

The site was surveyed from 4m above chart datum to 1.5m below chart datum. Vertical bedrock in the intertidal gave way to 1m high bedrock outcrops in the shallow subtidal interspersed with sand filled gullies.

This site is exposed to wave action and a moderate tidal flow.

Habitat / Community Types

Four habitat / community types were described:

1. Vertical intertidal bedrock dominated by limpets and barnacles.

2. The lower shore / sublittoral fringe was dominated by kelp (*Laminaria* sp.) plus the sea lettuce (*Ulva* sp.) and dense patches of the saw wrack (*Fucus serratus*).

3. Bedrock outcrops at -1m was covered with a red algal turf together with occasional sponges and sea squirts. Species recorded included the orange wisp sponge (*Esperiopsis fucorum*), the daisy anemone (*Cereus pedunculatus*), and the sandy creeplet anemone (*Epizoanthus couchii*). Other species included the white Christmas tree sea squirt (*Bugula plumosa*), the star sea squirt (*Botryllus schlosseri*) and the linear colonial sea squirt (*Botrylloides leachii*). Mobile species included the yellow lined kelp sea slug (*Polycera quadrilineata*) and fish including the tompot blenny (*Parablennius gattorugine*).

4. Unidentified flatfish (*Pleuronectidae* indet.) were recorded from the sand habitat.

Observations / Features of Interest

The flora and faunal turf of habitat/community type 3 merits further description.

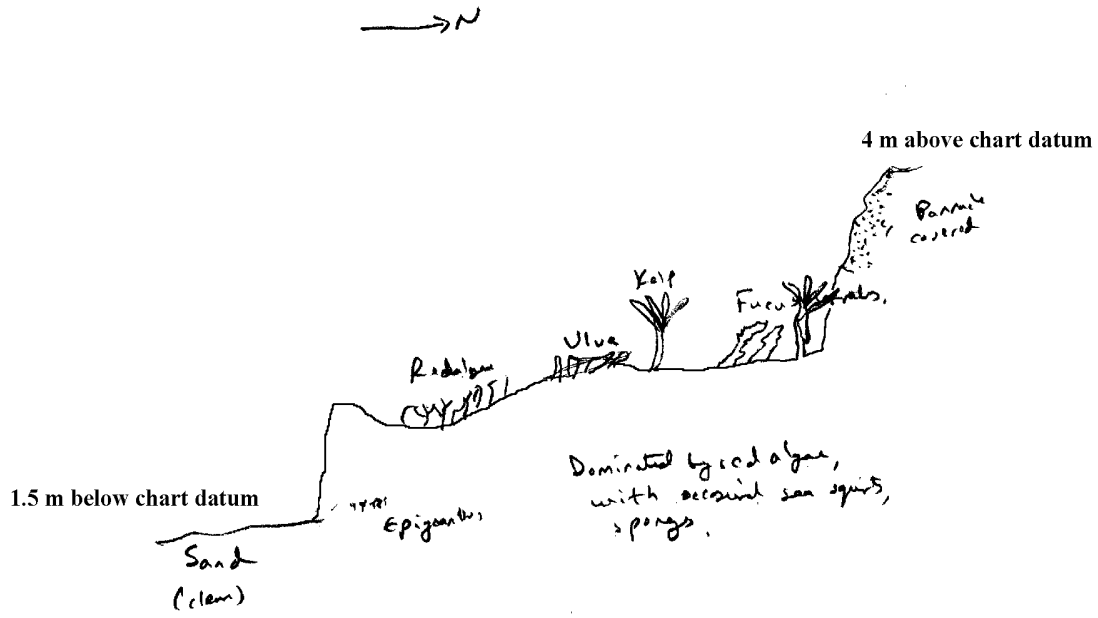


Figure 6 Sketch to show the habitats encountered at Site 19/95 (by James Perrins and Amanda Holloway).

3.1.9 Site 2/95: Pwlldu Head B (51.5559°N, 4.056383°W)

Surveyed 24/06/1995 by James Perrins, Peter Taylor and Emma Taylor

Physical Environment

The seabed was surveyed between 3.7 m and 6.7 m below chart datum and was composed of bedrock with occasional shelly sand patches and boulders.

This site is exposed to wave action and tidal streams.

Habitat / Community Types

One habitat / community type was described:

1. A bedrock plateau with a turf of sponges, sea firs and bryozoans and sparse red seaweeds. Dominant sponges included the white spiky sponge (*Dysidea fragilis*), the golf ball sponge (*Tethya aurantium*) and an erect finger-like sponge (*Polymastia* sp.). Sea firs included the straight antenna sea fir (*Nemertesia antennina*) and sea squirts included the star sea squirt (*Botryllus schlosseri*) and the light bulb sea squirt (*Clavelina lepadiformis*). Species characteristic of scoured habitats included the dahlia anemone (*Urticina felina*), jelly fingers (*Alcyonium diaphanum*) and horn wrack (*Flustra foliacea*). Mobile species included small spider crabs (unidentified)

Observations / Features of Interest

The occurrence of an unidentified branched 'finger-like' sponge (also described from sites 3/95 and 4/95) is of interest and a specimen / photograph would be useful for identification.

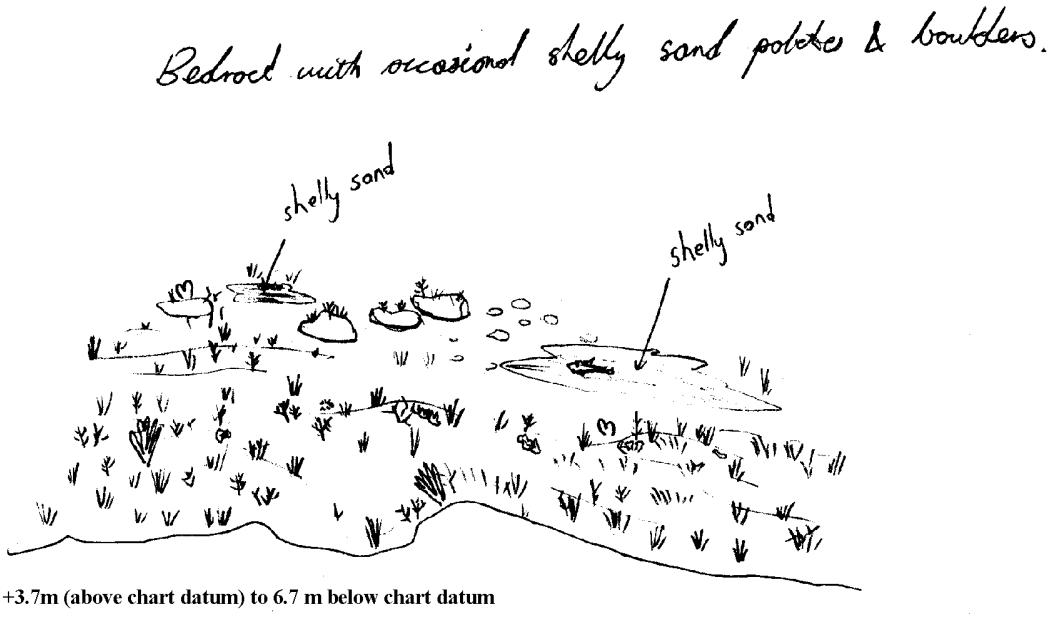


Figure 7 Sketch to show habitats at site 2./95 by Peter and Emma Taylor

3.1.10 Site 3/95: Pwlldu Bay (51.5559°N, 4.05638°W)

Surveyed 24/06/1995 by Sarah Hughes and Iain Park

Physical Environment

This site was studied between 3.7m to 7.7m below chart datum. Much of the seabed was fairly level bedrock with ridges and ledges. Sand and silt were generally distributed and small patches of sediment occurred in hollows together with cobbles. Adjacent to the bedrock was rippled sand and medium to large boulders.

This site is exposed to both wave action and tidal streams.

Habitat / Community Types

Three habitat / community types were described:

1. Level scoured bedrock with 'orange sponge', the straight antenna sea fir (*Nemertesia antennina*), anemones (*Sagartia* sp.), 'fan worms' and the light bulb sea squirt (*Clavelina lepadiformis*). A few dead men's fingers (*Alcyonium digitatum*) were present and an unidentified branched 'salmon pink' sponge was also recorded. Mobile species included including swimming crabs (*Necora puber*) and edible crabs (*Cancer pagurus*).

2. Scoured boulders with barnacles and 'fan worms', various sponges, the common starfish (*Asterias rubens*). Various crustaceans sheltered under the boulders including swimming crabs (*Necora puber*) and edible crabs (*Cancer pagurus*).

3. Rippled sand with broken shell and no conspicuous macrofauna.

Observations / Features of Interest
The unidentified branched pink sponge found at other sites (3/95 and 4/95) may be of interest.

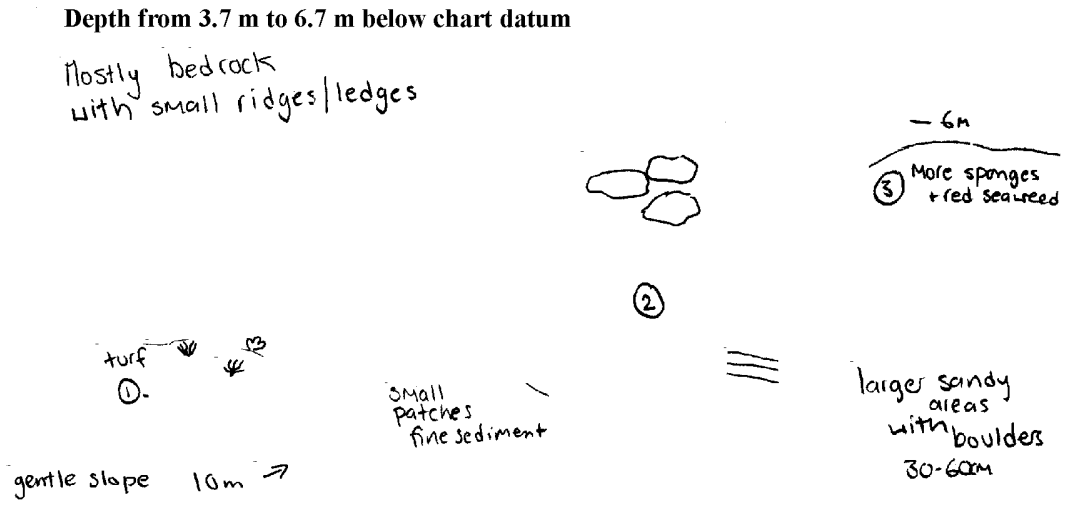


Figure 8 Sketch to show the habitats encountered at Site 3/95 (by Iain Park and Sarah Hughes).

3.1.11 Site 1/95: Pwlldu Head A (51.555°N, -4.06°W)

Surveyed 24/06/1995 by Delyth Grady, Lucy Gilkes and Paul Kay

Physical Environment
This site was studied between 2.5 m to 5.6 m below chart datum. Medium rippled sand occurred between 4.1 m and 6.5 m. Outcropping from this was an area of small boulders between 4.1 m and 5.0 m following followed by a low-lying plateau of bedrock dissected by small (0.5 m deep) gullies (between 4.1 m and 4.4 m). The bedrock gave way once more to rippled sand, which sloped down to another more prominent bedrock outcrop with gullies 1m deep (between 5.0 m and 6.6 m).

This site is exposed to both wave action and tidal streams.

Habitat / Community Types
Four habitat / community types were described:

1. Rippled medium sand with no conspicuous macrofauna except for one juvenile flat fish (Pleuronectidae indet.).

2. Small boulders partially buried in sand with barnacles, keel worms (*Pomatoceros* sp.) and a short turf of sea firs. A mat of the horseshoe worm (*Phoronis hippocrepia*) was also present.

3. Low lying bedrock with gullies covered in a short faunal turf including the straight antenna sea fir (*Nemertesia antennina*) bearing many sea slug egg masses, the horseshoe worm (*Phoronis hippocrepia*) and fan worms (Sabellidae indet.).

4. Bedrock outcrops with deep gullies rich in species (especially sponges, sea firs and sea anemones), with the breadcrumb sponge (*Halichondria panicea*), the white spiky sponge (*Dysidea* fragilis), the straight and branched antenna sea firs (*Nemertesia antennina* and *Nemertesia ramosa*), dead men's fingers (*Alcyonium digitatum*), dahlia anemones (*Urticina felina*), delicate anemones (*Sagartia elegans*) plus the star sea squirts (*Botryllus schlosseri*) and the no spot club squirt (*Morchellium argus*). The feather star (*Antedon bifida*) was present and also the tompot blenny (*Parablennius gattorugine*).

Observations / Features of Interest

The larger bedrock outcrops in habitat 4 were richest in species. Of interest was the presence of the feather star (*Antedon bifida*), which was rarely recorded during this survey.

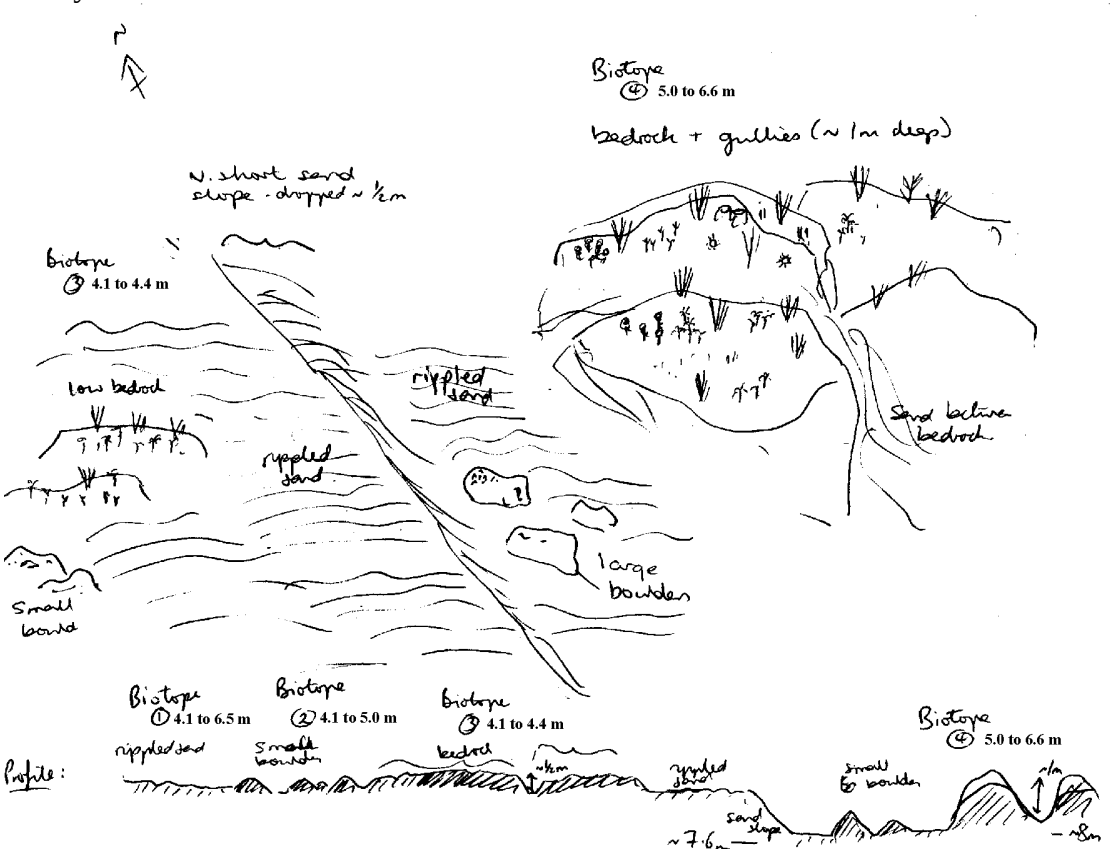


Figure 9 Sketch to show the habitats encountered at Site 1/95 (by Lucy Gilkes and Paul Kay).

3.1.12 Site 4/95: Hunts Bay A (51.555842°N, 4.072833°W)

Surveyed 24/06/96 by James Perrins

Physical Environment

This site was studied at 4.8 m below chart datum. The seabed was formed by bedrock ridges 2 to 3 m in height with gullies running north / south.sloping. Gullies were filled with differing substrata including boulders, clean shell gravel and sand.

This site is exposed to wave action and tidal streams.

Habitat / Community Types

One habitat / community types was described:

1. Dominant communities were a mixture of red seaweeds, sponges, sea squirts and sea firs. Dominant species included the orange wisp sponge (*Esperiopsis fucorum*), the straight antenna sea fir (*Nemertesia antennina*) and the sandy creeplet anemone (*Epizoanthus couchii*). Other conspicuous species included the breadcrumb sponge (*Halichondria panicea*), the velvet dome sponge (*Suberites carnosus*), the white hedgehog sponge (*Polymastia mamillaris*). An unidentified branched pink sponge was also noted. Mobile species included the swimming crab (*Necora puber*) and the dogfish (Scyliorhinus canicula). Several other species occurred in lesser abundance and red seaweeds were sparse.

Observations / Features of Interest

The presence of the unidentified branched pink sponge (found also at sites 2/95 and 3/95) is potentially of interest.

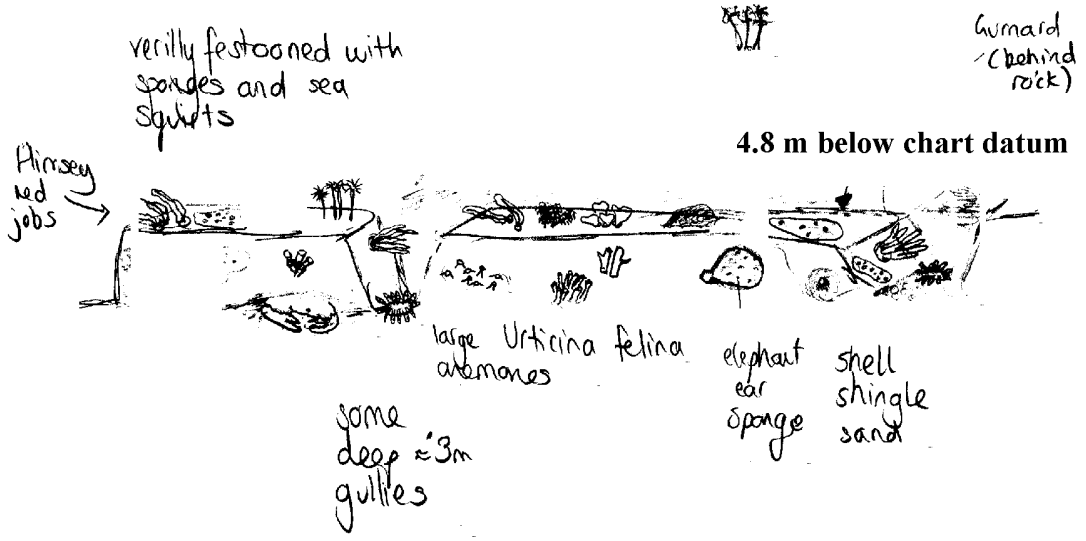


Figure 10 Sketch to show the habitats encountered at Site 4/95 (by James Perrins).

3.1.13 Site 5/95: Hunts Bay B (51.55694°N, 4.07394°W).

Surveyed 24/06/1995 by Suzanne Hart, Dale Rostron and Colin Deller

Physical Environment

The depth at this site was not recorded but due to the proximity to site 4/95, it is probable that depth was less than 5 m below chart datum. The seabed was formed from bedrock with 1m high gullies.

This site is exposed to wave action and tidal streams.

Habitat / Community Types

One habitat / community type was described:

1. Bedrock gullies with horizontal surfaces populated by a red seaweed and animal turf. Dominant turf animals included sponges, hydroids and sea

squirts. The vertical surfaces were covered in sponges, tube worms and sea squirts and were undercut at the base providing a habitat for mobile crustacea.

A list of over 60 species was collected from this site (see Appendix 2), however no indication of abundance or dominance was given.

Observations / Features of Interest

The large number of species recorded at this site is of interest. The chocolate star anemone (*Isozoanthus sulcatus*) and the northern yellow feather sea fir (*Halecium muricatum*) were not recorded elsewhere during this study. The presence of an unidentified transparent soft blue sponge is also of interest.

3.1.14 Site 6/95: Hunts Bay C (51.559683°N, 4.079116°W)

Surveyed 24/06/95 by Kate Lock

Physical Environment

This site was studied between 1.4 m and 3.4 m below chart datum. A seabed was formed of bedrock and areas of small (football sized) boulders outcropping from sand and shell. The bedrock was formed into gullies up to 2 m wide and 2 m high.

The site is exposed to wave action and moderate tidal streams.

Habitat / Community Types

Three habitat / community types were described:

1. Small boulders covered in barnacles with the straight antenna sea fir (*Nemertesia antennina*), the white Christmas tree sea mat (*Bugula plumosa*) and a variety of sea squirts including the star sea squirt (*Botryllus schlosseri*), the light bulb sea squirt (*Clavelina lepadiformis*), and orange spot club sea squirt (*Aplidium punctum*). The sandy creeplet anemone (*Epizoanthus couchii*), tube worms and an unidentified 'orange sponge' were also present.

2. Horizontal bedrock surfaces with a thick turf of red seaweeds and animals. Red seaweeds included cock's comb (*Plocamium cartilagineum*), red leaf weed (*Delesseria sanguinea*), red feather weed (*Heterosiphonia plumosa*), the flat tentacle weed (*Calliblepharis ciliata*), iridescent ruffle weed (*Cryptopleura ramosa*) and a possible record of red glow weed (*Drachiella spectabilis*). A variety of sponges were present including the boring sponge (*Cliona celata*), the white hedgehog sponge (*Polymastia mamillaris*), the white spiky sponge (*Dysidea fragilis*), the breadcrumb sponge (*Halichondria panicea*) and a branched sponge (*Raspailia* sp.). Other species included the beadlet anemone (*Actinia* equina), velvet swimming crabs (*Necora puber*) and the edible crab (Cancer pagurus).

3. Steep sided bedrock gullies with a turf of plants and animals rich in sea firs such as the straight antenna sea fir (*Nemertesia* antennina), sponges and patches of the sea mat jelly fingers (*Alcyonidium* diaphanum). Unidentified sea slugs were a feature of this habitat (many egg masses on the sea firs).

Observations / Features of Interest

The general rich faunal and floral turf on the bedrock merits further investigation.

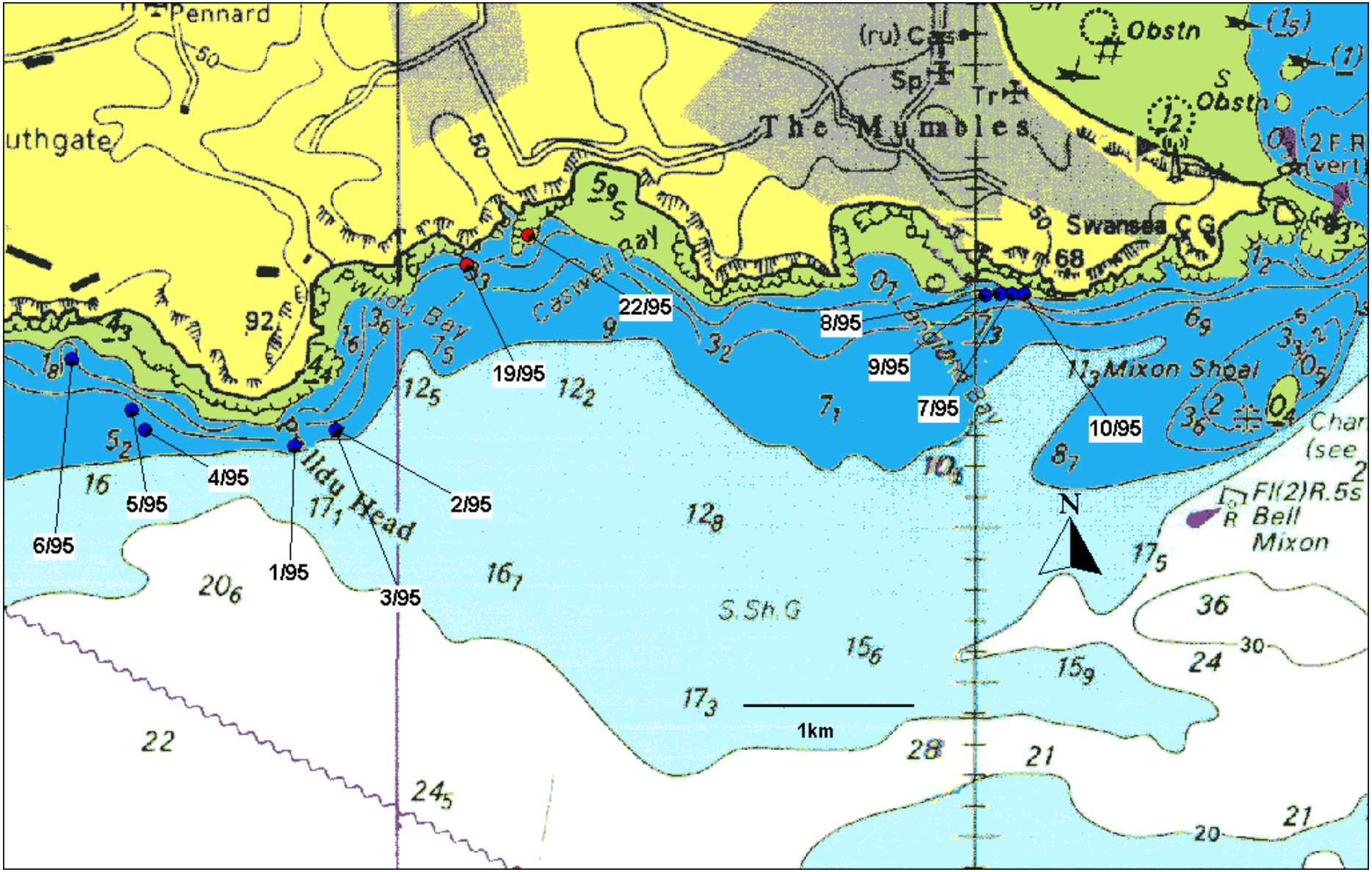


Figure 11 Chart to show the location of dives between Mumbles Head and Pwlldu Head

3.2 Site Information Oxwich Bay (between Pwlldu Head and Oxwich Point)

3.2.1 Site 16/95 West of Pwlldu Head (51.56345°N, -4.0926°W)

Surveyed 25/06/95 by Francis Bunker and Michelle Boinn.

Physical Environment

This site was surveyed from 1.5m to 0.5m above chart datum. Gently sloping or level bedrock with a covering of sand and areas of rippled sand comprised the seabed.

This site is semi-exposed to wave action and tidal streams.

Habitat / Community Types

One habitat / community types was described:

1. Sand inundated rock surfaces with kelp park, foliose red seaweeds and a variety of epifauna. Plants of the northern kelp (*Laminaria hyperborea*) were sparsely distributed and there were a variety of sand tolerant seaweeds. Extensive mats of the sand binding red rose grass weed (*Rhodothamniella floridula*) were present together with larger seaweeds including the little forked worm weed (*Furcellaria lumbricalis*), slender red filament weed (*Gracilaria gracilis*), false forking leaf bearer (*Phyllophora pseudoceranoides*), Irish moss (*Chondrus crispus*) and cock's comb (*Plocamium cartilagineum*).

   Attached animals included mats of the horseshoe worm (*Phoronis hippocrepia*) and the clumps of small mussels (*Mytilus edulis*). Other conspicuous species were the white zigzag sea fir (*Sertularella polyzonias*), the cave dwelling anemone (*Sagartia troglodytes*), the sea mat (*Electra pilosa*) and the pink colonial sea squirt (*Distaplia rosea*). Deeper areas of sand harboured, a small fan worm (*Sabellidae* indet.) and the sand mason worm (*Lanice conchilega*). One common cuttlefish (*Sepia officinalis*) was recorded during the dive.

Observations / Features of Interest

This site was a good example of a shallow sandy community.

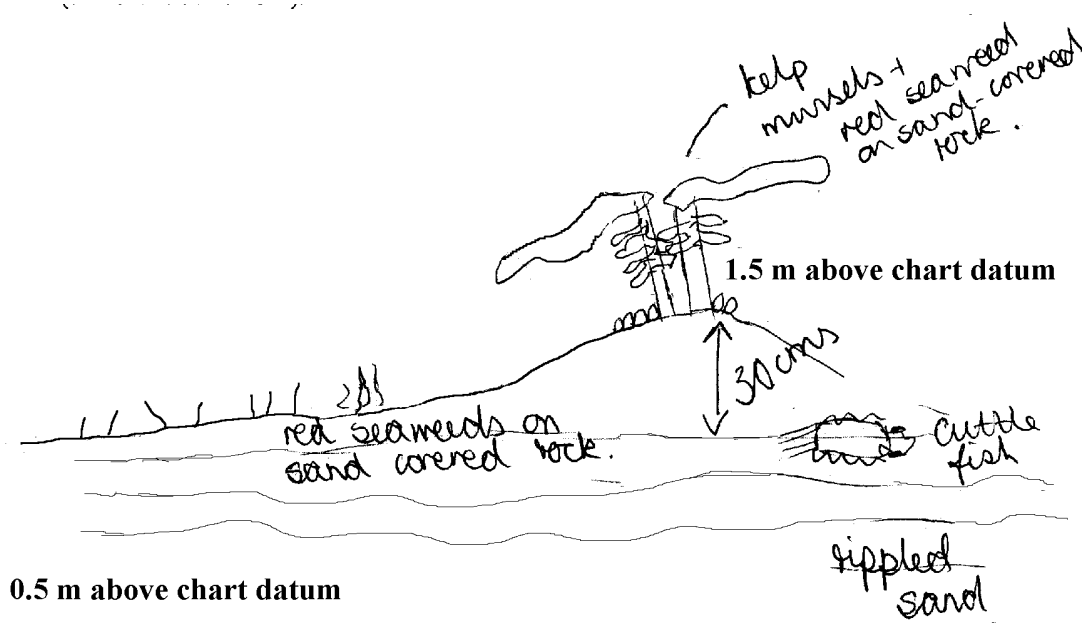


Figure 12 Sketch to show the habitats encountered at Site 16/95 (by Michelle Bouin).

3.2.2 Site 17/95 Between Oxwich Bay and Pwlldu Head (51.5638°N, -4.0988°W)

Surveyed 25/06/95 by Sarah Hughes

Physical Environment

The depth of this site was close to the shoreline extending between 0.7m above chart datum to 1.3 m below chart datum. The seabed was formed by a low-lying reef of sand inundated limestone sloping gently down to a plain of rippled sand.

This site is semi-exposed to wave action and tidal streams.

Habitat / Community Types

Two habitat / community types were described:

1. Sand covered limestone bedrock on the lower shore and shallow subtidal with sand tolerant seaweeds and patches of very large mussels (*Mytilus edulis*). Seaweeds included saw wrack (*Fucus serratus*), red bottlebrush weed (*Halurus equisetifolius*), slender red filament weed (*Gracilaria gracilis*), many similar rounded frond weed (*Polyides rotundus*) and Irish Moss (*Chondrus crispus*). Mobile animals included the dog whelk (*Nucella lapillus*), a lobster (*Homarus gammarus*) and various crab species including shore crabs (*Carcinus maenas*), velvet swimming crabs (*Necora puber*), edible crabs (Cancer pagurus) and hermit crabs. The base of the rock slope bore large patches of the white horseshoe worm (*Phoronis hippocrepia*) and the linear colonial sea squirt (*Botrylloides leachii*).

2. A subtidal rippled sand plain with razor shell (*Ensis* sp) siphons, worm casts (unidentified) and occasional sand mason worms (*Lanice conchilega*) and hermit crabs.

Observations / Features of Interest

The sand tolerant seaweed communities could warrant further study.

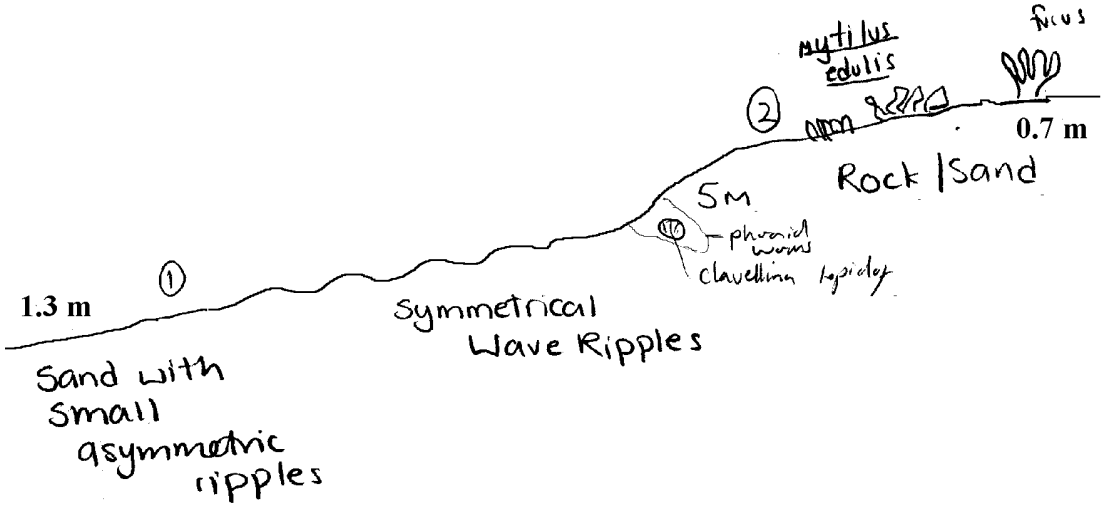


Figure 13 Sketch to show the habitats encountered at Site 17/95 (by Sarah Hughes).

3.2.3 Site 13/95 Oxwich Bay Wreck (51.548383°N, -4.144397000°W)

Surveyed 25/06/95 by Dale Rostron and Alistair Law

Physical Environment

The depth of this site was not recorded during the survey but it is a popular dive site with Swansea Sub-Aqua Club and is known to be approximately 3 m to 7 m below chart datum.

This site is semi-exposed to wave action and tidal streams.

Habitat / Community Types

One habitat / community type was described:

1. The upper surfaces of the wreck bore a park of the northern kelp (*Laminaria hyperborea*) and the foliose seaweeds cock's comb (*Plocamium cartilagineum*) and equally divided net weed (*Dictyota dichotoma*) were conspicuous. Common conspicuous animals on the wreck included the plumose anemone (*Metridium senile*), the spike barnacle (*Balanus crenatus*) and the feather star (*Antedon bifida*). Other conspicuous species included the light bulb sea squirt (*Clavelina lepadiformis*), the candy-striped flat worm (*Prostheceraeus vittatus*), the yellow Christmas tree sea squirt (*Bugula turbinata*) and common mud tube shrimps (Jassidae indet.). Of interest was a record of the native Oyster (*Ostrea edulis*). It is unclear whether this was found on the wreck itself or the adjacent seabed.

Observations / Features of Interest

The presence of the native oyster *Ostrea edulis* is of interest.

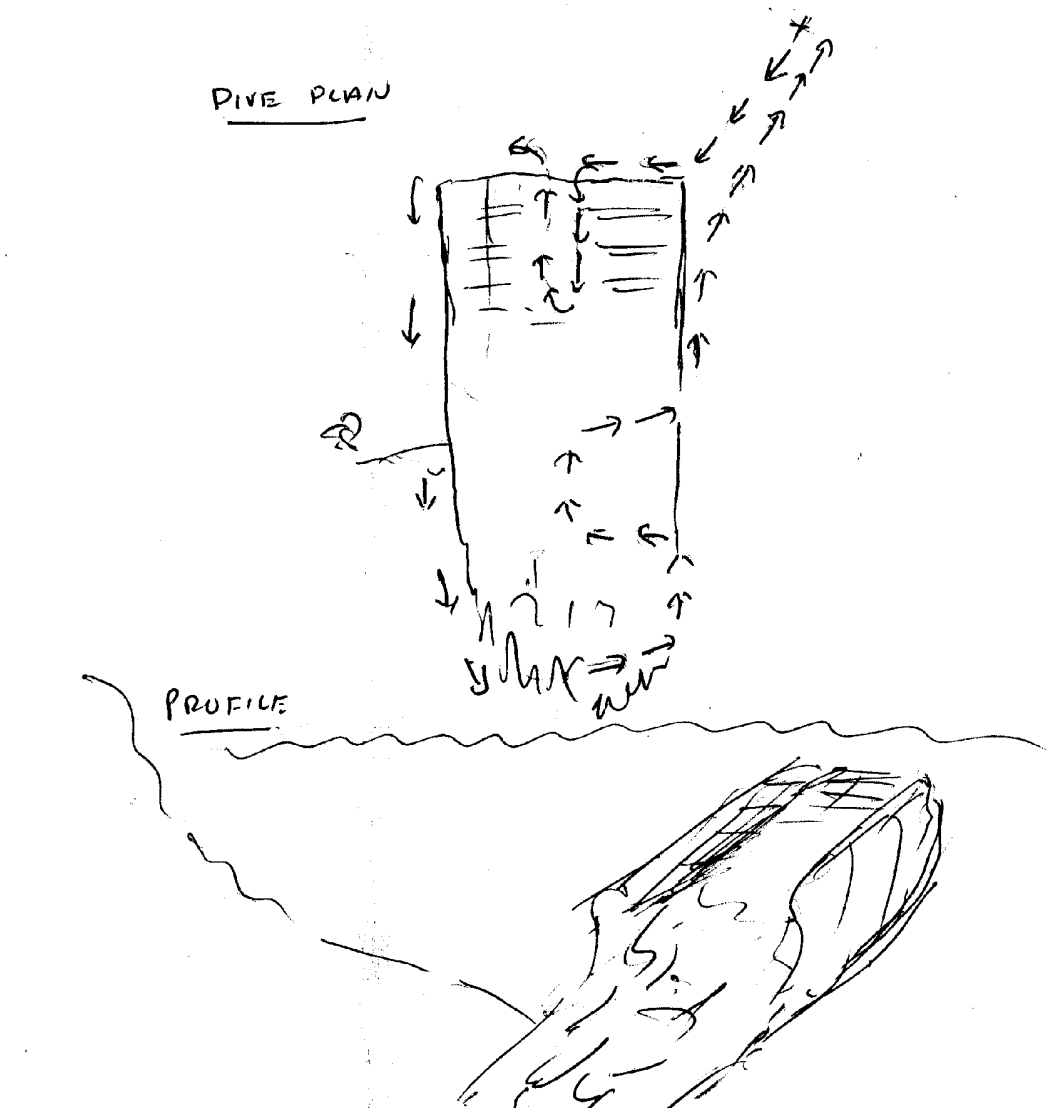


Figure 14 Sketch to show the habitats encountered at Site 13/95 (by Dale Rostron and Alistair Law).

3.2.4 Site 18/95 Oxwich Bay Wreck B (51.548383°N, 4.144397000°W)

Surveyed 25/06/95 by Suzanne Hart

Physical Environment

The depth of this site was not recorded during the survey but it is a popular dive site with Swansea Sub-Aqua Club and is known to be approximately 3 m to 7 m below chart datum. The seabed around the shipwreck was composed of sand with pebbles with the ship itself lying in a north / south position.

This site is semi-exposed to wave action and tidal streams.

Habitat / Community Types

One habitat / community type was described:

1. Ship sides with plumose anemones (*Metridium senile*) and (*Actinothoe sphyrodeta*), particularly on the port rear end and stern.

2. Overhangs formed by the wreckage over the sandy seabed on the east side with large conger eels (*Conger conger*).

3. Inside the wreck with surfaces bearing sponges, sea firs and encrusting bryozoa. Large specimens of the dahlia anemone (*Urticina felina*) were recorded together with the Devonshire cup-coral (*Caryophyllia smithii*).

4. Outer surfaces with the yellow Christmas tree sea mat (*Bugula turbinata*) together with feather stars (*Antedon bifida*). The sponge *Clathrina coriacea* was also recorded plus candy-striped flat worm (*Prostheceraeus vittatus*) and the yellow prickled sea slug (*Crimora papillata*). Mobile species include the spiny spider crab (*Maia squinado*), the edible crab (*Cancer pagurus*), the lobster (*Homarus gammarus*), and fish including dragonets (*Callionymus lyra*) and the scorpion fish (*Taurulus bubalis*).

Observations / Features of Interest

Of interest was the record the Devonshire Cup-Coral (*Caryophyllia smithii*), which was not recorded elsewhere on this survey. Suzanne Hart also noted how the trigger fish (*Balistes capriscus*) is found regularly on this wreck in late summer.

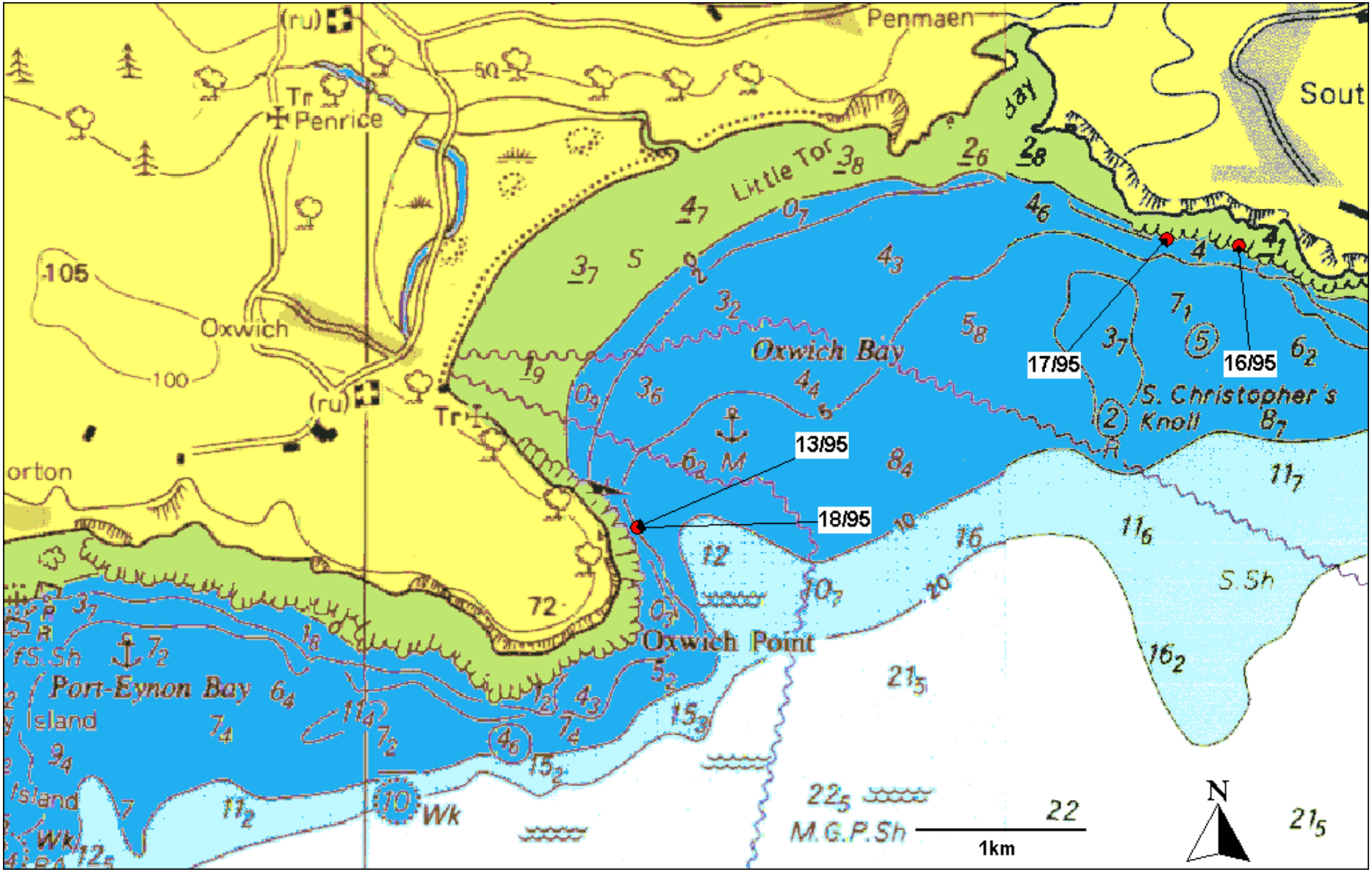


Figure 15 Chart to show the location of dives in Oxwich Bay (between Pwlldu Head and Oxwich Point)

3.3 Between Port-Eynon Head and Worms Head

3.3.1 Site 15/95 East Helliswick Bay (51.537°N, 4.2225°W)

Surveyed 25/06/95 by Amanda Holloway, James Perrins and Kate Lock

Physical Environment

This site was surveyed between 5.6 m and 9.6 m below chart datum and was formed from undulating bedrock.

This site is semi-exposed to wave action and tidal streams.

Habitat / Community Types

One habitat / community type was described:

1. Very dense mussel beds (*Mytilus* edulis) covered almost 100% of all surfaces and were composed of patches of both small and large individuals. The common starfish (*Asterias rubens*) was numerous as was the dahlia anemone (*Urticina felina*). Other associated fauna was relatively scarce but included the boring sponge (*Cliona* celata), honeycomb sponge (*Hemimycale columella*), orange wisp sponge (*Esperiopsis fucorum*), both straight and branched antenna sea firs (*Nemertesia antennina* and *Nemertesia ramosa*), the cave dwelling anemone (*Sagartia troglodytes*), dead man's fingers (*Alcyonium digitatum*) and the sandy creeplet (*Epizoanthus couchii*). Mobile species recorded included an angler fish (*Lophias piscatorius*) and a shoal of sand eels (*Ammodytes* sp.).

Observations / Features of Interest

The extensive mussel beds at this site are of interest.

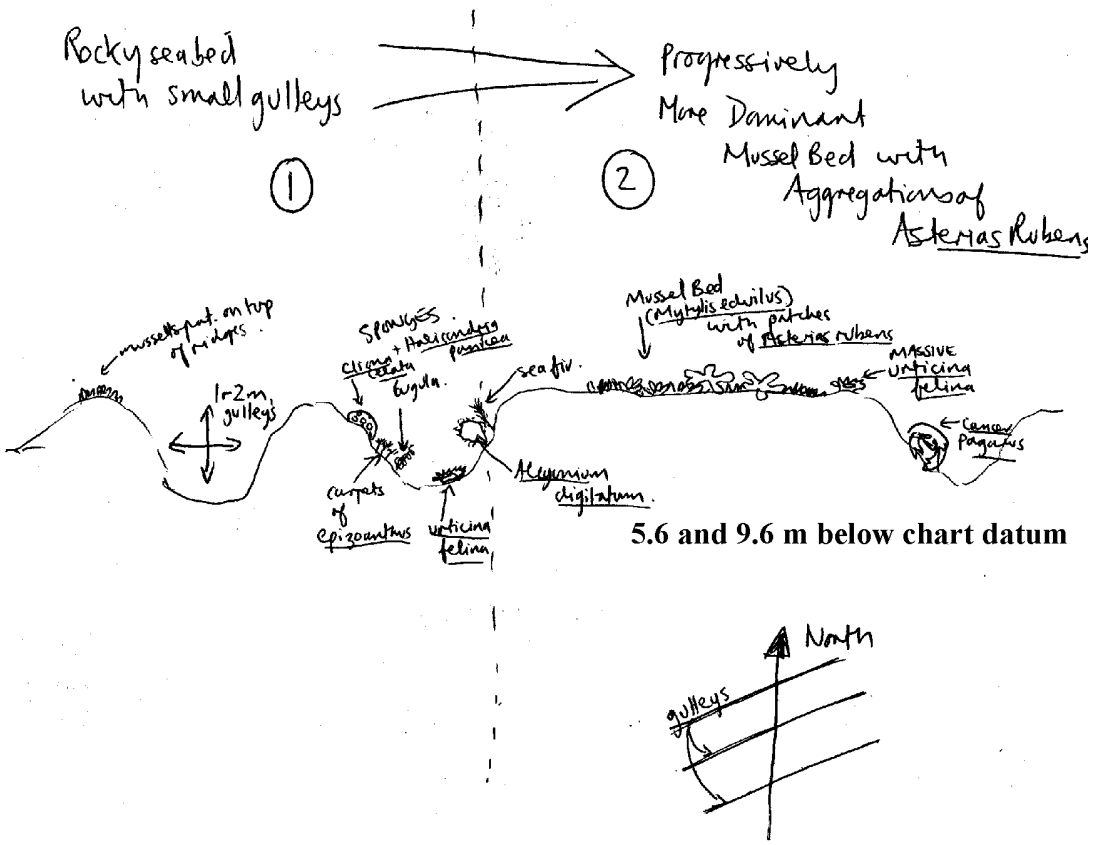


Figure 16 Sketch to show the habitats encountered at Site 15/95 (by Kate Lock).

3.3.2 Site 20/95 Overton Mere (51.537877°N, 4.22695°W)

Surveyed 25/06/95 by Suzanne Hart

Physical Environment

The depth of this site was not recorded during the survey but it is assumed to be similar to adjacent sites (15/95 and 21/95) and would be approximately between 6 m and 10 m below chart datum.

Habitat / Community Types

One habitat / community type was described:

1. Dense mussel (*Mytilus edulis*) patches occurred in some places and a faunal turf in others. Species recorded included sponges (not specified), antenna sea firs (*Nemertesia* sp.) with sea slug eggs (from *Doto* species), dead men's fingers (*Alcyonium digitatum*) the light bulb sea squirt (*Clavelina lepadiformis*). Mobile species included a lobster (*Homarus gammarus*), common starfish (*Asterias rubens*) and an unidentified orange coloured sea slug which had the appearance of an *Aeolidia* species.

Observations / Features of Interest

The dense mussel beds and the presence of the unidentified orange coloured sea slug (?*Aeolidia* sp) are of interest.

3.3.3 Site 21/95 Overton Cliff (51.539333°N, 4.236367°W)

Surveyed 25/06/95 by Colin Deller and Delyth Grady

Physical Environment
The depth of this site was between 6.9 m and 9.9 m below chart datum. At 6.9 m, the seabed was formed by undulating bedrock with some pebble filled gullies and others sand filled and running in a north / south direction. Between 7.9 m and 8.9 m the seabed was sandy with more bedrock and gullies occurring at 9.9m.

Habitat / Community Types
Three habitat / community types were described:

1. On the bedrock between 6.9m and 9.9m, sea firs, including antenna sea firs (*Nemertesia* sp) and dahlia anemones (*Urticina felina*) together with four other unidentified sea anemones were conspicuous. The sea slug (*Archidoris pseudoargus*) was noted to be laying egg ribbons. On the gully floors, 'tube worms' (probably the keel worm, *Pomatoceros* sp.) were prolific on pebbles.

2. Species recorded on the sandy seabed between 7.9m and 8.9m included the sand mason worm (*Lanice conchilega*), hermit crabs (species unknown) and the common starfish (*Asterias rubens*).

3. The bedrock at 9.9m bore sponges, sea firs, anemones, sea mats and tube worms. Sea slugs, crustaceans and starfish were also recorded.

Observations / Features of Interest
The deeper bedrock communities require further description.

3.3.4 Site 24/95 Boiler Slab B, Overton Cliff (51.538555°N, 4.240255°W)

Surveyed 25/06/95 by Paul Kay and Lucy Gilkes

Physical Environment
The depth of this site was between 6.4 m and 10.3 m below chart datum. A series of limestone bedrock reefs separated by gullies were recorded running north to south offshore with gullies between.

Habitat / Community Types
Two habitat / community types were described:

1. Three varieties of animal turf occurred on the bedrock. Low-lying reefs had either a dense covering of the sea squirt *Polycarpa ?scuba* or empty mussel shells with common starfish, while sponges plus the oaten pipes hydroid (*Tubularia indivisa*) and other species were described as occurring on 'higher' rocky reefs.

2. Medium rippled sand occurred between reefs and offshore of the bedrock between 7.9 m and 10.3 m. The only conspicuous species recorded were two

common starfish (*Asterias rubens*) and bunches of common cuttlefish (*Sepia officinalis*) eggs.

Observations / Features of Interest
The variety of communities on the bedrock reefs in a small area is of interest. The reefs dominated by the blue-mouthed red sea squirt were not recorded elsewhere during the survey.

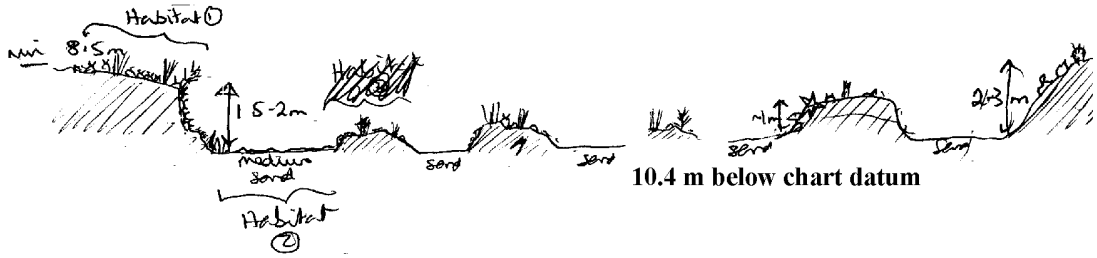


Figure 17 Sketch to show the habitats encountered at Site 13/95 (by Paul Kay and Lucy Gilkes).

3.3.5 Site 23/95 Boiler Slab A, Overton Cliff (51.53913°N, 4.24176°W)

Surveyed 25/06/95 by Dale Rostron and Alistair Law

Physical Environment
The depth of this site was between 6.9 m below chart datum. The seabed was formed from level pitted limestone rock with gullies and overhangs.

Habitat / Community Types
One habitat / community types was described:

1. In some areas, tops of the rock platforms were dominated by small mussels (*Mytilus edulis*) with the single antenna sea fir (*Nemertesia antennina*) and common starfish (*Asterias rubens*). Other areas were dominated by sea squirts including *Polycarpa* sp. and the large colonial sandy sea squirt (*Polyclinum aurantium*). The common mud tube shrimps (Jassidae indet.) covered most surfaces. Other conspicuous species included the dahlia anemone (*Urticina felina*). There were many red and black-streaked doto (*Doto dunnei*) on the single antenna sea fir (*Nemertesia antennina*).

Dead men's fingers (*Alcyonium digitatum*) were conspicuous on the gulley sides and bib (*Trisopterus luscus*) and ballan wrasse (*Labrus bergylta*) were recorded beneath overhangs. Other species noted were pollack (*Pollachius pollachius*) and cobble areas had patches of (*Alcyonium diaphanum*).

Observations / Features of Interest
The extensive carpets of mussels and the sea squirt *Polycarpa* sp. are of interest as were records of the orange and black spotted nudibranch sea slug (*Thecacera peregrina*).

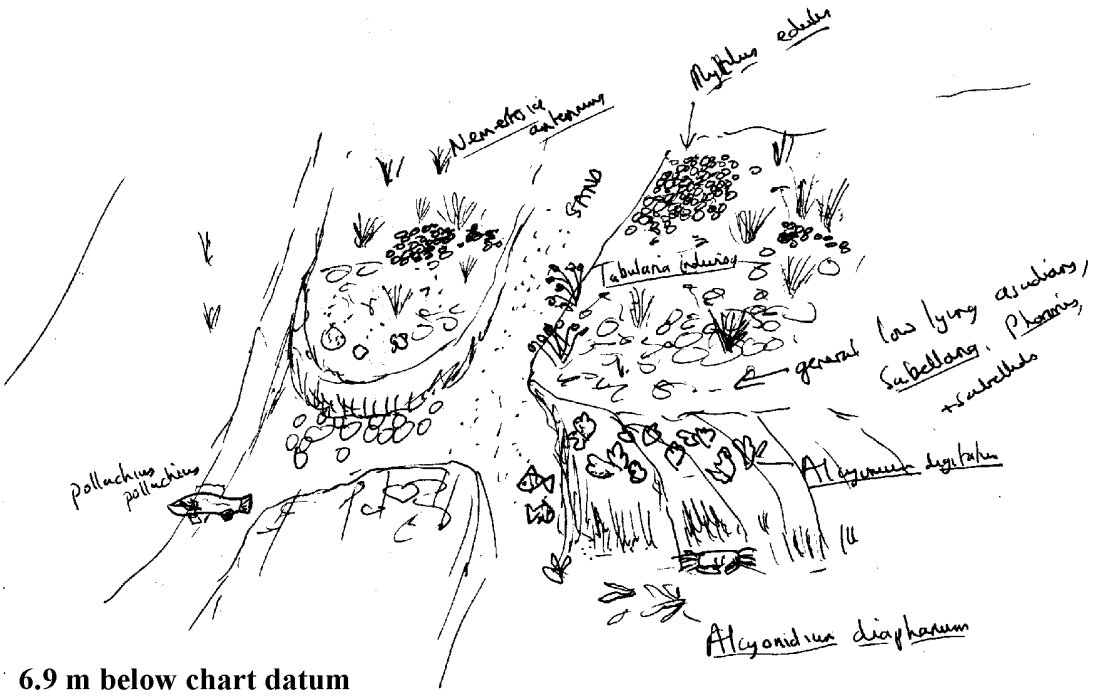


Figure 18 Sketch to show the habitats encountered at Site 23/95 (by Dale Rostron).

3.3.6 Site 14/95 Helwick Channel N. Side (A and B (51.54148°N, -4.2465°W)

Surveyed 25/06/95 by Francis Bunker, Michell Boinn and Mark Burton

Physical Environment
The depth of this site was between 3.5 m and 6.1 m below chart datum. The seabed was formed from undulating limestone bedrock.

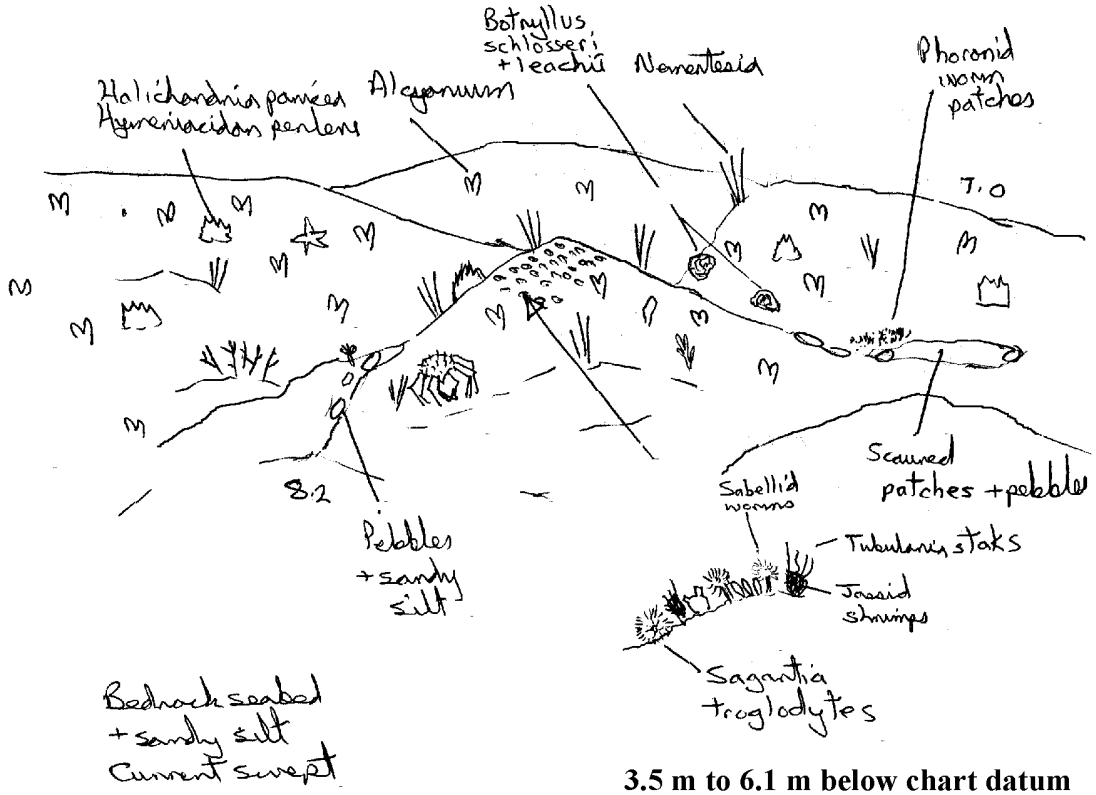
Habitat / Community Types
One habitat / community types was described:

> Most of the seabed was covered by the mussels (*Mytilus edulis*) and a variety of associated species were also present, including various sponge species, the straight and branched antenna sea firs (*Nemertesia antennina* and *Nemertesia ramosa*), the oaten-pipes sea fir (*Tubularia indivisa*), the cave dwelling anemone (*Sagartia troglodytes*), dead man's fingers (*Alcyonium digitatum*), common mud tube shrimps (Jassidae indet.) and various sea squirts.

Characteristic coils of the ghost sea slug (*Okenia adspersa*) were found in silty sediment pockets of the limestone.

Observations / Features of Interest

A total of 44 species were recorded from this site despite the dominance of mussels (*Mytilus edulis*). Of interest was the record of the ghost sea slug (*Okenia adspersa*).



3.5 m to 6.1 m below chart datum

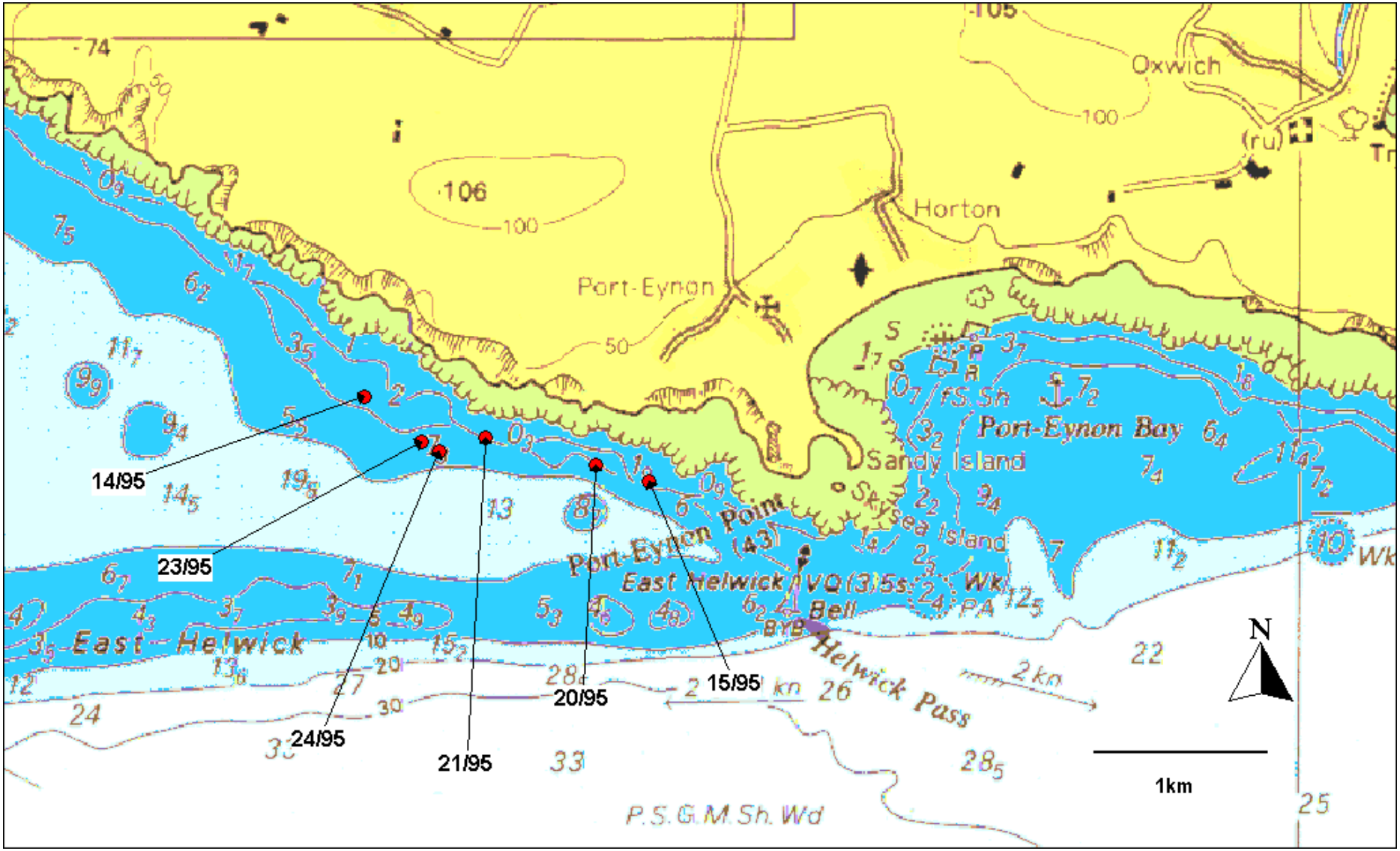


Figure 19 Chart to show the location of dives between Port Eynon Head and Worms Head

4 Discussion

The general conclusions gained from the Seasearch survey data as well as some of the observations and features of interest mentioned in the site descriptions (Sections 3.1, 3.2 and 3.3) are discussed here. Consideration is also given to the methods used.

4.1 Observations and Features of Interest

4.1.1 General Features of the Gower Coast

Limestone rock fringes the coastline over the length of the survey area, punctuated occasionally by sandy bays (including Port-Eynon Bay and Oxwich Bay). Subtidal bedrock does not extend more than a couple of hundred meters offshore in most places, after which sandy sediments cover the seabed. The exception is at East Helwick (Hiscock, 1979) where bedrock slopes away into deep water (estimated from the chart to be approximately 30m below chart datum).

The northern kelp (*Laminaria hyperborea*) forms a fringe of short plants (approximately 0.5 m high) that grow down to 1m below chart datum. Below this, a turf of red seaweeds descends to approximately 3 to 4 m below chart datum and below this the communities are animal dominated. A generalised description of the shallow subtidal habitats has been compiled below. These descriptions (as the survey) concentrate on the inshore areas of rocky substrata rather than the sediments and describe the survey area from east to west.

To the east of Swigg Buoy was an extensive area of tide swept small boulders and cobbles. The habitat was stable with rocks bearing barnacles, sea firs and large sponge growths (including the breadcrumb sponge, *Halichondria panicea*, and the branched holey sponge *Haliclona oculata*). Under boulder communities were also present with encrusting sponges and the pea crab (*Pisidia longicornis*). Fish, including the black goby (*Gobius nigra*) and a corkwing wrasse (*Ctenolabrus rupestris*) also characterised this habitat and many nudibranchs were present.

The wreck of the “Strombus” provides hard substrata for colonisation by animal communities on an otherwise sediment-dominated seabed. Sponges thrive, including the spiny antler sponge (*Raspailia hispida*) and the white hedgehog sponge, (*Polymastia mamillaris*) together with sea firs, a few dead man’s fingers (*Alcyonium digitatum*) and anemones including the plumose anemone (*Metridium senile*). Effects of scour were apparent from the presence of jelly fingers (*Alcyonium diaphanum*) and horn wrack (*Flustra foliacea*). The sediment seabed around the wreck was colonised by the stalked sea fir (*Corymorpha nutans*).

The coast west of Mumbles Head and around Pwlldu Head is exposed to both tidal streams and wave action. A shallow forest of the northern kelp (*Laminaria hyperborea*), descended to low lying bedrock with a rich turf of seaweeds and attached animals mixed in. In several locations, gullies have formed in weaknesses between limestone strata and provide multiple habitats for marine life including upward facing surfaces, verticals, overhangs and cobbles or sediment floors.

Below the kelp forest rock tops were colonised by red seaweeds, including flat tentacle weed (*Calliblepharis ciliata*), irridescent ruffle weed (*Cryptopleura ramosa*), cocks comb (*Plocamium cartilagineum*), Irish moss (*Chondrus crispus*) and dulse

(*Palmaria palmata*). Animals were present in amongst the red seaweed turf including the guarded flask sponge (*Scypha ciliata*), the golf ball sponge (*Tethya aurantium*) the white spiky sponge (*Dysidea fragilis*), the velvet dome sponge (*Suberites carnosus*), white hedgehog sponge (*Polymastia mamillaris*) and the orange wisp sponge (*Esperiopsis fucorum*). Other coelenterates included the straight antenna sea fir (*Nemertesia antennina*) and the sandy creeplet anemone (*Epizoanthus couchii*). The only sea mat recorded was the white Christmas tree bryozoan (*Bugula plumosa*). Sea squirts included the star sea squirt (*Botryllus schlosseri*), the light bulb sea squirt (*Clavelina lepadiformis*), and the orange spot club sea squirt (*Aplidium punctum*).

Gully sides were animal dominated with sponges, sea firs (including *Nemertesia antennina*), small colonies of dead man's fingers (*Alcyonium digitatum*) and dahlia anemones (*Urticina felina*). A variety of sea squirts were present including the star sea squirt (*Botryllus schlosseri*), the light bulb sea squirt (*Clavelina lepadiformis*) and the no spot club sea squirt (*Morchellium argus*). At some sites, the horseshoe worms (*Phoronis hippocrepia*) and fan worms (Sabellidae indet.) burrowed into the limestone. The bases of gully bases were colonised by scour tolerant species such as jelly fingers (*Alcyonium diaphanum*) and horn wrack (*Flustra foliacea*). Crevices and overhangs provided refuge for a variety of mobile species including the edible crab (*Cancer pagurus*), the velvet swimming crab (*Liocarcinus puber*), the lobster (*Homarus gammarus*) and the spiny spider crab (*Maia squinado*). The tompot blenny (*Parablennius gattorugine*) was recorded on several dives along this stretch of coast.

Oxwich Bay provides a degree of shelter from wave action and tidal streams and the seabed is predominantly sandy. Shallow inshore bedrock is home to sand tolerant algal communities where mossy clumps of red rose grass weed (*Rhodothamniella floridula*) occurred with larger species including little forked worm weed (*Furcellaria lumbricalis*), slender red filament weed (*Gracilaria gracilis*), red bottlebrush weed (*Halurus equisetifolius*), many similar rounded frond weed (*Polyides rotundus*) and Irish Moss (*Chondrus crispus*) together with the ubiquitous cock's comb (*Plocamium cartilagineum*). Patches of mussels (*Mytilus edulis*) were widespread as was the white horseshoe worm (*Phoronis hippocrepia*) and various sea squirts. Mobile species included the dog whelk (*Nucella lapillus*), a lobster (*Homarus gammarus*), shore crabs (*Carcinus maenas*), velvet swimming crabs (*Necora puber*), edible crabs (Cancer pagurus) and hermit crabs. Conspicuous species in the shallow sandy areas included sand mason worms (*Lanice conchilega*), razor shells (*Ensis* sp) and hermit crabs.

Wreckage to the south of Oxwich Bay harboured a rich community of species. The wreck is in shallow water with upper surfaces covered in foliose seaweed including cock's comb (*Plocamium cartilagineum*) and equally divided net weed (*Dictyota dichotoma*). Common conspicuous animals on the wreck included the plumose anemone (*Metridium senile*), the spike barnacle (*Balanus crenatus*) and the feather star (*Antedon bifida*). Other conspicuous species included the light bulb sea squirt (*Clavelina lepadiformis*), the candy-striped flat worm (*Prostheceraeus vittatus*), the yellow Christmas tree bryozoan (*Bugula turbinata*) and common mud tube shrimps (Jassidae indet.). A variety of fish and crustacea live around the wreck including large conger eels (*Conger conger*). Of special interest is a record the Devonshire Cup Coral (*Caryophyllia smithii*) growing inside the wreck, the only one from the Gower and another of the native Oyster (*Ostrea edulis*), probably from the adjacent seabed.

The coast between Port-Eynon and Worms's Head is exposed to wave action and strong tidal streams. Much of the bedrock here had a dense covering of mussels (*Mytilus edulis*) with patches of both small and large individuals. In some places mussels had been heavily predated by the common starfish (*Asterias rubens*), and the blue-mouthed red sea squirt (*Polycarpa scuba*) covered the rocks. A small but numerous animal was the common mud tube shrimp (Jassidae indet.) which covered many surfaces. Other associated epifauna was sparsely distributed but many species were present, including the boring sponge (*Cliona celata*), the honeycomb sponge (*Hemimycale columella*), orange wisp sponge (*Esperiopsis fucorum*), both straight and branched antenna sea firs (*Nemertesia antennina* and *Nemertesia ramosa*) and in one location, the oaten-pipes hydroid (on the largest rocky outcrops). Anthozoa included the cave dwelling anemone (*Sagartia troglodytes*), the dahlia anemone (*Urticina felina*), the sandy creeplet anemone. (*Epizoanthus couchii*) and dead man's fingers (*Alcyonium digitatum*). Sea squirts were conspicuous and included the light bulb sea squirt (*Clavelina lepadiformis*) and the pink colonial sea squirt (*Distaplia rosea*).

Mobile species recorded included lobsters (*Homarus gammarus*), bib (*Trisopterus luscus*), ballan wrasse (*Labrus bergylta*), pollack (*Pollachius pollachius*) and an angler fish (*Lophias piscatorius*). Of interest were records of the orange and black spotted sea slug (*Thecacera peregrina*), eggs of the ghost sea slug (*Okenia adspersa*) and an unidentified orange colour *Aeolidia* type sea slug.

Offshore from the rock reefs (below approximately 8m below chart datum), the seabed was sandy with sand mason worms (*Lanice conchilega*), hermit crabs and the common starfish (*Asterias rubens*). Bunches of cuttlefish (*Sepia officinalis*) eggs were recorded from one spot.

4.1.2 General Observations and Species of Interest

Hiscock (1979) recorded 66 species of seaweed and 122 species of animals during their survey of the Gower coast. This survey recorded 38 species of algae and 171 animal species. The increase of animal species recorded is interesting although it is difficult to determine why this should be so. This increase may be partly accounted for by advances in taxonomy and availability of better taxonomic literature since 1979. The records of fewer seaweed species probably reflect a lack of recording expertise in the algae on this survey and concentration of sites and habitats below the main algal zones. The lack of echinoderms encountered on Hiscock's survey was of note with only 4 species recorded. This study confirmed a paucity of echinoderms both in terms of number of individuals and species with a total of 7 species recorded.

Species records of interest include records for the nationally rare orange and black spotted nudibranch sea slug (*Thecacera peregrina*) and the uncommon ghost sea slug (*Okenia adspersa*). These records were verified by the marine biologist divers on the trip.

The wrecks of the Strombus and Oxwich Bay provide substrata raised above the generally low lying and sediment affected rock of the seabed. They harbour species that are not found or that are uncommon elsewhere including the spiny antler sponge (*Raspailia hispida*) and the white hedgehog sponge, (*Polymastia mamillaris*), dead man's fingers (*Alcyonium digitatum*) and plumose anemones (*Metridium senile*). The

Oxwich Bay wreck provides the only known locality for the Devonshire Cup Coral (*Caryophyllia smithii*) along this coast and is also home to some large conger eels and in the summer to ocean trigger fish (*Balistes balistes*).

The mixed seaweed and faunal turf communities in current swept shallow water (between the Mumbles and Oxwich Bay) were rich and interesting, and where dissected by deep gullies were exceptionally species rich (for example those at Hunts Bay site 5/95). Within Oxwich Bay, the large areas of sand inundated bedrock had very good examples of sand tolerant seaweed communities with species such as red rose grass weed (*Rhodothamniella floridula*), little forked worm weed (*Furcellaria lumbricalis*), slender red filament weed (*Gracilaria gracilis*), red bottlebrush weed (*Halurus equisetifolius*) and many similar rounded frond weed (*Polyides rotundus*) present.

The extensive beds of mussel (*Mytilus edulis*) on the exposed coast between Porth Eynon and Worms Head were a dramatic feature of the shallow subtidal. Although mussels far outweighed any other species in terms of numbers and biomass, the area was very species rich with other life forms present in low abundance. The richness of fauna associated with mussel beds is well document from intertidal areas (Swane and Setyobudiandi, 1996, Seed *et* al, 2000) and the same seems to be true on subtidal rock.

4.2 Appraisal of Methods

4.2.1 Conditions Encountered During the Survey

Most of the survey area would be impossible to dive without use of boats and requires exceptionally calm sea conditions. The survey was fortunate to have very good sea conditions at the time of the survey. The waters along the Gower Coast are fairly turbid in nature and this survey encountered exceptionally good visibility (up to 8m horizontally).

4.2.2 Seasearch survey methodology

The Seasearch methodology (according to Foster-Smith, 1995) has proved to be a robust survey method capable of producing data, which gives a broad overview of the marine habitats and communities of the Gower area. As with Stackpole Seasearch (Bunker, 2001), this survey was fortunate in attracting many marine biologists to join the Seasearch events, which greatly enhanced both the quality and quantity of data collected. A detailed record from a pair of divers including a marine biologist gives credence to the data of other amateur biologist surveyors working nearby.

5 Recommendations for Further Work

This study has highlighted several areas, which justify further investigation, and these are listed below:

- The rich algal faunal turfs between the Mumbles and Pwlldu head and the sand influenced algal communities in Oxwich Bay both deserve further study by marine biologists.
- The sea caves along the coast were not studied during this survey but could be worth further investigation (although none of these occur within the Carmarthen Bay and Estuaries cSAC).

- The deeper water rock communities off East Helwick mentioned in Hiscock, 1979 were not studied during this survey and deserve further study.
- The extent and dynamics of the mussel (*Mytilus edulis*) dominated communities between Porth Eynon and the Mumbles are of interest and warrant further study.

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7 Acknowledgements

This report would not have been possible without the tireless efforts of Suzanne Hart who organised every stage of the survey and who has been a great supporter of Seasearch in Wales.

The author would also like to thank those members of Swansea Sub-Aqua Club who provided boats for the survey.

Special thanks to all the volunteer divers who gave their time to work on this project: Michelle Bouin, Mark Burton, Colin Deller, Delyth Grady, Paul Kay, Lucy Kay (neé Gilkes), Alistair Law, Kate Lock, Iain Park, Amanda Perrins (neé Holloway), Sarah Hughes, James Perrins, Dale Rostron, Peter Taylor, Emma Taylor and Suzanne Hart.

Thank you to Phil Coates of South Wales Sea Fisheries Committee for providing information on the inshore fisheries of the area and Dr Kate Smith of CCW for references relating to the importance of populations of *Mytilus edulis*. Also to Ivor Johnson for information on the position of the Strombus wreck.

Particular thanks go to Dr Kirsten Ramsay and Anne Bunker of CCW and Adam Cooper of Carmarthen Bay and Estuaries SAC, for commenting on draft versions of the report.

Appendix 1

Example of a recording form used during this study (side 1 and 2 of form):

Side 1

Site form: See Delyth + Alistair's 10/95

JOINT NATURE CONSERVATION COMMITTEE

SEASEARCH

Marine Nature Conservation Review

SEASEARCH is run by the Marine Conservation Society on behalf of the Joint Nature Conservation Committee

MARINE CONSERVATION SOCIETY

9/95 attached

DIVE RECORDING FORM

Survey name: Gower survey Date of dive: 24/5/95

Site name: Doctor Rise' Site number: Dive number:

Name and address of recorder: P. Kay & L. Gilkes, 2 FRON PANT, POOL ST, LLANFAIRFECHAN, GWYNEDD LL33 0TW

Site location: use one of the following:- OS grid reference; latitude/longitude; Decca:

Time of dive (24hr clock please): Start: Finish: Duration: 52 mins

Depth range below sea level: From: 5m To: 9m

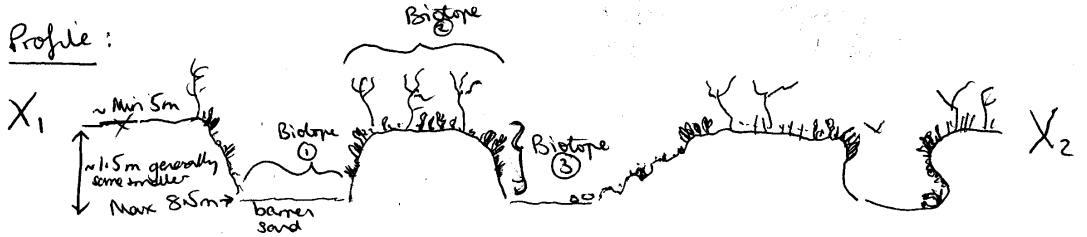
Depth range below chart datum (if known): From: To:

Underwater visibility: ~ 8m at start, decreasing to ~5m towards end.

Sketch:

Please sketch your dive plan (map) and profile. Draw any habitats, communities or peculiar features marking depths. Indicate positions corresponding to your written habitat descriptions (see reverse side of form).

Profile:



See over →

Side 2

Dive Description:

Describe the following four points for each habitat you wish to describe. Try to use terms in the Guidance Notes. Please start with the shallowest (where applicable); number your habitats and indicate their positions on the sketch map and profile.

1. Sea floor type (substratum). **2. Depth** (range) of each habitat. **3. Communities** (describe conspicuous species and those which are most numerous; what is the general appearance of the community?). **4. Any special features** that might influence the community (e.g., silt, urchin grazing).

(1) 1. Medium barren sand in bottom of gullies, from ~6m to 8.5m
2. 6m to 8.5m
3. No visible burrows or other species.
4.

(2) 1. limestone bedrock – large mounds of bedrock with gullies (horizontal top surfaces) running N→S and also E→W where the blocks of limestone have split.
2. ~5m to .7m
3. On top surfaces of bedrock: Kelp (Laminaria hyperborea) in places, quite dense in others more like a kelp park. Kelp stands quite short ~50cm high. Under kelp and dense algal turf of red and green algae.

(3) 1. limestone bedrock – vertical side surfaces of the gullies. In places these had overhangs and horizontal crevices ~6cm high running the length of the bedrock 'trough 'mound'.
2. 5m to 8.5m. ~~Gullies generally ~1.5m deep. Rock + green algae in top scour; mixed~~
3. Red + green algae in top part of vertical surfaces, leading into mixed low faunal turf dominated by ascidians in most places; and short hydroid turf in bottom part (likely to be affected by scour from sand).
Species scour roughly 10'd)
- Red + green algae: Ploconium sertularium, Polyeorpus, Dasydoa grossularia
- Mixed low faunal turf: Botryllus, Botrylloides, Morchellium argus, clavelina, Serpulid worms, Phoronis, Crumb, sponges, Nemertesia antenna, Urticina felina, v. small Alcyonium digitatum
In places some Mytilus edulis, Pyura tessellata (v. small ones), Asterias rubens
- In horizontal crevices: Cancer pagurus, Aporrhais pes-pelecani, Homarus gammarus, very small one (~10cm total length), Palaemon serratus, Labrus bergylta, quite a lot of large Blennius gattorugine. Group of mysids.
- Under overhangs: 1x Chalmys distorta (curved in sponge)

Appendix 2

The table below lists the common and Latin Names of species compiled by the author for use in the Seasearch Project (not only this report). The following protocol was used when devising this name list:

- The primary source of common names was the official CCW list (Roberts, S. 2001).
- If the name was not present in the above, the Marine Conservation Society Guide to Inshore Marine Life (Erwin and Picton, 1987) was consulted.
- If the name was not present in either of the above the following authoritative texts were consulted eg Sea anemones (Gosse, P.H., 1860) and Crabs (Ingle, 1980).
- If no name could be found, then the author made up a name, which appropriately described the animal (from a Latin derivation of appropriate). A list was drawn up for the Stackpole Quay Seasearch report (Bunker, 2001) using these protocols. This list was used and added to for Gower Seasearch.

If no name could be found, then the author made up a name, which appropriately described the animal.

Common Name	**Latin Name**
Sponges	**Porifera**
breadcrumb sponge	*Halichondria panicea*
translucent breadcrumb sponge	*Halichondria bowerbanki*
hairy antler sponge	*Raspailia ramosa*
spiny antler sponge	*Raspailia hispida*
yellow white hedgehog sponge	*Polymastia boletiformis*
white hedgehog sponge	*Polymastia mamillaris*
bread crumb sponge	*Halichondria panicea*
blueberry sponge	*Terpios fugax*
yellow stag horn sponge	*Axinella dissimilis*
white lace sponge	*Clathrina coriacea*
elephants ear sponge	*Pachymatisma johnstonia*
black cave sponge	*Dercitus bucklandi*
pink wisp sponge	*Hymeniacidon perleve*
orange wisp sponge	*Esperiopsis fucorum*
boring sponge	*Cliona celata*
white spiky sponge	*Dysidea fragilis*
branched holey sponge	*Haliclona oculata*
golf ball sponge	*Tethya aurantium*
guarded flask sponge	*Scypha ciliata*
velvet dome sponge	*Suberites carnosus*
rough dome sponge	*Suberites ficus*
honeycomb sponge	*Hemimycale columella*
brain sponge	*Axinella damicornis*
pencil sponge	*Ciocalypta penicillus*
Coelenterata	**Sea firs, anemones, jellyfish and corals**
red specked pimplet anemone	*Anthopleura balli*
spiralled sea fir	*Hydrallmania falcata*
smooth dahlia anemone	*Urticina eques*
night anemone	*Halcampoides elongatus*
transparent tentacled anemone	*Sagartiogeton undatus*

Common Name	**Latin Name**
cave dwelling anemone	*Sagartia troglodytes*
delicate anemone	*Sagartia elegans*
snowy anemone	*Sagartia elegans* var. *nivea* (all white):
scarlet fringed anemone	*Sagartia elegans* var. *miniata* (with a patterned disk)
rosy anemone	*Sagartia elegans* var. *rosea* (purple variety)
orange-disked anemone	*Sagartia elegans* var. *venusta* (orange disk)
eel grass sea fir	*Laomedea angulata*
daisy anemone	*Cereus pedunculatus*
starlet sea anemone	*Nematostella vectensis*
phosphorescent sea pen	*Pennatula phosphorea*
slender sea pen	*Funiculina quadrangularis*
stiff sea pen	*Virgularia mirabilis*
kelp sea fir	*Obelia geniculata*
dead man's fingers	*Alcyonium digitatum*
northern sea fan	*Swiftia pallida*
broad sea fan	*Eunicella verrucosa*
Devonshire cup coral	*Caryophyllia smithii*
oaten-pipes sea fir	*Tubularia indivisa*
jewel anemone	*Corynactis viridis*
olive-green wart anemone	*Phellia gausapata*
white trumpet anemone	*Parazoanthus anguicomus*
furrowed creeplet	*Parazoanthus axinellae*
sandy creeplet	*Epizoanthus couchii*
chocolate star anemone	*Isozoanthus sulcatus*
pink soft coral	*Parerythropodium corallioides*
Weymouth carpet coral	*Hoplangia durotrix*
trumpet anemone	*Aiptasia mutabilis*
beadlet anemone	*Actinia equina*
short white weed	*Sertularia argentea*
white weed	*Sertularia cupressina*
thick-branched feather sea fir	*Halecium halecinum*
northern yellow feather sea fir	*Halecium muricatum*
encrusted feather sea fir	*Abietinaria abietina*
straight antenna sea fir	*Nemertesia antennina*
branched antenna sea fir	*Nemertesia ramosa*
white candy striped anemone	*Actinothoe sphyrodeta*
zigzag kelp sea fir	O*belia geniculata*
delicate sea fir	*Diphasia* sp.
ghost sea fir	*Corymorpha nutans*
the white zigzag sea fir	*Sertularella polyzonias*
downy sea fir	*Kirchenpaueria pinnata*
stalked sea fir	*Corymorpha nutans*
Platyhelminthes	
candy-striped flat worm	*Prostheceraeus vittatus*
Annelida	**True Worms**
mole-nosed mudworm	*Scoloplos armiger*
sand mason worm	*Lanice conchilega*
sugar cone worms	*Lagis* spp.
white cat worm	*Nephtys cirrosa*
white abra	*Abra alba*
fan mussel	*Atrina fragilis*
lug worm	*Arenicola marina*
two-horned sandworm	*Scolelepis squamata*
the gallery worm	*Capitella capitata*

Common Name	**Latin Name**
lug worm	*Arenicola marina*
peacock worm	*Sabella pavonia*
reef sandworm	*Sabellaria alveolata*
subtidal reef sandworm	*Sabellaria spinulosa*
ridged toothpaste worm	*Pomatoceros triqueter*
smooth toothpaste worm	*Pomatoceros lamarckii*
limestone fan worm	*Pseudopotamilla reniformis*
tentacled limestone worm	*Polydora* sp.
Crustacea	**Crabs, Prawns and Shrimps**
spike barnacle	*Balanus crenatus*
common shrimp	*Crangon vulgaris*
green estuary shrimps	*Gammarus zaddachi*
shore crab	*Carcinus maenas*
common shrimp	*Crangon vulgaris*
sand-digger shrimp	*Bathyporeia pelagica*
bulldozer shrimp	*Haustorius arenarius*
speckled sea-louse	*Eurydice pulchra*
Goodsir's shrimp-tadpole	*Cumopsis goodsiri*
lagoon mud shrimp	*Corophium insidiosum*
crab sponge	*Suberites pagurorum*
scampi prawn	*Nephrops norvegicus*
acorn barnacle	*Semibalanus balanoides*
shore crab	*Carcinus maenas*
sea toad	*Hyas araneus*
spiny spider crab	*Maia squinado*
long legged spider crab	*Macropodia rostrata*
masked crab	*Corystes cassivelaunus*
circular crab	*Atelecyclus rotundus*
edible crab	*Cancer pagurus*
velvet swimming crab	*Liocarcinus puber*
harbour crab	*Liocarcinus depurator*
common mud tube shrimps	Jassidae indet.
ghost shrimps	Caprellidae indet.
Molluscs	**Snails, Seaslugs, Bivalves, Octopus and Squid**
limpets	*Patella vulgata*
red-nosed piddock	*Hiatella arctica*
common piddock	*Pholas dactylus*
edible periwinkle	*Littorina littorea*
purple topshell	*Gibbula umbilicalis*
northern octopus	*Eledone cirrhosa*
horse mussel	*Modiolus modiolus*
queen scallops	*Aequipecten opercularis*
edible mussel	*Mytilus edulis*
trough shells	*Spisula* and *Mactra* species
razor shells	*Ensis* sp
sea tellin	*Tellina fabulina*
common nut shell	*Nucula nitidosa*
edible cockle	*Cerastoderma edule*
native oyster	*Ostrea edulis*
peppery furrow shell	*Scrobicularia plana*
mud snail	*Hydrobia ulvae*
edible cockle	*Cerastoderma edule*
edible mussel	*Mytilus edulis*
lagoon sea slug	*Tenellia adspersa*
yellow lined kelp sea slug	*Polycera quadrilineata*

Common Name	**Latin Name**
yellow prickled sea slug	*Crimora papillata*
lagoon mud snail	*Hydrobia ventrosa*
lagoon cockles	*Cerastoderma glaucum*
edible mussel	*Mytilus edulis*
horse mussel	*Modiolus modiolus*
white-ruffed sea-slug	*Aeolidiella alderi*
orange and black spotted nudibranch	*Thecacera peregrina*
thin tellin	*Angulus tenuis*
blue rayed limpet	*Helcion pellucidum*
grey topshell	*Gibbula cineraria*
painted topshell	*Calliostoma zizyphinum*
toothed top shell	*Monodonta lineata*
European cowry	*Trivia monacha*
dog whelk	*Nucella lapillus*
netted whelk	*Hinia reticulata*
sea hare	*Aplysia punctata*
dog cockle	*Glycymeris glycymeris*
razor shell	*Ensis* sp.
distorted scallop	*Chlamys distorta*
common cuttlefish	*Sepia officinalis*
sea lemon	*Archidoris pseudoargus*
red and black streaked doto	*Doto dunnei*
black spotted doto	*Doto pinnatifida*
ghost sea slug	*Okenia aspersa*
Bryozoa	**Sea Mats**
lagoon lace-mat	*Conopeum seurati*
orange dome seamat	*Cellepora pumicosa*
matchstick seamat	*Cellaria spp*
kelp seamat	*Membranipora membranacea*
ross coral	*Pentapora foliacea*
grey horn wrack	*Flustra foliacea*
yellow Christmas tree seamat	*Bugula turbinata*
white Christmas tree seamat	*Bugula plumosa*
flat Christmas tree seamat	*Bugula flabellata*
jelly fingers	Alcyonidium diaphanum
white moss seamat	Crisiidae indet
hairy seamat	*Electra pilosa*
Phoronida	Horseshoe Worms
white horseshoe worm	*Phoronis hippocrepia*
Echinodermata	**Starfish, Brittlestars, Sea Urchins and Sea Cucumbers**
common brittle star	*Ophiothrix fragilis*
slender-armed brittle star	*Amphiura filiformis*
mottled-brown brittlestar	*Ophiura ophiura*
dwarf brown seacucumber	*Ocnus planci*
shell gravel sea cumber	*Neopentadactyla mixta*
black brittle star	*Ophiocomina nigra*
common heart urchin	*Echinocardium cordatum*
feather star	*Antedon bifida*
sun star	*Crossaster papposus*
bloody henry	*Henricia oculata*
common starfish	*Asterias rubens*
spiny starfish	*Marthasterias glacialis*
sea urchin	*Echinus esculentus*

Common Name	**Latin Name**
cotton spinner	*Holothuria forskali*
Ascidiacea	**Sea squirts**
red gooseberry sea squirt	*Dendrodoa grossularia*
red pimple sea squirt	*Distomus variolosus*
orange gooseberry sea squirt	*Stolonica socialis*
gut squirt	*Ciona intestinalis*
star sea squirt	*Botryllus schlosseri*
linear colonial sea squirt	*Botrylloides leachii*
light bulb sea squirt	*Clavelina lepadiformis*
football sea squirt	*Diazona violacea*
blue-mouthed red sea squirt	*Polycarpa scuba*
yellow rimmed sea squirt	*Ciona intestinalis*
pink colonial sea squirt	*Distaplia rosea*
pigmented mucus mat sea squirt	*Diplosoma listerianum*
gelatinous mucus mat sea squirt	*Diplosoma spongiforme*
large colonial sandy sea squirt	*Polyclinum aurantium*
Small colonial sandy sea squirt	*Aplidium densum*
flat-lobed colonial sea squirt	*Aplidium proliferum*
orange spot club sea squirt	*Aplidium punctum*
no spot club sea squirt	*Morchellium argus*
hard small pored hard sea squirt	*Didemnum maculosum*
hard lacey sea squirt	*Lissoclinum perforatum*
gas mantle sea squirt	*Corella parallelogramma*
Fluted siphoned sea squirt	*Ascidiella aspersa*
striped siphoned sea squirt	*Ascidiella scabra*
thick coated sea squirt	*Ascidia mentula*
Korean sea squirt	*Styela clava*
teapot sea squirt	*Polycarpa pomaria*
yellow pin-head sea squirt	*Pycnoclavella aurilucens*
flat topped white colonial sea squirt	*Sidnyum* sp.
Pices	**Fish**
Dogfish	*Scyliorhinus canicula*
flounder	*Platichthys flesus*
tompot blenny	*Parablennius gattorugine*
salmon	*Salmo salar*
sea trout	*Salmo trutta*
alis shad	*Alosa alosa*
twaite shad	*Alosa fallax*
cuckoo wrasse	*Labrus mixtus*
pollock	*Pollachius pollachius*
whiting	*Merlangius merlangus*
conger eel	*Conger conger*
the trigger fish	*Balistes capriscus*
the scorpion fish	*Taurulus bubalis*
angler fish	*Lophias piscatorius*
sand eels	*Ammodytes* sp.
the grey gurnard	*Eutrigla gurnardus*
Chlorophyta	**Green Seaweeds**
slubweed weed (or gut weed?)	*Enteromorpha* sp
emerald cave weed	*Pseudoclonium submarinum*
bushy green weed	*Cladophora* sp
Phyophaeta	**Brown Seaweeds**
long bladdered wrack	*Fucus ceranoides*

Common Name	**Latin Name**
bladder wrack	*Fucus vesiculosus*
egg wrack	*Ascophyllum nodosum* ecad *mackii*
egg wrack	*Ascophyllum nodosum*
northern kelp	*Laminaria hyperborea*
brown feather weed	*Halopteris filicina*
penny weed	*Zanardinia prototypus*
brown bottlebrush weed	Cladostephus spongiosus
bush brown feathers	*Halopteris scoparia*
forked ribbons	*Dictyota dichotoma*
tangle	*Laminaria digitata*
sea belt	*Laminaria saccharina*
furbelows	*Saccorhiza polyschides*
dabber locks	*Alaria esculenta*
mermaid's tresses	*Chorda filum*
pod weed	*Halidrys siliquosa*
landladies wig	*Desmarestia aculeata*
Red Seaweeds	**Rhodophyta**
red rose grass weed	*Rhodothamniella floridula*
slender red filament weed	*Gracilaria gracilis*
false forking leaf bearer	*Phyllophora pseudoceranoides*
little forked worm weed	*Furcellaria lumbricalis*
red-teat weed	*Scinaia* spp.
interrupted rib-weed	*Stenogramme interrupta*
pink paint weeds	Corallinaceae indet
diaphanous spotted weed	*Nitophyllum punctatum*
brandy paint weed	*Hildenbrandia rubra*
coral weed	*Corallina officinalis*
red jelly seaweed	*Schmitzia hiscockiana*
red feather weed	*Heterosiphonia plumosa*
flat tentacle weed	*Calliblepharis ciliata*
round-based red antler weed	*Polyides rotundus*
many-siphoned weeds	*Polysiphonia spp.*
pointed membranous rib weed	*Hypoglossum hypoglossoides*
rounded membranous rib weed	*Apoglossum ruscifolium*
cock's comb	*Plocamium cartilagineum*
toothed vein weed	*Erythroglossum laciniatum*
iridescent ruffle weed	*Cryptopleura ramosa*
red kidney weed	*Kallymenia reniformis*
red-wedge fan weed	*Callophyllis laciniata*
black wire weed	*Ahnfeltia plicata*
spiralled sand weed	*Rhodomela confervoides*
spiralled four-siphoned weed	*Polysiphonia stricta*
smelly siphon weed	*Polysiphonia foetidissima*
elongated siphon weed	*Polysiphonia elongata*
reattaching glow weed	*Drachiella spectabilis*
red rags	*Dilsea carnosa*
red leaf weed	*Delesseria sanguinea*
erect sand weed	*Cordylecladia erecta*
red lichen weed	*Radicilingua thysanorhizans*
red bottlebrush weed	*Halurus equisetifolius*
thin red bottlebrush weed	*Sphondylothamnion multifidum*
red ghost weed	*Aglaothamnion byssoides*
dulse	*Palmaria palmata*
red oak weed	*Phycodrys rubens*
Irish moss	*Chondrus crispus*

Common Name	Latin Name
Lichens	
yellow dust lichens	*Caloplaca marina*
black paint lichen	*Verrucaria* sp. (black)
Higher Plants	
sea pink	*Armeria maritima*
sea lavender	*Limonium* spp.
eel grass	*Zostera marina*
eel grass	*Zostera* spp.
tassel weed	*Ruppia* species
fox-tailed stonewort	*Lamprothamnion pustulosum*
eel grass	*Zostera marina*
intertidal eel grass	*Zostera* spp.

Appendix 3

All the species records from the sites described in this report are included below. The Latin names for species are given and these follow the nomenclature of the MCS species directory; Howson and Picton (1999).

Species	Site Numbers									
Site number	1/95				2/95	3/95			4/95	5/95
Habitat number	1	2	3	4	1	1	2	3	1	1
PORIFERA										
Porifera indet.						P	P	P		
PORIFERA – Calcarea										
Leucosolenia botryoides										P
Scypha sp										
Scypha ciliata										
Clathrina coriacea										
PORIFERA – Demospongiae										
Tethya aurantium					P					P
Suberites ficus										
Suberites carnosus									P	P
Polymastia mamillaris					P				P	
Cliona celata			P	P					P	
Axinellidae indet						P	?			
Axinella dissimilis				P						
Stelligera stuposa										P
Raspailia sp										
Raspailia hispida										
Raspailia ramosa										P
Halichondria panicea				P					P	P
Halichondria bowerbanki										P
Esperiopsis fucorum									P	P
Myxilla incrustans										
Haliclona sp.			P	P						
Haliclona oculata										P

Species	Site Numbers									
Site number	1/95				2/95	3/95			4/95	5/95
Habitat number	1	2	3	4	1	1	2	3	1	1
Haliclona urceolus										?
Dysidea fragilis				P	P					P
Dercitus bucklandi										P
Hymeniacidon perleve										P

Species	Site Numbers									
Site number	1/95				2/95	3/95			4/95	5/95
Habitat number	1	2	3	4	1	1	2	3	1	1
Porifera indet. (crusts)					P					
Translucent blue crust										P
Hymeniacidon perleve										
Slimy white sponge										
CNIDARIA - Hydrozoa										
Hydroid indet.		P		P					P	
Corymorpha nutans										
Tubularia indivisa									R	
Halecium beanii										P
Halecium muricatum										P
Aglaophenia pluma										P
Nemertesia sp						P		P		
Nemertesia antennina			P	P	P				P	P
Nemertesia ramosa			P	P	P				P	
Hydrallmania falcata										
Sertularia argentea										
Sertularella polyzonias										
Obelia dichotoma										
CNIDARIA - Anthozoa										
Anthozoa indet.										
Caryophyllia smithii										
Alcyonium digitatum				P		P			P	
Epizoanthus couchii									?	
Isozoanthus sulcatus										P
Bunodactis verrucosa										
Urticina felina				P	P				P	P
Metridium senile					P					
Sagartia sp.						P		P		
Sagartia elegans				P						

Species	Site Numbers									
Site number	1/95				2/95	3/95			4/95	5/95
Habitat number	1	2	3	4	1	1	2	3	1	1
Sagartia troglodytes										
Cereus pedunculatus										
Actinothoe sphyrodeta										
Edwardsia sp				P						
NEMERTEA										
Lineus longissimus				P						
PLATYHELMINTHES										
Prothoceraeus vittatus										
ANNELIDA - Polychaeta										
Lanice conchilega			P	P			P			
Bispira volutacornis										P
Sabellidae indet.		P				?	?			P
Serpulidae indet.										
Pomatoceros sp.		P								
Salmacina dysteri										P
Phyllodocidae indet.										
Sabellaria spinulosa										
CRUSTACEA - Cirripedia										
Cirripedia indet.		P					P			
Balanus crenatus										P
CRUSTACEA - Isopoda										
Isopoda indet.										
Caprellidae indet.										P
Dyopedos porrectus										
Jassidae indet.										

Species	Site Numbers									
Site number	1/95				2/95	3/95			4/95	5/95
Habitat number	1	2	3	4	1	1	2	3	1	1
CRUSTACEA - Malacostraca										
Mysidiacea indet.					P					P
Homarus gammarus			P							
Paguridae indet.										
Pagurus bernhardus										
Decapoda indet.					P					
Cancer pagurus			P		P	P	P		P	P
Carcinus maenas										
Inachinae indet.							P			
Inachus sp.										
Inachus dorsettensis										
Hyas araneus										
Portunidae indet.							P			
Pisidia longicornis										
Macropodia sp.										
Macropodia rostrata										
Liocarcinus sp.										
Liocarcinus depurator										
Necora puber			P		P	P			P	P
Maia squinado										
Pisa armata										
Natantia indet. (prawn)										
Palaemon serratus										
MOLLUSCA - Gastropoda										
Patella sp.										
Gibbula cineraria										
Trivia sp.			P							
Nucella lapillus										
Hinia incrassata										

Species	Site Numbers									
Site number	1/95				2/95	3/95			4/95	5/95
Habitat number	1	2	3	4	1	1	2	3	1	1
Crepidula fornicata										
Mollusca - Opistobranchia										
Nudibranchia indet.										
Doto sp					P					
Doto fragilis			P	P						
Doto dunnei										P
Doto pinnatifida										P
Janolus cristatus										
Flabellina pedata					?					
Flabellina sp										
Facelina sp			P							
Coryphella browni										
Archidoris pseudoargus										
Polycera sp.										
Polycera quadrilineata										P
Thecacera peregrina										
Okenia aspersa (eggs)										
Aeolidia papillosa										
Crimora papillata										
Mollusca - Pelecypoda										
Ostrea edulis										
Mytilus edulis										
Chlamys distorta										P
MOLLUSCA - Cephalopoda										
Sepia officinalis										

Species	Site Numbers									
Site number	1/95				2/95	3/95			4/95	5/95
Habitat number	1	2	3	4	1	1	2	3	1	1
BRYOZOA										
Bryozoa indet.				P	P					
Bryozoa indet. (encrusting)										
Bowerbankia citrina										
Alcyonidium diaphanum			P		P					P
Membranipora membranacea										
Electra pilosa										P
Flustra foliacea				P						
Securiflustra securifrons										
Chartella papyracea										
Bugula sp.					P					
Bugula flabellata										
Bugula plumosa				P				P		P
Bugula turbinata										P
Bicellariella ciliata										P
Scrupocellaria sp.										P
Cellaria sinuosa			P							
Parasmittina trispinosa										
PHORONIDA										
Phoronis hippocrepia		P	P							P
ECHINODERMATA										
Antedon bifida				P						
Asterias rubens										
Marthasterias glacialis										
Ophiuroidea indet.								P		
Amphipholis squamata										
Ophiothrix fragilis										
Aslia lefevrei										P

Species	Site Numbers									
Site number	1/95				2/95	3/95			4/95	5/95
Habitat number	1		3	4	1	1	2	3	1	1
CHORDATA / TUNICATA - Ascidiacea										
Ascidiacea indet.				P					P	
Clavelina lepadiformis			P		P	P		P	P	P
Polyclinum aurantium										
Morchellium argus			P	P						P
Sidnyum sp.										
Sidnyum turbinatum										P
Aplidium sp.					P					
Aplidium densum										
Aplidium punctum				P						
Orange Polyclinidae										P
Didemnidae indet.										
Didemnum maculosum										
Distaplia rosea										P
Diplosoma spongiforme										
Ascidiella aspersa										
Polycarpa pomaria										P
Polycarpa scuba										P
Polycarpa sp.										
Dendrodoa grossularia										
Distomus variolosus										P
Botryllus schlosseri			P	P	P			P		
Botrylloides leachi				P						P
Molgula manhattensis										
CHORDATA - Chondrichthyes										
Scyliorhinus canicula								P	P	

Species	Site Numbers									
Site number	1/95				2/95	3/95			4/95	5/95
Habitat number	1	2	3	4	1	1	2	3	1	1
CHORDATA - Osteichthyes										
Pollachius pollachius										
Pollachius virens										
Trisopterus minutus										
Taurulus bubalis										
Myoxocephalus scorpius										
Dicentrarchus labrax										
Ctenolabrus rupestris										
Ctenolabrus melops										P
Labridae indet.										
Labrus bergylta										
Parablennius gattorugine				P					P	
Callionymus lyra										
Gobiidae indet.										
Gobiusculus flavescens										
Pleuronectidae indet.										
Pleuronectes platessa										
Microstomus kitt										
Rockling (species not recorded)										
Conger conger										
Balistes capriscus										
Merlangius merlangus										
Lophius piscatorius										
Agonus cataphractus										
Aspitrigla cuculus								P		
Eutrigla gurnardus										
Trigla lucerna										
Pleuronectidae indet.	P									

Species	Site Numbers									
Site number	1/95				2/95	3/95			4/95	5/95
Habitat number	1	2	3	4	1	1	2	3	1	1
RHODOPHYTA										
Rhodophycota indet.								P	P	
Porphyra sp.										
Corallinaceae indet. (crusts)										
Corallina officinalis										
Audouinella sp.										
Furcellaria lumbricalis										
Polyides rotundus										
Cystoclonium purpureum										
Gracilaria gracilis										
Palmaria palmata										
Mastocarpus stellatus / Chondrus crispus			P							
Chondrus crispus										
Rhodymenia sp										P
Rhodymenia holmesii										
Rhodymenia pseudopalmata										
Plocamium cartilagineum			P		P					P
Calliblepharis ciliata										P
Ceramium sp.										P
Cryptopleura ramosa										P
Delesseria sanguinea										P
Hypoglossum hypoglossoides									P	P
Heterosiphonia plumosa										
Drachiella sp.										
Drachiella heterocarpa										P
Drachiella spectabilis			P							
Rhodomela confervoides										
Erythroglossum laciniatum										P
Phyllophora pseudoceranoides										
Halurus equisetifolius										

Species	Site Numbers									
Site number	1/95				2/95	3/95			4/95	5/95
Habitat number	1	2	3	4	1	1	2	3	1	1
PHAEOPHYTA										
Dictyota dichotoma										P
Desmarestia ligulata										
Laminaria hyperborea										
Laminaria saccharina										
Fucus serratus										
Ectocarpaceae indet.										
CHLOROPHYTA										
Chlorophyta indet.			P							
Cladophora pellucida										
Ulva sp.			P							
Chaetomorpha sp.										

Species											
Site number	6/95			7/95			8/95	9/95	10/95		
Habitat number	1	2	3	1	2	3	1	1	1	2	3
PORIFERA											
Porifera indet.	P					P					P
PORIFERA - Calcarea											
Leucosolenia botryoides											
Scypha sp							P				
Scypha ciliata											
Clathrina coriacea											
PORIFERA - Demospongiae											
Tethya aurantium							P				
Suberites ficus											
Suberites carnosus											
Polymastia mamillaris		P									
Cliona celata		P						P			
Axinellidae indet											
Axinella dissimilis								P			
Stelligera stuposa											
Raspailia sp		P									
Raspailia hispida											
Raspailia ramosa											
Halichondria panicea		P									
Halichondria bowerbanki											
Esperiopsis fucorum											
Myxilla incrustans											
Haliclona sp.											
Haliclona oculata											
Haliclona urceolus											
Dysidea fragilis		P					P				
Dercitus bucklandi											
Hymeniacidon perleve											
Porifera indet. (crusts)											

Species											
Site number	6/95			7/95			8/95	9/95	10/95		
Habitat number	1	2	3	1	2	3	1	1	1	2	3
Translucent blue crust											
Hymeniacidon perleve											
Slimey white sponge											
CNIDARIA - Hydrozoa											
Hydroid indet.							P				
Corymorpha nutans											
Tubularia indivisa											
Halecium beanii											
Halecium muricatum											
Aglaophenia pluma											
Nemertesia sp			P								
Nemertesia antennina	P						P				P
Nemertesia ramosa											
Hydrallmania falcata											
Sertularia argentea											
Sertularella polyzonias											
Obelia dichotoma											
CNIDARIA - Anthozoa											
Anthozoa indet.											
Caryophyllia smithii											
Alcyonium digitatum			P								P
Epizoanthus couchii	P										
Isozoanthus sulcatus											
Bunodactis verrucosa											
Urticina felina		P									P
Metridium senile											
Sagartia sp.											
Sagartia elegans											

Species											
Site number	6/95			7/95			8/95	9/95	10/95		
Habitat number	1	2	3	1	2	3	1	1	1	2	3
Sagartia troglodytes											
Cereus pedunculatus											
Actinothoe sphyrodeta											
Edwardsia sp											
NEMERTEA											
Lineus longissimus											
PLATYHELMINTHES											
Prothoceraeus vittatus											
ANNELIDA - Polychaeta											
Lanice conchilega											
Bispira volutacornis											
Sabellidae indet.											
Serpulidae indet.											P
Pomatoceros sp.											
Salmacina dysteri											
Phyllodocida indet.											
Sabellaria spinulosa											
CRUSTACEA - Cirripedia											
Cirripedia indet.	P			P	P						
Balanus crenatus											
CRUSTACEA - Isopoda											
Isopoda indet.											
Caprellidae indet.											
Dyopedos porrectus											
Jassidae indet.											

Species											
Site number	6/95			7/95			8/95	9/95	10/95		
Habitat number	1	2	3	1	2	3	1	1	1	2	3
CRUSTACEA - Malacostraca											
Mysidiacea indet.											P
Homarus gammarus	P										P
Paguridae indet.											
Pagurus bernhardus											
Decapoda indet.											
Cancer pagurus		P									P
Carcinus maenas											
Inachinae indet.											
Inachus sp.											
Inachus dorsettensis											
Hyas araneus											
Portunidae indet.											
Pisidia longicornis											
Macropodia sp.											
Macropodia rostrata											
Liocarcinus sp.											
Liocarcinus depurator											
Necora puber		P			P						P
Maia squinado											P
Pisa armata											
Natantia indet. (prawn)											
Palaemon serratus											P
MOLLUSCA - Gastropoda											
Patella sp.				P							
Gibbula cineraria											
Trivia sp.											P
Nucella lapillus											

Species											
Site number	6/95			7/95			8/95	9/95	10/95		
Habitat number	1	2	3	1	2	3	1	1	1	2	3
Hinia incrassata											
Crepidula fornicata											
Mollusca - Opistobranchia											
Nudibranchia indet.			P								
Doto sp			P								
Doto fragilis											
Doto dunnei											
Doto pinnatifida											
Janolus cristatus											
Flabellina pedata											
Flabellina sp							P				
Facelina sp											
Coryphella browni											
Archidoris pseudoargus											
Polycera sp.							P				
Polycera quadrilineata											
Thecacera peregrina							P				
Okenia aspersa (eggs)											
Aeolidia papillosa											
Crimora papillata											
Mollusca - Pelecypoda											
Ostrea edulis											
Mytilus edulis											P
Chlamys distorta											P
MOLLUSCA - Cephalopoda											
Sepia officinalis											

Species											
Site number	6/95			7/95			8/95	9/95	10/95		
Habitat number	1	2	3	1	2	3	1	1	1	2	3
BRYOZOA											
Bryozoa indet.					P	P					
Bryozoa indet. (encrusting)											
Bowerbankia citrina											
Alcyonidium diaphanum											
Membranipora membranacea					P						
Electra pilosa											
Flustra foliacea											
Securiflustra securifrons											
Chartella papyracea											
Bugula sp.							P				
Bugula flabellata											
Bugula plumosa	P										
Bugula turbinata											
Bicellariella ciliata											
Scrupocellaria sp.											
Cellaria sinuosa											
Parasmittina trispinosa											
PHORONIDA											
Phoronis hippocrepia											p
ECHINODERMATA											
Antedon bifida											
Asterias rubens											P
Marthasterias glacialis											
Ophiuroidea indet.											
Amphipholis squamata											
Ophiothrix fragilis											
Aslia lefevrei											

Species											
Site number	6/95			7/95			8/95	9/95	10/95		
Habitat number	1	2	3	1	2	3	1	1	1	2	3
CHORDATA / TUNICATA - Ascidiacea											
Ascidiacea indet.	P				P	P					
Clavelina lepadiformis	P										P
Polyclinum aurantium											
Morchellium argus											P
Sidnyum sp.											
Sidnyum turbinatum											
Aplidium sp.											
Aplidium densum											
Aplidium punctum	P										
Orange Polyclinid											
Didemnidae indet.											
Didemnum maculosum											
Distaplia rosea											
Diplosoma spongiforme											
Ascidiella aspersa											
Polycarpa pomaria											
Polycarpa scuba											
Polycarpa sp.											P
Dendrodoa grossularia											P
Distomus variolosus											
Botryllus schlosseri	P						P				P
Botrylloides leachi											P
Molgula manhattensis											
CHORDATA - Chondrichthyes											
Scyliorhinus canicula							P				

Species											
Site number	6/95			7/95			8/95	9/95	10/95		
Habitat number	1	2	3	1	2	3	1	1	1	2	3
CHORDATA - Osteichthyes											
Pollachius pollachius											P
Pollachius virens											
Trisopterus minutus											
Taurulus bubalis											
Myoxocephalus scorpius											
Dicentrarchus labrax											P
Ctenolabrus rupestris											
Ctenolabrus melops											
Labridae indet.					P						
Labrus bergylta							P				
Parablennius gattorugine							P				P
Callionymus lyra											
Gobiidae indet.											
Gobiusculus flavescens											
Pleuronectidae indet.											
Pleuronectes platessa											
Microstomus kitt											
Rockling (species not recorded)											
Conger conger											
Balistes capriscus											
Merlangius merlangus											
Lophius piscatorius											
Agonos cataphractus											
Aspitrigla cuculus											
Eutrigla gurnardus											
Trigla lucerna											
Pleuronectidae indet.											

Species											
Site number	6/95			7/95			8/95	9/95	10/95		
Habitat number	1	2	3	1	2	3	1	1	1	2	3
RHODOPHYTA											
Rhodophycota indet.						P		P		P	P
Porphyra sp.											
Corallinaceae indet. (crusts)								P			
Corallina officinalis											
Audouinella sp.											
Furcellaria lumbricalis											
Polyides rotundus											
Cystoclonium purpureum											
Gracilaria gracilis											
Palmaria palmata											
Mastocarpus stellatus / Chondrus crispus											
Chondrus crispus											
Rhodymenia sp											
Rhodymenia holmesii											
Rhodymenia pseudopalmata											
Plocamium cartilagineum		P					P				P
Calliblepharis ciliata		P					P				
Ceramium sp.		P									
Cryptopleura ramosa		P									
Delesseria sanguinea		P									
Hypoglossum hypoglossoides											
Heterosiphonia plumosa		P									
Drachiella sp.		P			?						
Drachiella heterocarpa											
Drachiella spectabilis											
Rhodomela confervoides											
Erythroglossum laciniatum											
Phyllophora pseudoceranoides											
Halurus equisetifolius											

Species											
Site number	6/95			7/95			8/95	9/95	10/95		
Habitat number	1	2	3	1	2	3	1	1	1	2	3
PHAEOPHYTA											
Dictyota dichotoma											
Desmarestia ligulata											
Laminaria hyperborea					P			P		P	
Laminaria saccharina											
Fucus serratus					P						
Ectocarpaceae indet.											
CHLOROPHYTA											
Chlorophyta indet.				P						P	P
Cladophora pellucida											
Ulva sp.											
Chaetomorpha sp.											

Species											
Site number	11/95	12/95		13/95	14/95	15/95		16/95	17/95		18/95
Habitat number	1	1	2	1	1	1	2	1	1	2	1
PORIFERA											
Porifera indet.											
PORIFERA - Calcarea											
Leucosolenia botryoides											
Scypha sp		P									
Scypha ciliata					R						
Clathrina coriacea											P
PORIFERA - Demospongiae											
Tethya aurantium		P			O						
Suberites ficus	R										
Suberites carnosus											
Polymastia mamillaris		P				P					
Cliona celata	O			R	P	P					
Axinellidae indet						P					
Axinella dissimilis											
Stelligera stuposa											
Raspailia sp											
Raspailia hispida		P									
Raspailia ramosa											
Halichondria panicea	C	P		O	F	P					
Halichondria bowerbanki	O										
Esperiopsis fucorum	R				O						
Myxilla incrustans	O										
Haliclona sp.											
Haliclona oculata	P				F						
Haliclona urceolus											
Dysidea fragilis	O	P			R	P					
Dercitus bucklandi											
Hymeniacidon perleve	O			R	F						
Porifera indet. (crusts)	O	P				P					

Species											
Site number	11/95	12/95		13/95	14/95	15/95		16/95	17/95		18/95
Habitat number	1	1	2	1	1	1	2	1	1	2	1
Translucent blue crust	R										
Hymeniacidon perleve											
Slimy white sponge											
CNIDARIA - Hydrozoa											
Hydroid indet.											
Corymorpha nutans			?								
Tubularia indivisa		?			C	P					
Halecium beanii	P										
Halecium muricatum											
Aglaophenia pluma	F			O	F						
Nemertesia sp											
Nemertesia antennina	F	P			C	P					
Nemertesia ramosa	F	P				P					
Hydrallmania falcata	O										
Sertularia argentea					R			R			
Sertularella polyzonias								F			
Obelia dichotoma				O							
CNIDARIA – Anthozoa											
Anthozoa indet.											
Caryophyllia smithii											P
Alcyonium digitatum		P		O	C	P					
Epizoanthus couchii						P	P				
Isozoanthus sulcatus											
Bunodactis verrucosa					P						
Urticina felina	O	P		F	C	P	P	O			P
Metridium senile		P		C	F						P
Sagartia sp.		P									
Sagartia elegans				F	F	P					

Species											
Site number	11/95	12/95		13/95	14/95	15/95		16/95	17/95		18/95
Habitat number	1	1	2	1	1	1	2	1	1	2	1
Sagartia troglodytes	F				C			F			
Cereus pedunculatus											
Actinothoe sphyrodeta		P			O			R			P
Edwardsia sp											
NEMERTEA											
Lineus longissimus											
PLATYHELMINTHES											
Prothoceraeus vittatus				F							P
ANNELIDA - Polychaeta											
Lanice conchilega	P		P		O		P	F	P		
Bispira volutacornis											
Sabellidae indet.					C			C			
Serpulidae indet.											
Pomatoceros sp.	P										
Salmacina dysteri											
Phyllodocidae indet.					R						
Sabellaria spinulosa											
CRUSTACEA - Cirripedia											
Cirripedia indet.						P					
Balanus crenatus	S			C				O		P	
CRUSTACEA - Isopoda											
Isopoda indet.					?						
Caprellidae indet.					C						
Dyopedos porrectus	C										
Jassidae indet.				C	A						

Species											
Site number	11/95	12/95		13/95	14/95	15/95		16/95	17/95		18/95
Habitat number	1	1	2	1	1	1	2	1	1	2	1
CRUSTACEA - Malacostraca											
Mysidiacea indet.											
Homarus gammarus		P			O					P	P
Paguridae indet.									P	P	
Pagurus bernhardus	C				O			O			
Decapoda indet.											
Cancer pagurus	O			O	F		P			P	P
Carcinus maenas								F			
Inachinae indet.											
Inachus sp.	O										
Inachus dorsettensis											
Hyas araneus					R						
Portunidae indet.											
Pisidia longicornis	C										
Macropodia sp.	R				?						
Macropodia rostrata											
Liocarcinus sp.					O						
Liocarcinus depurator	F										
Necora puber					F					P	P
Maia squinado				R	F		P				P
Pisa armata											
Natantia indet. (prawn)	O										
Palaemon serratus											
MOLLUSCA - Gastropoda											
Patella sp.											
Gibbula cineraria	R										
Trivia sp.											
Nucella lapillus				O						P	
Hinia incrassata											
Crepidula fornicata	P										

Species											
Site number	11/95	12/95		13/95	14/95	15/95		16/95	17/95		18/95
Habitat number	1	1	2	1	1	1	2	1	1	2	1
Mollusca - Opistobranchia											
Nudibranchia indet.											
Doto sp	P										
Doto fragilis											
Doto dunnei	S										
Doto pinnatifida		P									
Janolus cristatus											
Flabellina pedata	F	P		O	P						
Flabellina sp											
Facelina sp											
Coryphella browni	R										
Archidoris pseudoargus	F	P			P						
Polycera sp.											
Polycera quadrilineata								F			
Thecacera peregrina	O										
Okenia aspersa (eggs)					P						
Aeolidia papillosa					?P						
Crimora papillata											P
Mollusca - Pelecypoda											
Ostrea edulis				O							
Mytilus edulis		P			A	P	P	A		P	
Chlamys distorta											
MOLLUSCA - Cephalopoda											
Sepia officinalis								R			

Species											
Site number	11/95	12/95		13/95	14/95	15/95		16/95	17/95		18/95
Habitat number	1	1	2	1	1	1	2	1	1	2	1
BRYOZOA											
Bryozoa indet.					O	P					
Bryozoa indet. (encrusting)					O						P
Bowerbankia citrina	R										
Alcyonidium diaphanum	C										
Membranipora membranacea											
Electra pilosa								F			
Flustra foliacea	R	P									
Securiflustra securifrons											
Chartella papyracea				?0							
Bugula sp.											
Bugula flabellata	O										
Bugula plumosa	O					P					
Bugula turbinata	O	P		F	F	P					P
Bicellariella ciliata	C			O							
Scrupocellaria sp.				R	F						
Cellaria sinuosa											
Parasmittina trispinosa											
PHORONIDA											
Phoronis hippocrepia					F			C			
ECHINODERMATA											
Antedon bifida		P		C							P
Asterias rubens	O				F		P			P	
Marthasterias glacialis					R						
Ophiuroidea indet.		P									
Amphipholis squamata	O				?P						
Ophiothrix fragilis	O										
Aslia lefevrei											

Species											
Site number	11/95	12/95		13/95	14/95	15/95		16/95	17/95		18/95
Habitat number	1	1	2	1	1	1	2	1	1	2	1
CHORDATA / TUNICATA - Ascidiacea											
Ascidiacea indet.											
Clavelina lepadiformis				F	O	P					
Polyclinum aurantium					F						
Morchellium argus					F						
Sidnyum sp.					P						
Sidnyum turbinatum											
Aplidium sp.											
Aplidium densum											
Aplidium punctum					P	P					
Orange Polyclinid				F							
Didemnidae indet.					P						
Didemnum maculosum				R							
Distaplia rosea	P				F			F			
Diplosoma spongiforme					P						
Ascidiella aspersa	R										
Polycarpa pomaria											
Polycarpa scuba	O				F						
Polycarpa sp.											
Dendrodoa grossularia											
Distomus variolosus											
Botryllus schlosseri					F	P					
Botrylloides leachi	C				F			O			
Molgula manhattensis					F						
CHORDATA - Chondrichthyes											
Scyliorhinus canicula							P				

Species											
Site number	11/95	12/95		13/95	14/95	15/95		16/95	17/95		18/95
Habitat number	1	1	2	1	1	1	2	1	1	2	1
CHORDATA - Osteichthyes											
Pollachius pollachius											
Pollachius virens					P						
Trisopterus minutus		P									
Taurulus bubalis					?P						P
Myoxocephalus scorpius											
Dicentrarchus labrax											
Ctenolabrus rupestris				O							
Ctenolabrus melops											
Labridae indet.											
Labrus bergylta				R							
Parablennius gattorugine				C	P						
Callionymus lyra	O										P
Gobiidae indet.			P								
Gobiusculus flavescens											
Pleuronectidae indet.											
Pleuronectes platessa							P				
Microstomus kitt											
Rockling (species not recorded)	P										
Conger conger											P
Balistes capriscus											P
Merlangius merlangus											
Lophius piscatorius											
Agonus cataphractus											
Aspitrigla cuculus											
Eutrigla gurnardus			P								
Trigla lucerna											
Pleuronectidae indet.											

Species											
Site number	11/95	12/95		13/95	14/95	15/95		16/95	17/95		18/95
Habitat number	1	1	2	1	1	1	2	1	1	2	1
RHODOPHYTA											
Rhodophycota indet.					P						
Porphyra sp.											
Corallinaceae indet. (crusts)											
Corallina officinalis								O			
Audouinella sp.								A			
Furcellaria lumbricalis								C			
Polyides rotundus										P	
Cystoclonium purpureum								F			
Gracilaria gracilis								C		P	
Palmaria palmata								F		P	
Mastocarpus stellatus / Chondrus crispus											
Chondrus crispus								C		P	
Rhodymenia sp											
Rhodymenia holmesii					F						
Rhodymenia pseudopalmata					F						
Plocamium cartilagineum				C	O		P	C			
Calliblepharis ciliata											
Ceramium sp.											
Cryptopleura ramosa											
Delesseria sanguinea							P				
Hypoglossum hypoglossoides					P			O			
Heterosiphonia plumosa							P				
Drachiella sp.											
Drachiella heterocarpa											
Drachiella spectabilis											
Rhodomela confervoides								F			
Erythroglossum laciniatum											
Phyllophora pseudoceranoides								C			
Halurus equisetifolius										P	

Species											
Site number	11/95	12/95		13/95	14/95	15/95		16/95	17/95		18/95
Habitat number	1	1	2	1	1	1	2	1	1	2	1
PHAEOPHYTA											
Dictyota dichotoma				C						P	
Desmarestia ligulata								C			
Laminaria hyperborea				C				C			
Laminaria saccharina											
Fucus serratus										P	
Ectocarpaceae indet.								F			
CHLOROPHYTA											
Chlorophyta indet.											
Cladophora pellucida				O							
Ulva sp.											
Chaetomorpha sp.								O			

Species												
Site number	19/95		20/95	21/95			22/95			23/95	24/95	
Habitat number	1	1	1	1	2	3	1	2	3	1	1	2
PORIFERA												
Porifera indet.						P					P	
PORIFERA - Calcarea												
Leucosolenia botryoides												
Scypha sp												
Scypha ciliata									P			
Clathrina coriacea												
PORIFERA – Demospongiae												
Tethya aurantium												
Suberites ficus												
Suberites carnosus									P			
Polymastia mamillaris									P			
Cliona celata										O	P	
Axinellidae indet												
Axinella dissimilis												
Stelligera stuposa												
Raspailia sp												
Raspailia hispida												
Raspailia ramosa												
Halichondria panicea								P	P	F	P	
Halichondria bowerbanki												
Esperiopsis fucorum		P								O		
Myxilla incrustans												
Haliclona sp.												
Haliclona oculata										O	P	
Haliclona urceolus												
Dysidea fragilis									P	O		
Dercitus bucklandi												
Hymeniacidon perleve										O		
Porifera indet. (crusts)			P									

Species												
Site number	19/95		20/95	21/95			22/95			23/95	24/95	
Habitat number	1	1	1	1	2	3	1	2	3	1	1	2
Translucent blue crust												
Hymeniacidon perleve										O		
Slimy white sponge										R		
CNIDARIA - Hydrozoa												
Hydroid indet.			P	P		P						
Corymorpha nutans												
Tubularia indivisa						?					P	
Halecium beanii												
Halecium muricatum												
Aglaophenia pluma												
Nemertesia sp			P	P								
Nemertesia antennina											P	
Nemertesia ramosa								P	P		P	
Hydrallmania falcata												
Sertularia argentea												
Sertularella polyzonias												
Obelia dichotoma												
CNIDARIA - Anthozoa												
Anthozoa indet.						P						
Caryophyllia smithii												
Alcyonium digitatum			P							F	P	
Epizoanthus couchii		P						P	P			
Isozoanthus sulcatus												
Bunodactis verrucosa												
Urticina felina				P		P				C	P	
Metridium senile						P				F	P	
Sagartia sp.												
Sagartia elegans										F	P	

Species												
Site number	19/95		20/95	21/95			22/95			23/95	24/95	
Habitat number	1	1	1	1	2	3	1	2	3	1	1	2
Sagartia troglodytes												
Cereus pedunculatus		P										
Actinothoe sphyrodeta						P						
Edwardsia sp												
NEMERTEA												
Lineus longissimus												
PLATYHELMINTHES												
Prostheceraeus vittatus												
ANNELIDA - Polychaeta												
Lanice conchilega					P						P	
Bispira volutacornis												
Sabellidae indet.						P				C	P	
Serpulidae indet.												
Pomatoceros sp.				P					P			
Salmacina dysteri											P	
Phyllodocidae indet.												
Sabellaria spinulosa												
CRUSTACEA - Cirripedia												
Cirripedia indet.	P								P			
Balanus crenatus												
CRUSTACEA - Isopoda												
Isopoda indet.												
Caprellidae indet.												
Dyopedos porrectus										F		
Jassidae indet.										S		

Species													
Site number	19/95		20/95	21/95			22/95			23/95	24/95		
Habitat number	1	1	1	1	2	3	1	2	3	1	1	2	
CRUSTACEA - Malacostraca													
Mysidiacea indet.										P			
Homarus gammarus			P						P				
Paguridae indet.					P								
Pagurus bernhardus													
Decapoda indet.													
Cancer pagurus						P	P		P	O	P		
Carcinus maenas											P		
Inachinae indet.													
Inachus sp.						P							
Inachus dorsettensis											P		
Hyas araneus											P		
Portunidae indet.													
Pisidia longicornis										F			
Macropodia sp.						P							
Macropodia rostrata											P		
Liocarcinus sp.													
Liocarcinus depurator													
Necora puber						P	P		P	F	P		
Maia squinado						P	P		P		P		
Pisa armata											P		
Natantia indet. (prawn)										R			
Palaemon serratus													
MOLLUSCA - Gastropoda													
Patella sp.	P												
Gibbula cineraria													
Trivia sp.													
Nucella lapillus													
Hinia incrassata										O			
Crepidula fornicata													

Species												
Site number	19/95		20/95	21/95			22/95			23/95	24/95	
Habitat number	1	1	1	1	2	3	1	2	3	1	1	2
Mollusca - Opisthobranchia												
Nudibranchia indet.						P						
Doto sp			P							F		
Doto fragilis												
Doto dunnei										S		
Doto pinnatifida									P			
Janolus cristatus										R		
Flabellina pedata												
Flabellina sp												
Facelina sp												
Coryphella browni												
Archidoris pseudoargus				P								
Polycera sp.												
Polycera quadrilineata		P						P				
Thecacera peregrina										O		
Okenia aspersa (eggs)												
Aeolidia papillosa			P									
Crimora papillata												
Mollusca - Pelecypoda												
Ostrea edulis												
Mytilus edulis		P	P				P			S		
Chlamys distorta												
MOLLUSCA - Cephalopoda												
Sepia officinalis												

Species												
Site number	19/95		20/95	21/95			22/95			23/95	24/95	
Habitat number	1	1	1	1	2	3	1	2	3	1	1	2
BRYOZOA												
Bryozoa indet.						P						
Bryozoa indet. (encrusting)												
Bowerbankia citrina												
Alcyonidium diaphanum											P	
Membranipora membranacea								P				
Electra pilosa												
Flustra foliacea												
Securiflustra securifrons										O		
Chartella papyracea												
Bugula sp.		P				P						
Bugula flabellata										O		
Bugula plumosa								P	P	F		
Bugula turbinata												
Bicellariella ciliata										C		
Scrupocellaria sp.												
Cellaria sinuosa												
Parasmittina trispinosa										O		
PHORONIDA												
Phoronis hippocrepia										F	P	
ECHINODERMATA												
Antedon bifida										O		
Asterias rubens			P		P	P				C	P	P
Marthasterias glacialis												
Ophiuroidea indet.												
Amphipholis squamata												
Ophiothrix fragilis										O	P	
Aslia lefevrei												

Species												
Site number	19/95		20/95	21/95			22/95			23/95	24/95	
Habitat number	1	1	1	1	2	3	1	2	3	1	1	2
CHORDATA / TUNICATA - Ascidiacea												
Ascidiacea indet.								P	P		P	
Clavelina lepadiformis			P						P	F	P	
Polyclinum aurantium										F		
Morchellium argus										O	P	
Sidnyum sp.												
Sidnyum turbinatum										O		
Aplidium sp.												
Aplidium densum												
Aplidium punctum									P			
Orange Polyclinidae												
Didemnidae indet.												
Didemnum maculosum												
Distaplia rosea										F		
Diplosoma spongiforme												
Ascidiella aspersa												
Polycarpa pomaria												
Polycarpa scuba											p	
Polycarpa sp.												
Dendrodoa grossularia											P	
Distomus variolosus												
Botryllus schlosseri									P		P	
Botrylloides leachi		P								O	P	
Molgula manhattensis												
CHORDATA - Chondrichthyes												
Scyliorhinus canicula						P					P	

Species												
Site number	19/95		20/95	21/95			22/95			23/95	24/95	
Habitat number	1	1	1	1	2	3	1	2	3	1	1	2
CHORDATA – Osteichthyes												
Pollachius pollachius								P				
Pollachius virens												
Trisopterus minutus						P				F	P	
Taurulus bubalis		P									P	
Myoxocephalus scorpius								P				
Dicentrarchus labrax												
Ctenolabrus rupestris												
Ctenolabrus melops												
Labridae indet.												
Labrus bergylta										R		
Parablennius gattorugine		P										
Callionymus lyra						P						
Gobiidae indet.							P					
Gobiusculus flavescens						P						
Pleuronectidae indet.		P										
Pleuronectes platessa												
Microstomus kitt											P	
Rockling (species not recorded)												
Conger conger												
Balistes capriscus												
Merlangius merlangus							P					
Lophius piscatorius										R		
Agonus cataphractus											P	
Aspitrigla cuculus												
Eutrigla gurnardus												
Trigla lucerna											P	
Pleuronectidae indet.												

Species												
Site number	19/95		20/95	21/95			22/95			23/95	24/95	
Habitat number	1	1	1	1	2	3	1	2	3	1	1	2
RHODOPHYTA												
Rhodophycota indet.									P	P		
Porphyra sp.							P					
Corallinaceae indet. (crusts)												
Corallina officinalis												
Audouinella sp.												
Furcellaria lumbricalis												
Polyides rotundus												
Cystoclonium purpureum												
Gracilaria gracilis												
Palmaria palmata									P			
Mastocarpus stellatus / Chondrus crispus												
Chondrus crispus									P			
Rhodymenia sp												
Rhodymenia holmesii												
Rhodymenia pseudopalmata												
Plocamium cartilagineum									P			
Calliblepharis ciliata									P			
Ceramium sp.												
Cryptopleura ramosa									P			
Delesseria sanguinea												
Hypoglossum hypoglossoides												
Heterosiphonia plumosa												
Drachiella sp.												
Drachiella heterocarpa												
Drachiella spectabilis												
Rhodomela confervoides												
Erythroglossum laciniatum												
Phyllophora pseudoceranoides												
Halurus equisetifolius												

Species												
Site number	19/95		20/95	21/95			22/95			23/95	24/95	
Habitat number	1	1	1	1	2	3	1	2	3	1	1	2
PHAEOPHYTA												
Dictyota dichotoma												
Desmarestia ligulata												
Laminaria hyperborea								P				
Laminaria saccharina								P				
Fucus serratus												
Ectocarpaceae indet.												
CHLOROPHYTA												
Chlorophyta indet.												
Cladophora pellucida												
Ulva sp.							P					
Chaetomorpha sp.												

Appendix 4

Details of survey dive sites.

SiteNo	Date	Site Name	Divers	Time	Upper Depth (m)	Lower Depth (m)	Corrected Upper Depth (m)	Corrected Lower Depth (m)	No. Habitats	Latitude (WGS84)	Longitude (WGS84)
14/95	25/06/1995	Helwick Channel N. Side (A & B)	Francis Bunker, Michell Boinn & Mark Burton	1027 to 1110	6	8.2	3.5	6.7	1	51.5415	-4.2465
13/95	25/06/1995	Oxwich Bay Wreck A	Dale Rostron & Alistair Law	1545 to 1635					1	51.5484	-4.1444
15/95	25/06/1995	East Helliswick Bay	Am&a Holloway, James Perrins & Kate Lock	1156 to 1241	8	12.0	5.6	9.6	2	51.5370	-4.2225
16/95	25/06/1995	West of Pwlldu Head	Francis Bunker & Michelle Boinn	1505 to 1555	5	6.0	-1.5	-0.5	1	51.5635	-4.0926
17/95	25/06/1995	Between Oxwich Bay & Pwlldu Head	Sarah Hughes	1530 to 1600	6	8.0	-0.7	1.3	2	51.5638	-4.0988
18/95	25/06/1995	Oxwich Bay Wreck B	Suzanne Hart	1510 to 1600					1	51.5484	-4.1444
19/95	25/06/1995	West of Caswell Bay A	Am&a Holloway & James Perrins	1713 to 1745	4	9.5	-4.0	1.5	2	51.5648	-4.0451
20/95	25/06/1995	Overton Mere	Suzanne Hart	1010 to 1030					1	51.5379	-4.2270
21/95	25/06/1995	Overton Cliff	Colin Della & Delyth Grady	1021 to 1115	9	12.0	6.9	9.9	3	51.5393	-4.2364
22/95	25/06/1995	West of Caswell Bay B	Kate Lock & Iain Park	1718 to 1806	5	9.0	-3.1	0.9	3	51.5664	-4.0399
24/95	25/06/1995	Butter Slade, Overton Cliff	Paul Kay & Lucy Gilkes	1100 to 1205	9	12.4	6.4	10.3	2	51.5386	-4.2403
23/95	25/06/1995	Boiler Slab A, Overton Cliff	Dale Rostron & Alistair Law	1044 to 1132		9.0		6.9	1	51.5391	-4.2418
1/95	24/06/1995	Pwlldu Head A	Delyth Grady, Lucy Gilkes & Paul Kay	0920 to 1008	5	8.1	2.5	5.6	4	51.5550	-4.0600
2/95	24/06/1995	Pwlldu Head B	James Perrins, Peter Taylor & Emma Taylor	0946 to 1033	6	9.0	3.7	6.7	1	51.5559	-4.0564
3/95	24/06/1995	Pwlldu Bay	Sarah Hughes & Iain Park	0957 to ?	6	10.0	3.7	7.7	3	51.5559	-4.0564
4/95	24/06/1995	Hunts Bay A	James Perrins	1113 to 1213		7.5		4.8	1	51.5558	-4.0728
5/95	24/06/1995	Hunts Bay B	Suzanne Hart, Dale Rostron & Colin Deller	1041 to 1127					1	51.5569	-4.0739
6/95	24/06/1995	Hunts Bay C	Kate Lock	1100 to 1204	4	6.0	1.4	3.4	3	51.5597	-4.0791
7/95	24/06/1995	Langland A	Iain Park & Sarah Hughes	1420 to 1450	3	8.0	-3.2	1.8	3	51.5632	-3.9982
8/95	24/06/1995	Langland B	Peter & Emma Taylor	1405 to 1440	6	9.0	0.1	6.4	1	51.5632	-3.9992
10/95	24/06/1995	Doctors Mine A	Paul Kay & Lucy Gilkes	? (52 minutes)	5	9.0	-0.9	3.1	3	51.5632	-3.9992

SiteNo	Date	Site Name	Divers	Time	Upper Depth (m)	Lower Depth (m)	Corrected Upper Depth (m)	Corrected Lower Depth (m)	No. Habitats	Latitude (WGS84)	Longitude (WGS84)
9/95	24/06/1995	Doctors Mine B	Alistair Law	? (44 minutes)	6	9.2	0.1	3.3	1	51.5632	-4.0005
11/95	24/06/1995	East of Swigg Buoy	Dale Rostron	1533 to 15.48	12	14.0	4.7	6.7	1	51.5668	-3.9349
12/95	24/06/1995	Strombus Wreck, Swansea Bay	Kate Lock	1545 to 1630	10	12.0	2.4	4.4	2	51.5719	-3.9362