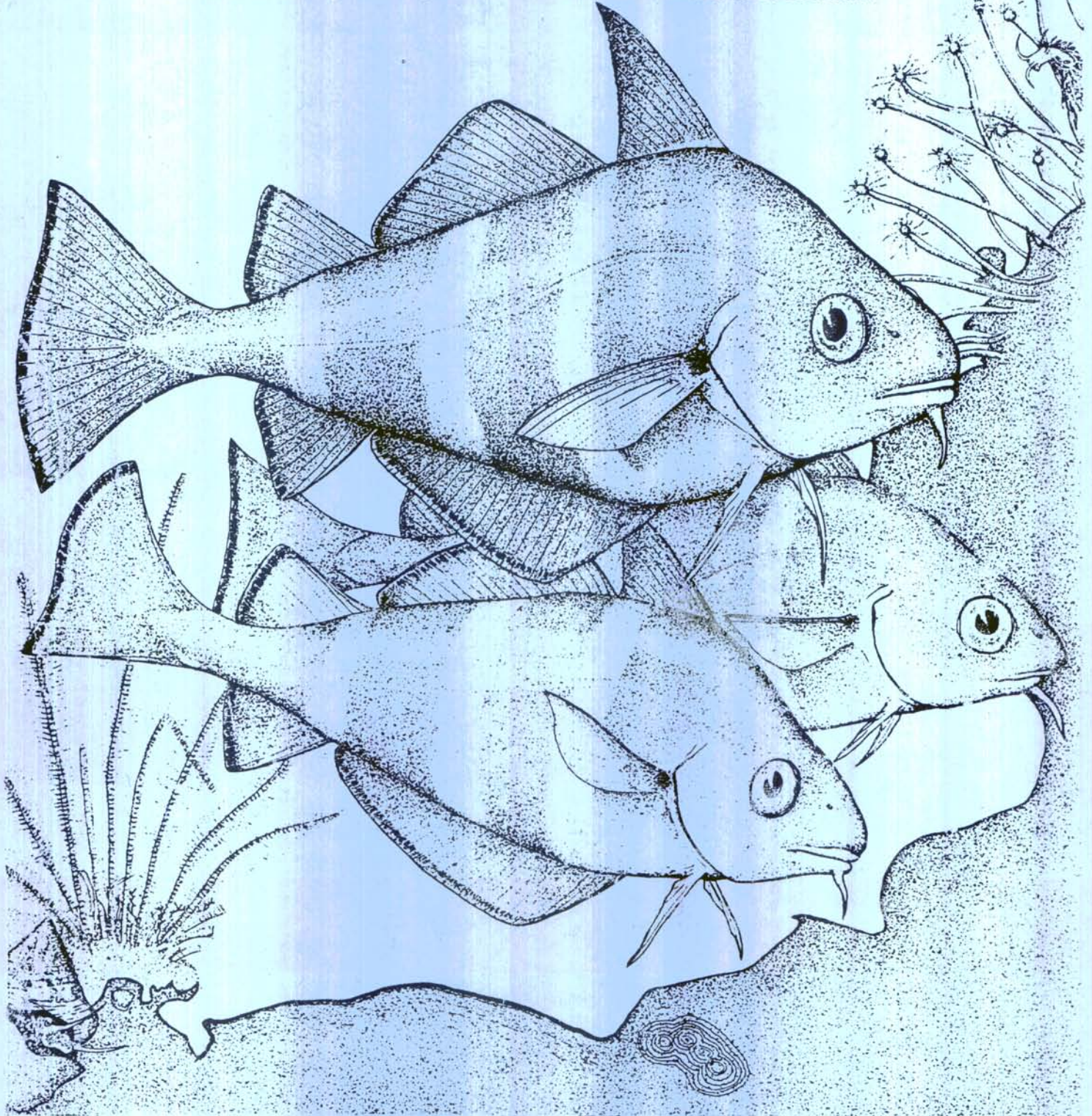


Seasearch is run by the Marine Conservation Society on behalf of  
the Nature Conservancy Council as part of the Marine Nature Conservation Review of Great Britain.



## Sandstone Reefs East Sussex



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

**SEASEARCH SURVEY OF SANDSTONE REEFS OFF  
EASTBOURNE, EAST SUSSEX**

June - July 1989

by Christopher Wood

Survey Team

Christopher Wood	-	Project Leader
Graham Ackers	-	Photographer
Carol Aldridge	-	Recorder
Martin Coster	-	Recorder
Paul Freedman	-	Recorder
Peter Hewitt	-	Photographer /Recorder
William Hewitt	-	Photographer /Recorder
Robert Irving	-	Recorder
Joe Sands	-	Recorder
Chris Spurrier	-	Recorder
Evan Jones	-	Diver
Colin Yule	-	Diver
Grahame Pembleton	-	Dive Recorder

March 1990

## ABSTRACT

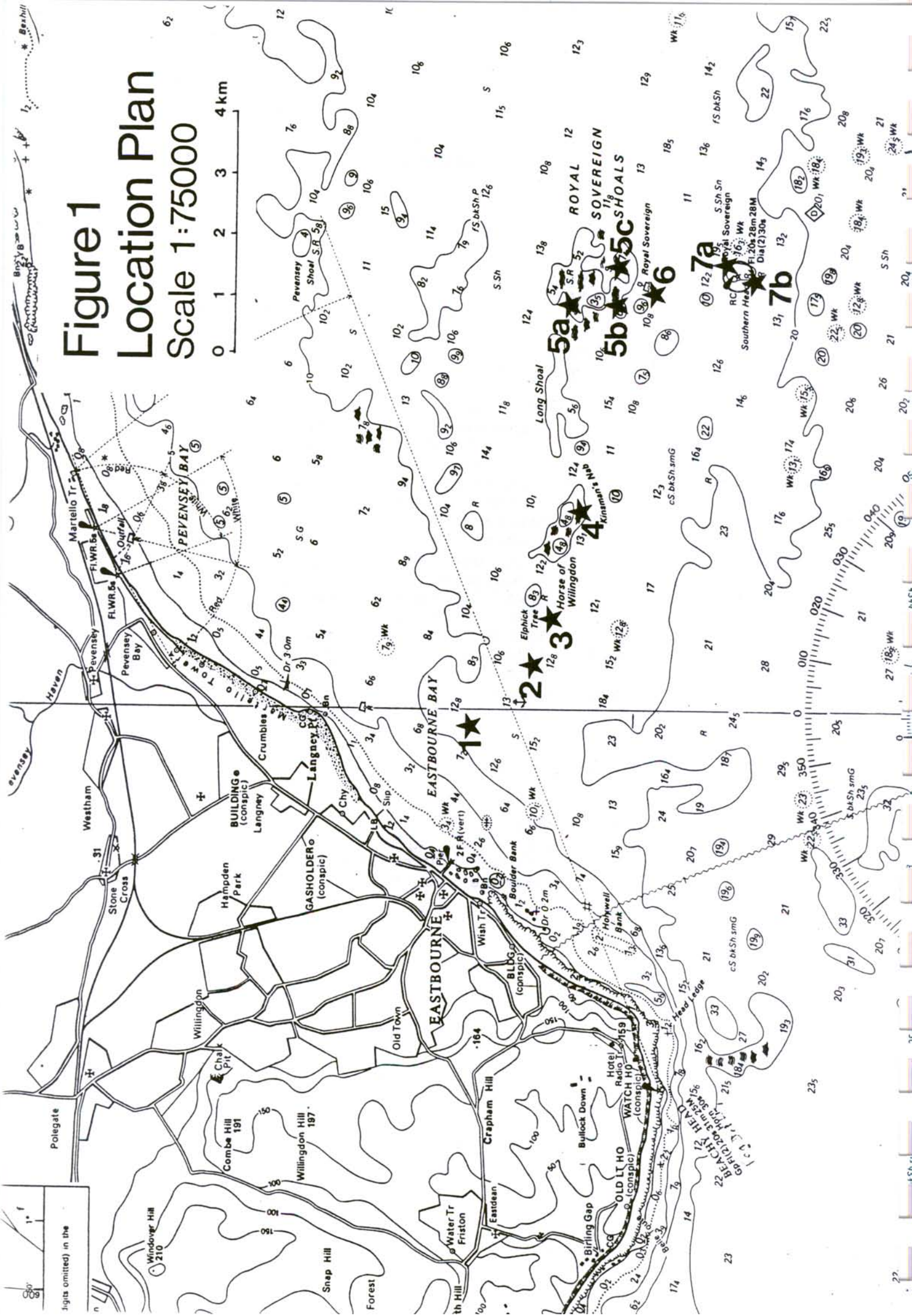
SEASEARCH survey techniques were used to collect information on the main habitat and community types in and around the series of offshore reefs lying south east of Eastbourne, East Sussex. Ten different areas were surveyed and fifteen habitat types identified which are described in the report. The main habitat types are sand/gravel/cobble mixtures, sandstone boulders and sandstone rock slabs/reefs. Direct human impact on the area is limited to amateur fishing, a little pot fishing, and the presence of a concrete Light Tower.

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# Figure 1 Location Plan Scale 1:75000

0 1 2 3 4 km



## 2. INTRODUCTION

### THE STUDY AREA

The Royal Sovereign Shoals lie in the eastern part of the English Channel between 7 and 10km east of Beachy Head and between 4 and 10km offshore from Langney Point, Eastbourne (see Location Plan, Figure 1).

The shoals comprise a number of rocky reefs separated by areas of flat seabed. The most westerly and closest to shore is Elphick Tree which rises as a knoll to a charted depth of 8.3m below chart datum (bcd) from a surrounding sea bed of 10-12m bcd. The next reef, the Horse of Wilingdon, is more extensive, about 1km in length and rises from 13m to 4.8m bcd. The Long Shoal is a similar length but is only charted to rise to 5.6m. The Royal Sovereign Shoals themselves cover an area about 1km square and are marked by a buoy on their southern side. They are charted to rise to depth of 3.5m bcd. The Royal Sovereign Light Tower is built on the most southerly reef, Southern Head (Photo 1). The Tower is a reinforced concrete structure and was completed in 1971 to replace the light vessel which had marked the shoal since 1875. The surrounding reefs reach a depth of 8.4m from a surrounding seabed of between 13m and 19m. Further details of the Tower and its construction are given by McDonald (1985).



Photo 1: The Royal Sovereign Light Tower with Beachy Head in the background.

### REASONS FOR STUDY

Previous surveys carried out by the Marine Conservation Society have covered the Sussex coast to the west (Wood, 1984 and Wood and Jones 1986) and the majority of rocky areas found in them comprise of relatively soft Chalk outcrops. A small sublittoral exposure of Greensand occurs at Head Ledge, Beachy Head and this has been shown to provide different habitats and species communities to the chalk substrata (Wood & Jones, 1986). Dives carried out by Marine Conservation Society members on the Horse of Wilingdon in 1986 and 1987 revealed that this reef is also Sandstone and suggested that the area

would be of interest both because of its offshore location and harder rocks than elsewhere in the eastern Channel.

The area was included in the SEASEARCH programme on the Society's recommendation and this expedition organised to collect data on the rocky reefs and the surrounding seabed.

#### SURVEY METHODS

The survey was planned to be carried out during the summer of 1988. Four weekends were planned and boats booked. On all four occasions weather conditions or extremely poor water clarity prevented the survey taking place. The work was therefore deferred until 1989.

A Planning and Training day was held at the Nature Conservancy Council offices in Lewes on 8th April 1989 and was attended by 11 potential participants. Three diving weekends were planned one each in May, June and July.

The first weekend, 27th - 28th May, was again aborted because of poor conditions. The hardboat left Newhaven at 6am and reached Beachy Head before turning back. The inflatable was unable to launch at Langney Point, Eastbourne.

The second weekend was 17th and 18th June and was attended by 7 divers and a recorder in addition to the hardboat crew. Boat cover on site was provided by the launch 'Karpetee' from Newhaven and the Marine Conservation Society South-East Region inflatable, launched from Eastbourne. The two boats rendezvoused at the Royal Sovereign buoy. The launch was equipped with Decca navigator and echo sounder and was used for position fixing whilst the inflatable acted as transport and cover for diving pairs. On each dive the first dive was carried out at slack water on one of the reef areas and was followed by a drift dive across areas of flat seabed.

Where possible habitat recorders and photographers formed mixed diving pairs. Habitat information was recorded underwater on slates and transferred to Seasearch forms on shore. Some divers made lists of prominent species in addition to habitats but there was no attempt to make these comprehensive.

The third weekend was 29th -30th July and was attended by 10 divers. Additional boat cover was provided by a second inflatable owned by William & Peter Hewitt. Three sites were dived successfully on 29th but strong winds overnight again prevented diving on the second day.

The information included in the report is therefore based on three days fieldwork. The fact that only 3 out of the 14 days diving arranged were possible demonstrates the exposure of the area which, coupled with strong tidal streams, makes diving unpredictable. It also increased the costs of the work due to lost boat booking deposits. However, it is believed that the sites surveyed are representative of the variety of habitats in the area and thus the aims of the survey have been met.

### 3. RESULTS

#### SITES SURVEYED

Seven different areas were surveyed. They are shown on Figure 1 and details of locations, latitude and longitude, dates dived, divers and information recorded are given in Table 1.

Table 1. Survey Locations and Records

Site No.	Site Name & Lat/Long	Date Dived	Divers	Records made (H-Habitat) (P-Photos) (S-Species)	
1	Off Langney Point 50°45.7'N - 0°19.7'E	18/6/89	Chris Wood Joe Sands	H H	
2	Off Elphick Tree 50°45.2'N - 0°20.8'E	17/6/89	Chris Wood Joe Sands	H H	
3	Elphick Tree from 50°45.1'N - 0°21.1'E to 50°44.8'N - 0°20.4'E	17/6/89	Chris Spurrier William Hewitt  Peter Hewitt Paul Freedman	H P  P H	
4	Horse of Wilingdon 50°44.8'N / 0°22.9'E	18/6/89	Chris Spurrier William Hewitt Evan Jones  Peter Hewitt Paul Freedman  Chris Spurrier William Hewitt	H h  H H  H H	S   S S
	exact site not known	13/6/86	Ponnie Dudley Chris Wood William Hewitt	H H S	S S
		21/6/87	Chris Wood Graham Ackers	H H	S S
5A	Royal Sovereign Shoals (north-west) 50°44.8'N/0°25.6'E	29/7/89	Chris Spurrier William Hewitt	H h	S P
5B	Royal Sovereign Shoals (south-west) 50°44.5'N/0°25.9'E	17/6/89	Chris Spurrier William Hewitt  Peter Hewitt Paul Freedman  Chris Wood Joe Sands	H h  H H  H H	S P  S S



5C	Royal Sovereign Shoals (south-east)				
		29/7/89	Graham Ackers		P
	50°44.4'N/0°26.3'E		Carol Aldridge	H	
			Chris Wood	H	
			Peter Hewitt		P
6	Royal Sovereign Buoy				
	50°44.2'N/0°26.0'E	29/7/89	Joe Sands		H
			Colin Yule		
7A	Royal Sovereign Light Tower (north-east side)				
	50°43.4'N/0°26.1'E	29/7/89	Graham Ackers		P
			Carol Aldridge	H	
			Joe Sands		H
			Colin Yule		
			Chris Wood	H	
			Robert Irving	H	
7B	Royal Sovereign Light Tower (south-west side)				
	50°43.3'N/0°26.0'E	29/7/89	Peter Hewitt	H	P
			Martin Coster	H	
			Chris Spurrier	H	S
			William Hewitt		P

#### OVERALL TOPOGRAPHY

In its simplest terms the study area comprises one of discrete areas of Sandstone reefs raised above the surrounding flat, soft sediment covered, sea bed. There is therefore a mixture of habitats based on both hard and soft substrata in the area.

The shallowest area recorded during our surveys was 5m below chart datum, although shallower depths are shown on the chart. The area is exposed to the prevailing south-westerly winds and is subject to strong tidal currents which reach 2.6 knots at spring tides.

The simple description masks the considerable range of detailed habitats in the area. In the following schedule 19 different habitats are identified. Boundaries between many of these are gradual rather than distinct and a considerable number may occur within a small area. At one site, Royal Sovereign Shoals (south-west), a total of 12 of the 19 habitats was recorded. The occurrence of each habitat at each site is summarised in Table 2 (page 7) and this demonstrates the wide range. Generally the areas furthest from the reefs showed the greatest level of homogeneity (e.g. Sites 1 & 2), whilst the reef sites were the most varied.

As a result of the mixture of detailed habitats which occur it is not possible to map them. However, Figure 2 (page 6) shows the main topographic features in a stylized form based on the dives undertaken, cartographic and depth sounder information.

## GEOLOGY OF THE AREA

We are not aware of any geological information about this area of reefs, and were not equipped to sample the rocks during the survey. However, the rock which forms the boulders, slabs and reefs is certainly hard and is assumed to be sandstone of the Upper Greensand which lies below the Lower Chalk in the geological succession in this area.

Upper Greensand sandstone is found on the shore at The Pound, Eastbourne and Head Ledge, Beachy Head. The formation of the intertidal portion of Head Ledge is strikingly similar to the structures described from Sovereign Shoals south-east (Site 5C, Habitat R6). At Head Ledge the creation of vertical and horizontal faults and the tendency to break off into rectangular slabs is evident (pers. obs.) as at a number of the sites visited during this survey.

We believe the assumption that the reefs are of Upper Greensand is a reasonable one. However McDonald (1985) describes the site of the construction of the Light Tower as "boulders, the result of a collapsed stratum of oolitic ironstone not found before in the English Channel."

The flat areas of softer rock around the Sandstone reefs also cannot be determined with certainty. The two rocks which could be anticipated in conjunction with Upper Greensand are Lower Chalk above it and Gault below. Lower Chalk has a clay content of 10-50% and is frequently referred to as 'grey chalk' or 'chalk marl' (Jones 1981). Gault also has a clay content. At its hardest, in the Eastern Channel (e.g. Copt Rocks, Folkestone), it is of a similar hardness to the Greensand sandstone, whilst at Beachy Head, close to Head Ledge it occurs as softer, flat, uncolonised areas both on the shore and in the shallow sublittoral (Wood & Jones 1986).

In the absence of samples from each site the names used by the individual recorders have been retained. There are certainly at least two different soft rocks to be found. Photo 17 shows a white rock, which is almost certainly Lower Chalk, whilst Photo 19 shows a softer grey sandy rock which is very likely to be Gault Clay. In terms of the habitats and species associations the differences are not consequential.

### DETAILED HABITAT DESCRIPTIONS

The detailed habitat description which follow have been categorised under the major headings which have been identified in the SEASEARCH Habitat Directory (MCS under development). The purpose of these headings is to assist cross referencing of habitat descriptions between SEASEARCH surveys. The detailed descriptions within each major heading have the appropriate code number followed by a letter. Numbers are assigned in chronological order and are not intended to show any relationship.

In view of the fundamentally different range of detailed habitats which are likely to occur in different broad

# Figure 2

## Dive Sites / Substrata

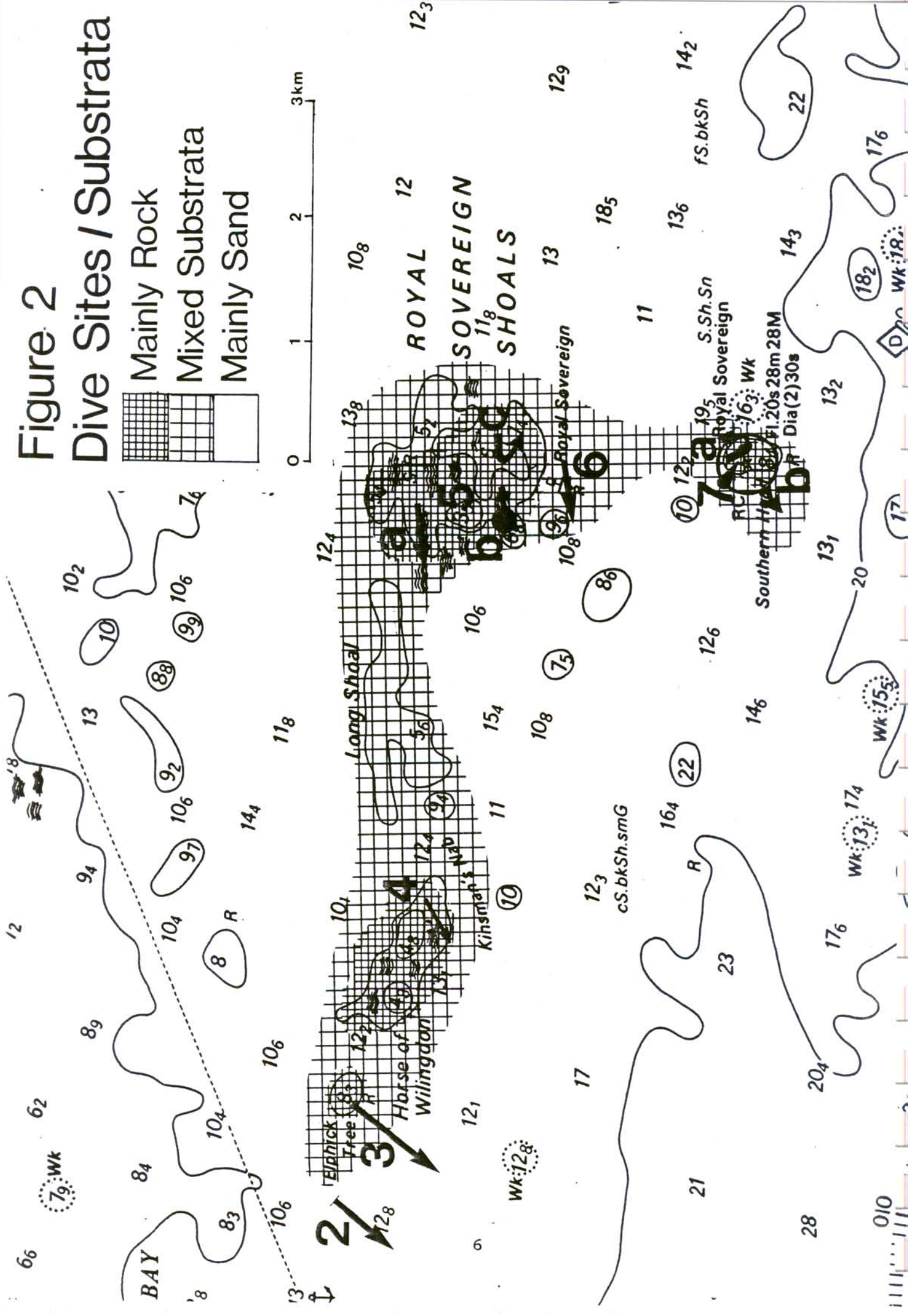


TABLE 2. SUMMARY OF HABITATS AND THEIR OCCURRENCE

Site Number >	1	2	3	4	5A	5B	5C	6	7A	7B
A Infralittoral Bedrock				X						
A/01 Exposed Flat Bedrock				X						
A/02 Flat Bedrock with Boulders				X		X				
A/03 Sandstone Bedrock Slabs				X						
B Circalittoral Bedrock				X		X	X			X
B/01 Exposed Flat Bedrock				X		X	X			X
B/02 Flat Bedrock with Boulders				X		X	X	X		X
B/03 Sandstone Bedrock Slabs				X		X	X	X		X
B/04 Flat Bedrock overlain with Sand/Cobble			X	X		X	X			
B/05 Raised Bedrock Reef				X		X	X			
C Infralittoral Artificial Substrata									X	
C/01 Concrete Wall									X	
D Circalittoral Artificial Substrata									X	X
D/01 Metal Debris									X	X
G Infralittoral Small Boulders (<1m)									X	
G/01 Boulders			X		X				X	
H Circalittoral Small Boulders (<1m)									X	
H/01 Boulders			X			X			X	
K Circalittoral Stones - Cobbles/Pebbles/Slates									X	X
K/01 Cobble and Pebbles			X		X				X	X
M Circalittoral Very Mixed Substrata - hard & soft										
M/01 Gravel with Boulders					X	X				
M/02 Boulders and Cobble		X				X			X	
P Circalittoral Gravel and Sand		X						X		X
P/01 Muddy Sand		X	X			X		X	X	X
P/02 Fine Sand			X			X		X	X	X
P/03 Coarse/Shelly Sand			X			X		X	X	X
P/04 Gravel/Sand/Cobble Mix		X	X			X		X	X	X
Total Number of Habitats at Site	1	2	7	5	5	12	5	3	10	6

geographical areas no attempt has been made to link the detailed habitat descriptions in this study with those described in SEASEARCH reports from Western Scotland. All of the descriptions are thus prefixed SE (South East) to distinguish them. Since no other SEASEARCH surveys have been carried out in the south east detailed habitat numbers under each major category begin at 01.

The division of the broad habitat types into infralittoral and circalittoral is not particularly appropriate for this study area. There are no kelp plants on the reefs but in the shallowest areas, down to 9m maximum, the upper rock surfaces are dominated by small foliaceous red algae. Even at this depth algae are absent from vertical, overhanging or sheltered surfaces. There is, therefore, a small extent of lower infralittoral but, because of its limited area the detailed habitats which occur in both the lower infralittoral and circalittoral have been combined eg. A&B, G&H.

HABITAT CODE NUMBER: SE/A/01 & SE/B/01

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: A/B: Infralittoral/Circalittoral Bedrock

SITE TYPE: Exposed Flat Bedrock

LOCATION (SITE NOS): 4, 5B, 5C, 7B

DOMINANT COMMUNITY: (A) Red algae covered with amphipod silt tubes.

**SITE DETAILS**

Situation: Open Sea  
Depth: A: 6-9m, B: 15-16m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology: Sandstone/Chalk

**HABITAT DETAILS**

Zone: Infralittoral/  
Circalittoral  
Substratum: Bedrock  
Modifiers:  
Features: Shallow cracks/  
crevices

**PHOTOGRAPH(S):**

None Available

**DESCRIPTION:**

Flat bedrock of grey Lower Chalk or Sandstone. Found on upper parts of main reef or as sloping areas towards edge of reefs. Differs from Habitat B/04 by not being overlain with mobile material. The lack of mobile cover derives from either the slope of the bedrock or the height above the surrounding seabed and consequent strong tidal currents. Rock often with shallow cracks and crevices.

**Communities:**

Shallow areas (down to about 9m.) with red algal turf cover, in turn covered with silt amphipod tubes. Asterias rubens and hydroids Nemertesia sp. common. A variety of sponges seen in smaller numbers.

HABITAT A/B/01 (continued)

Occurrence

- Site 4 - Horse of Wilingdon, depth 6m. On western side of reef. Flat Sandstone bedrock observed in two separate areas, one smooth and without crevices or fissures, the other with shallow fissures and channels on the surface.
- Site 4 - Horse of Wilingdon, depth 7-10m. West of main reef. Initially flat 7-8m. with shallow cracks and crevices. Further west gradually sloping to 10m. with deeper cracks.
- Site 5B - Royal Sovereign Shoals (south-west), depth 8-10m. Gently sloping bedrock with flattish surface with generally rectangular fault lines/small crevices.
- Site 5C - Royal Sovereign Shoals (south-east), depth 15-16m. Patches of grey Lower Chalk.
- Site 7B - Light Tower (south side), depth 7m. Flat, unfissured bedrock.

HABITAT CODE NUMBER: SE/A/02 & SE/B/02

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: A/B Infralittoral/Circalittoral Bedrock

SITE TYPE: Flat bedrock with Boulder cover

LOCATION (SITE NOS): 4, 5A, 5B

DOMINANT COMMUNITY: Silt-tolerant flora & fauna on rocks +  
silt amphipod tubes

**SITE DETAILS**

Situation: Open Sea

Depth: 6-13.

Salinity: Normal

Wave Exposure: Very Exposed

Tidal Streams: Mod. Strong

Geology: Chalk/Sandstone bedrock with Sandstone boulders

**HABITAT DETAILS**

Zone: Infralittoral/  
Circalittoral

Substratum: Bedrock

Modifiers: Boulders

Features:

**PHOTOGRAPH(S) :**



Photo 2: Large Sandstone bolder  
on Chalk bedrock overlain  
with pebbles (Site 5A)

**DESCRIPTION:**

Areas of flat bedrock of Sandstone or Chalk with scattered Sandstone boulders on top. Boulders mostly flat topped.

**Communities**

Boulders providing a good variety of sessile fauna and flora, though much covered in amphipod silt tubes. Boulder fauna described below (Habitats G/H01 & A/B04). Flat bedrock with a variety of anemones, including Cereus pedunculatus, Sagartia sp., Urticina felina and Actinothoe sphyrodeta; and some erect species including Nemertesia anteninna, Alcyonidium diaphanum and Flustra foliacea. Tunicates also common, including Clavelina lepadiformis, Pycnoclavella aurilucens and Botryllus schlosseri.



HABITAT A/B/02 (continued)

Occurrence

- Site 4 - Horse of Wilingdon, depth 10-13m. Off main reef to the west. Scattered Sandstone slabs and boulders on gently sloping bedrock bottom with gravel and flint cobbles.
- Site 5A - Royal Sovereign Shoals (north-west), depth 6m. Scattered boulders and cobbles overlying Chalk bedrock (Photo 2).
- Site 5B - Royal Sovereign Shoals (south-west), depth 10m. Sandstone bedrock with small, flat topped, boulders.

**HABITAT CODE NUMBER: SE/A/03 & SE/B/03**

**SURVEY NAME/AREA:** Sandstone Reefs off Eastbourne, E. Sussex

**HABITAT TYPE:** A/B: Infralittoral & Circalittoral Bedrock

**SITE TYPE:** Sandstone Bedrock Slabs

**LOCATION (SITE NOS):** 4, 5A, 5B, 5C, 6, 7A, 7B

**DOMINANT COMMUNITY:** Wide range of silt-tolerant fauna. Good fish life.

**SITE DETAILS**

Situation: Open Sea  
Depth: A 5-9m, B 10-18m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology: Sandstone

**HABITAT DETAILS**

Zone: Infralittoral/  
Circalittoral  
Substratum: Bedrock  
Modifiers: Vertical faces,  
Fissures, Overhangs, Caves  
Features: Silt (esp on  
horizontal surfaces)

**PHOTOGRAPH(S):**

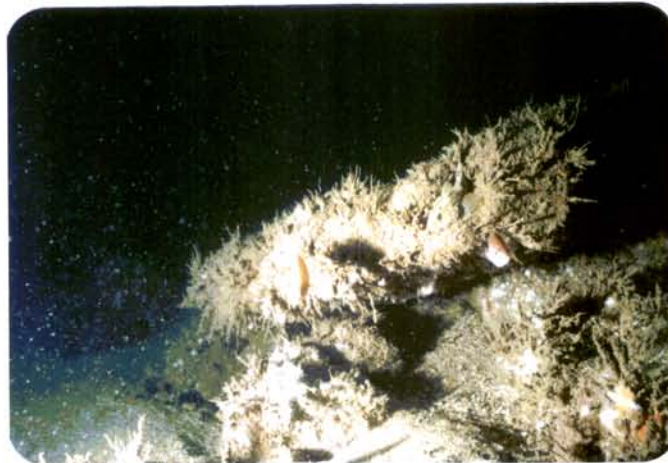


Photo 3: Tilted Sandstone slab (Site 7A - B/03)

**DESCRIPTION:**

Flat topped slabs of Sandstone bedrock (Photo 3), often rectangular in form with lengths of 2-3m and vertical sides typically 40-50cm high (Photo 4). In many areas the slabs were piled on one another with no consistent orientation thus creating deep fissures, overhangs and caves, up to 2m deep and 50cm. high (Figure 3). The base of the gullies between slabs was covered with coarse, shelly sand and cobbles, and occasionally flat Sandstone or Grey Chalk bedrock.

**Communities**

These areas provided the richest fauna within the survey area. Sparse red foliaceous algal cover on upper surfaces mostly covered in silt amphipod tubes or a layer of silt (Photo 5).

Sessile fauna similar to boulders but greater availability of shaded under slab surfaces provided habitat for Dead Men's Fingers, colonies of the tube worm Filograna implexa, bryozoans including Bugula sp. and some encrusting sponges. Current exposed slab rims had coverings of Halichondria panicea, which is common in similar situations on the chalk reefs in the area, and Pachymatisma johnstonia which by contrast has not been recorded from chalk reefs at all. This may be the most easterly record of this sponge species. Fish life was notable. Large numbers of Bib Trisopterus luscus (Photo 6) and Poor Cod Trisopterus minutus were present, their density resembling that at a typical wreck site rather than a reef. Wrasses, such as the Goldsinny and Ballan Wrasse, were also present as was the typical crevice dwelling blenny in this area, the Tompot Parablennius gattorugine. Crustacea were not obviously common despite the suitable terrain though Edible and Velvet Swimming Crabs were recorded.

Additional Photographs:



Photo 4: Sloping Sandstone slabs with characteristic rectangular profile (Site 7B - B/03)

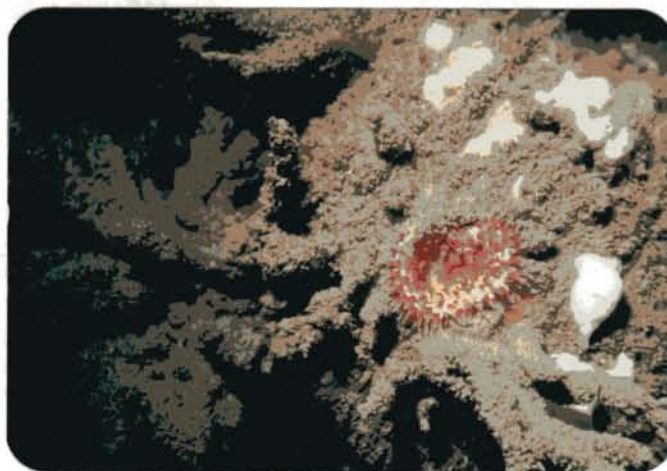
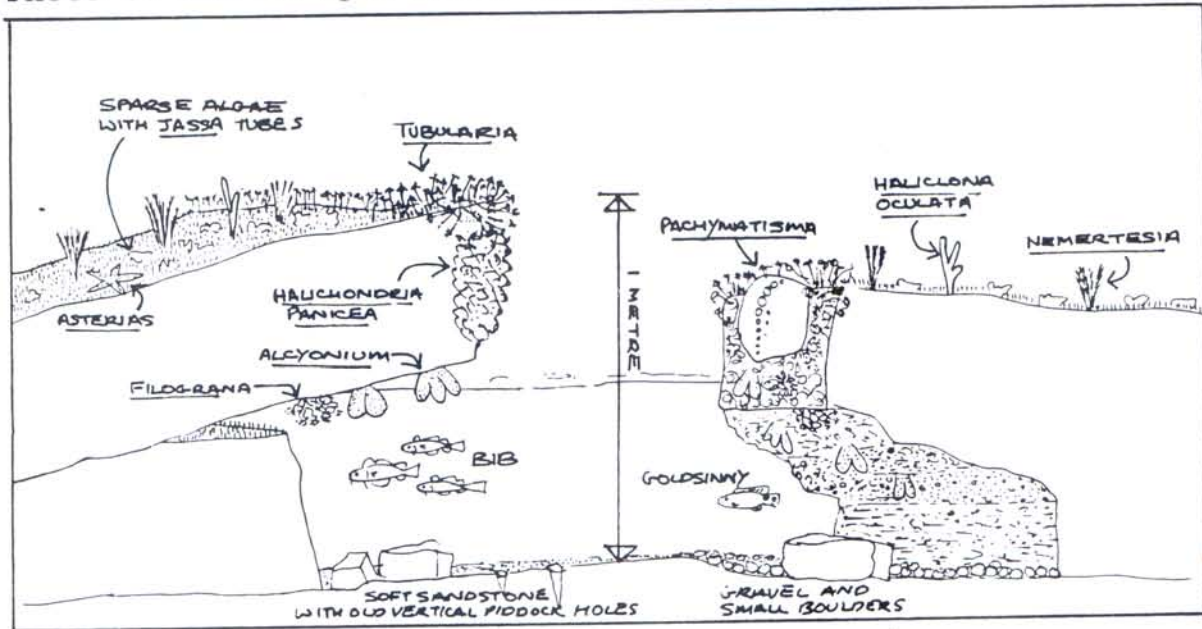


Photo 5: Alcyonidium diaphanum covered with silt (Site 5B)

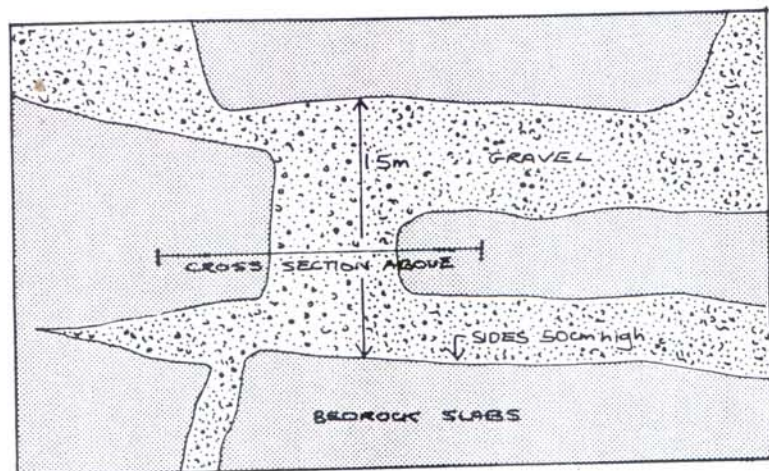
HABITAT A/B/03 (continued)



Photo 6: Bib amongst rocks (Site 5B - B/03)



section



plan

FIGURE 3. Cross Section and Plan of Sandstone slab habitat at Horse of Wilingdon (Site 4).

HABITAT A/B/03 (continued)

Occurrence

- Site 4 - Horse of Wilingdon, depth 5-9m. An extensive area of bedrock slabs forming the upper part of the reef (Figure 3). The area is clearly heavily fished with much discarded line and tackle with other boating debris.
- Site 5A - Royal Sovereign Shoals (north-west), depth 7m. Some Sandstone slabs on an otherwise smooth area of gently sloping Sandstone bedrock.
- Site 5B - Royal Sovereign Shoals (south-west), depth 10-14m. Slabs on bedrock providing vertical and horizontal surfaces. Forming transition between smooth Sandstone bedrock on the one side (Habitat B/01) and jumbled boulders on the other (Habitat H/01). Area of slabs much less extensive than at Horse of Wilingdon (Site 4).
- Site 5C - Royal Sovereign Shoals (south-east), depth 12m. Area of broken and fissured bedrock - see Habitat B/05.
- Site 6 - Sovereign Buoy, depth 16m. Slabs of flat Sandstone bedrock on a flat sand and gravel seabed.
- Site 7A - Light Tower (north side), depth 12-13m. Bedrock slabs up to 2m long/wide and 75cm high, lying on gravel and coarse sand with areas of Grey Chalk exposed below in places (Photo 3).
- Site 7B - Light Tower (south side), depth 10-18m. Large flat slabs at 10m and further west at 16m, some piled on one another (Photo 4). Widely spaced slabs on sloping sand below to 18m. Flat sand at 18m also with occasional slabs.

HABITAT CODE NUMBER: SE/B/04

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: B: Circalittoral Bedrock

SITE TYPE: Flat bedrock overlain with sand/cobble

LOCATION (SITE NOS): 3, 4, 5A, 5B, 7B

DOMINANT COMMUNITY:

SITE DETAILS

Situation: Open Sea  
Depth: 8-18m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology: Grey Chalk/Sandstone

HABITAT DETAILS

Zone: Circalittoral  
Substratum: Grey  
Chalk/Sandstone bedrock  
Modifiers:  
Features: Sediment on rock

PHOTOGRAPH(S):



Photo 7: Chalk exposed amongst sand and gravel (Site 3)

DESCRIPTION:

Flat bedrock below reefs. Usually of grey Lower Chalk in deeper areas and Sandstone where part of the main reef. Covered by a thin layer of sand/shelly sand/cobbles (Photo 7).

Communities

Limited sessile life owing to the unstable nature of the overlying sand or cobbles. Species present included two of the "chimney" sponges, Ciocalypta penicillus (Photo 8) and Polymastia mamillaris. Both have long chimney-like oscula which allow them to survive in unstable conditions. Other sessile species included the hydriod Corymorpha nutans, and anemonies Sagartia sp., Cereus pedunculatus and Urticina felina (Photo 8). Mobile species were starfish, Asterias rubens (Photo 7), whelk Buccinum undatum and hermit crabs.

HABITAT B/04 (continued)

Additional Photographs



Photo 8: Ciocalyptha and Urticina on shelly sand overlying bedrock (Site 3)



Photo 9: Grey Chalk exposed below gravel (Site 5A)



Photo 10: Sand, cobbles and boulders over Chalk (Site 7B)

## HABITAT B/04 (continued)

### Occurrence

- Site 3 - Elphick Tree, depth 11m. Area of flat Sandstone with covering of coarse sand. At one edge a 150mm vertical ledge supported a wider range of life.
- Site 3 - Elphick Tree, depth 13m. Flat Grey Chalk area off main reef. Some parts covered with silty sand (Photo 7), others clean with sand filled vertical piddock holes (no live species seen).
- Site 4 - Horse of Wilingdon, depth 9m. Flat Chalk bedrock covered with sand and gravel. Eastern side of reef.
- Site 4 - Horse of Wilingdon, depth 13-13.5m. Flat Grey Chalk with a thin silt/fine sand covering 0.5-1cm thick. Off reef to western side.
- Site 5A - Royal Sovereign Shoals (north west), depth 6-10m. Small exposure of Grey Chalk bedrock at 6m (Photo 9). Smooth Sandstone bedrock with some shallow crevices. Gently sloping with bare surface and cobbles in crevices at higher level and general cover of cobbles lower down (8-10m).
- Site 5B - Royal Sovereign Shoals (south west), depth 11m. An area of consolidated sand and clay forming a hard surface. Vertical piddock burrows (old and sand filled)
- Site 5B - Royal Sovereign Shoals (south west), depth 11-14m. On main area of reef. An area of flat gently sloping bedrock overlain with silty sand and shell fragments, often collecting together into pockets.
- Site 7B Light Tower (south side), depth 16-17m. Chalk overlain with silty, shelly sand up to 30cm thick and also boulders and Sandstone slabs.
- Site 7B Light Tower (south side), depth 18m. Flat Grey Chalk overlain with fine clean sand with scattered cobble and small boulders - a continuation of area above (Photo 10).





HABITAT CODE NUMBER: SE/B/05

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: B: Circalittoral Bedrock

SITE TYPE: Raised Bedrock Reef

LOCATION (SITE NOS): 5B, 5C

DOMINANT COMMUNITY: Tunicates and erect sponges

**SITE DETAILS**

Situation: Open Sea  
Depth: 8-15.  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology: Sandstone

**HABITAT DETAILS**

Zone: Circalittoral  
Substratum: Bedrock  
Modifiers: Broken bedrock  
                  slabs  
Features: silt covered  
                  surfaces

**PHOTOGRAPH(S):**



Photo 11: Rich vertical face at the top of bedrock ridge  
(Site 5C)

**DESCRIPTION:**

Bedrock at top of reef showing succession of erosion. Some areas of smooth sloping bedrock broken at reef crest into characteristically rectangular slabs.

**Communities**

Smooth upper faces with silt cover. Invertebrate cover dominated by tunicates Pycnoclavella aurilucens and Perophora listeri. Also some sponges, Ciocalypta penicillus and Haliclona oculata. Vertical faces and broken and fissured reefs with similar fauna to Boulder (Habitat H/01) and Bedrock Slab (Habitat B/03) areas. Fish life varied. Includes Bib, Poor Cod, Ballan Wrasse, Goldsinny and Tompot Blenny.

HABITAT B/05 (continued)

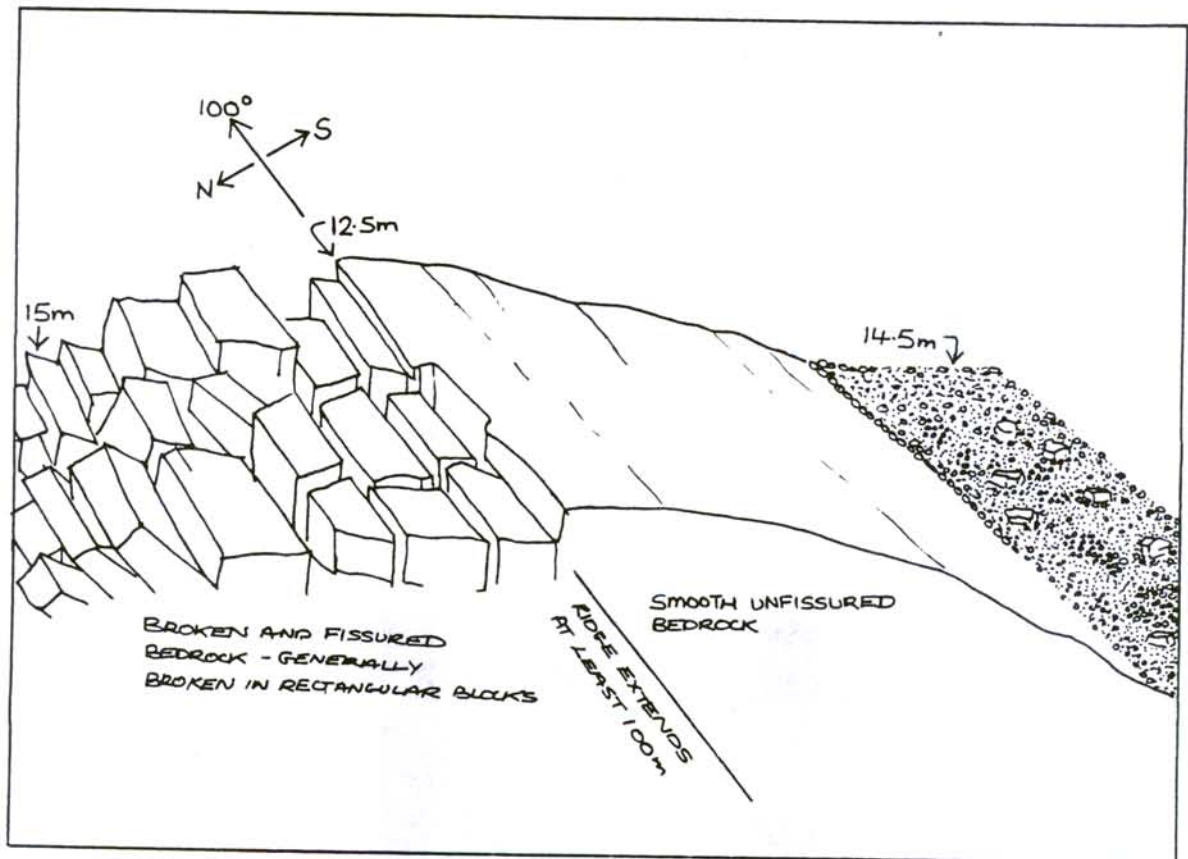


FIGURE 4. Sketch of raised reef structure at Royal Sovereign Shoals (south-east) (Site 5C).

Occurrence

Site 5B - Royal Sovereign Shoals (south-west), depth 8-10m. Smooth, very gently sloping bedrock with rectangular fault lines (Habitat A/01). Top of slope 8m with a 30cm deep drop then an area of large bedrock slabs 1m square and 30cm deep becoming more jumbled and dropping to 10m (Habitat A/B/03).

Site 5C - Royal Sovereign Shoals (south-east), depth 12-15m. Two areas of angled bedrock. Smooth unfissured 'dip' slope with either a low cliff 'scarp' face with boulders below, or a 'scarp' face of broken and fissured bedrock (photo 11) with a clear rectangular formation. The latter clearly represents an eroding stage in the breakup of the exposed bedrock (see Figure 4). A unique feature in the study area.

HABITAT CODE NUMBER: SE/C/01

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: C: Infralittoral Artificial Substrata

SITE TYPE: Concrete Wall

LOCATION (SITE NOS): 7A

DOMINANT COMMUNITY: Sessile fauna - hydroids, bryozoa, anthozoa

**SITE DETAILS**

Situation: Open Sea  
Depth: 0-8m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology:

**HABITAT DETAILS**

Zone: Infralittoral  
Substratum: Concrete  
Modifiers:  
Features:

**PHOTOGRAPH(S):**

No photograph available

**DESCRIPTION:**

Concrete foundation and vertical wall of Light Tower.

Communities

Concrete surfaces covered with hydroids, bryozoan turf, Plumose Anemonies and Actinothoe sphyrodeta.

HABITAT C/01 (continued)

Occurrence

Site 7A - Light Tower, depth at base 8m (Figure 5).

HABITAT CODE NUMBER: SE/D/01

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: D: Circalittoral Artificial Substrata

SITE TYPE: Metal Debris

LOCATION (SITE NOS): 7A, 7B

DOMINANT COMMUNITY:

**SITE DETAILS**

Situation: Open Sea  
Depth: 10m & 18m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology:

**HABITAT DETAILS**

Zone: Circalittoral  
Substratum:  
Modifiers:  
Features:

PHOTOGRAPH(S):



Photo 12: Encrusted chain near Light Tower (Site 7B)

**DESCRIPTION:**

Metal debris, presumably from construction process.  
Communities similar to boulders.

HABITAT D/01 (continued)

Occurrence

Site 7A - Light Tower, depth 10m. At base of boulder slope surmounted by Light Tower base.

Site 7B - Light Tower (south side), depth 18m. Heavy chain and anchor weight, possibly from former lightship (Photo 12).

HABITAT CODE NUMBER: SE/G/01 & SE/H/01

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: G/H: Infralittoral/Circalittoral Small Boulders

SITE TYPE: Individual boulders, boulder masses & boulder beds

LOCATION (SITE NOS): 3, 5A, 5B, 5C, 7A

DOMINANT COMMUNITY: Silt-tolerant fauna especially sponges and tunicates

#### SITE DETAILS

Situation: Open Sea  
Depth: G 5-9m, H 8-15m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology: Sandstone boulders

#### HABITAT DETAILS

Zone: Infralittoral/  
Circalittoral  
Substratum: bedrock/sediment  
Modifiers: small boulders  
Features: silt on boulders

#### PHOTOGRAPH(S):



Photo 13: General view of silty boulder bed (Site 5C)

#### DESCRIPTION:

Sandstone boulders 0.25 to 1m dimensions with a rounded or irregular form. Found either individually on areas of flat bedrock or soft seabed (Photo 13), or in jumbled boulder masses (Photo 14) or flat boulder beds.

#### Communities

Sparse foliose red algal cover in shallower areas. All surfaces silt covered. Major invertebrate cover was sponges (Photo 16) and tunicates with approximately 10 species of each recorded. Other larger invertebrates were anthozoans such as Alcyonium digitatum the colonial Epizoanthus sp. and ubiquitous Actinothoe sphyrodeta (Photo 17), hydroids such as Nemertesia and Obelia, and bryozoans Flustra, Chartella and Cellepora (Photo 18). Of particular note were substantial colonies of the Ross Coral, Pentapora foliacea (Photo 19).



Mobile life included Edible and Velvet Swimming Crabs, Common Starfish and fishes - Gunnel, Bib and Cuckoo Wrasse. Both Ross Coral and Cuckoo Wrasse appear to be very rare in occurrence in the eastern English Channel.

#### Additional Photographs



Photo 14: Boulder pile below Light Tower (Site 7A - H/01)



Photo 15: Algae and silt on shallow reef top (Site 5A - G/01)



Photo 16: Boulder with encrusting sponges, Dead Men's Fingers and hydroids (Site 5A)

HABITAT G/H/01 (continued)



Photo 17: Actinothoe sphyrodeta on small boulder amongst cobbles (Site 7B - H/01)



Photo 18: Cellepora pumicosa colony (Site 5B - H/01)



Photo 19: Pentapora foliacea  
colony (Site 5B - H/01)

HABITAT G/H/01 (continued)

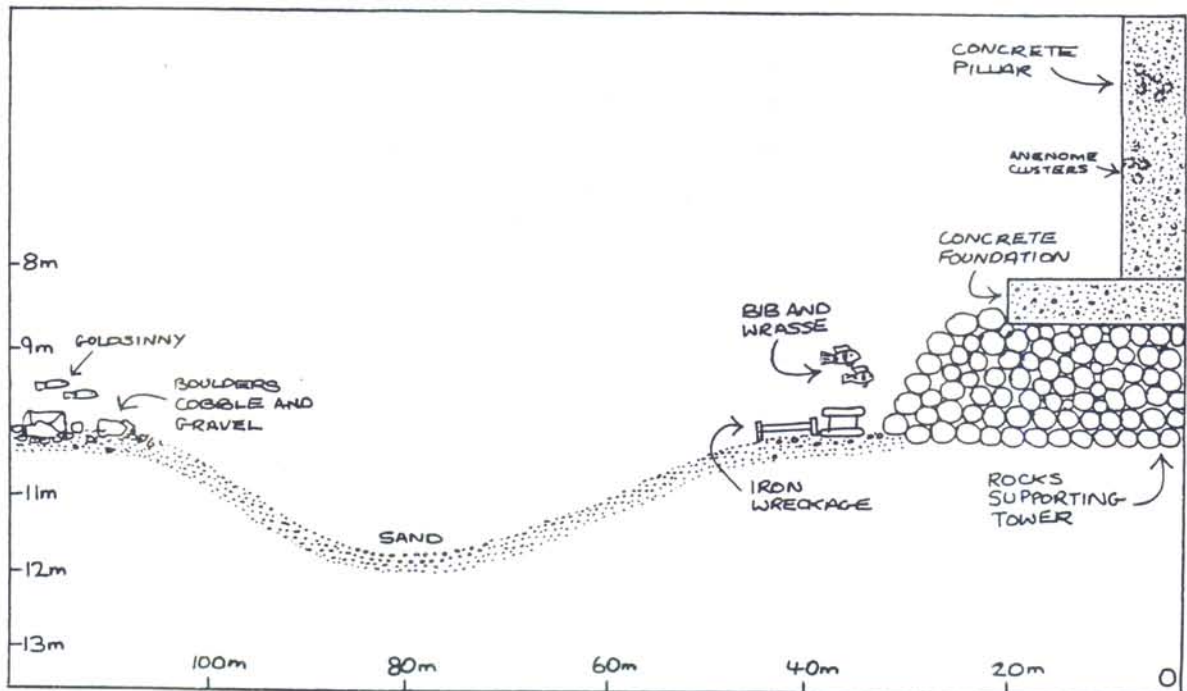


FIGURE 5. Sea Bed profile to north-west of Royal Sovereign Light Tower (Site 7A).

Occurrence

- Site 3 - Elphick Tree, depth 9m. Boulders on sand. Size approx 0.5m. Off reef to south-west.
- Site 3 - Elphick Tree, depth 11m. Smooth large boulders off reef to south west.
- Site 5A - Royal Sovereign Shoals (north-west), depth 5m. Boulder jumble on top of reef. Boulders up to 1m (Photo 24).
- Site 5B - Royal Sovereign Shoals (south-west), depth 9m. and in another area 14-15m. Smooth profiled scattered boulders ranging from 0.25-1m on silty and shelly sand and cobble bottoms.
- Site 5B - Royal Sovereign Shoals (south-west), depth 13-14m. Jumbled boulder slope about 1m high.
- Site 5C - Royal Sovereign Shoals (south-east), depth 12-13m. Extensive rich boulder bed of 0.5-1m. sized boulders, interspersed with smaller areas of pebble, coarse sand and cobble (Photos 21 & 22). Occasional flat beds of grey chalk visible below. Other areas with similar sized boulders in areas dominated by mobile substrata.
- Site 7A - Light Tower, depth 8-11m. Boulder mound forming base for concrete foundation of Light Tower (Photo 26 & Figure 5).

HABITAT CODE NUMBER: SE/K/01

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: Circalittoral stones

SITE TYPE: Mixed cobbles and pebbles

LOCATION (SITE NOS): 3, 5A, 7A, 7B

DOMINANT COMMUNITY: Barnacles and encrusting tunicates

SITE DETAILS

Situation: Open Sea  
Depth: 9-15m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology:

HABITAT DETAILS

Zone: Circalittoral  
Substratum: Cobbles  
Modifiers: Pebbles  
Features:

PHOTOGRAPH(S):



Photo 20: Cobble Bed with Flustra (Site 5A)

DESCRIPTION:

Flat cobble beds, normally unmixed but on occasions with some sand amongst them (Photo 20).

Communities:

Cobble surfaces dominated by barnacles. Hydroids, Nemertesia sp. and bryozoans, Flustra (Photo 20) and Chartella, on larger cobbles. In some areas cobbles covered with the encrusting tunicate Diplosoma spongiforme (Photo 21). Mobile life included sunstars.

HABITAT K/01 (continued)

Additional Photograph



Photo 21: Diplosoma encrusting over small boulder (Site 5A)

Occurrence

- Site 3 - Elphick Tree, 11m. Off main reef. Some areas of pure cobble but mixtures with gravel and sand more common (See P/04 below).
- Site 5A - Royal Sovereign Shoal (north west), 9-11m (Photo 20). Cobble beds off main reef area to west. Found between flat bedrock area to the east (Habitat B/04) and shelly gravel with scattered boulders (Habitat M/01) to the west.
- Site 7A - Light Tower (north side), depth 11.5m. Two small areas of pebble close to Light Tower itself and amongst areas of boulders (Habitat B/03) and shelly sand and boulders (Habitat P/02).
- Site 7B - Light Tower (south west side), depth 15m. Cobble bed close to Light Tower giving way to sandstone boulders and slabs further south (Habitat B/03).

HABITAT CODE NUMBER: SE/M/01

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: Circalittoral mixed hard & soft substrata

SITE TYPE: Gravel with boulders

LOCATION (SITE NOS): 5A, 5B

DOMINANT COMMUNITY:

**SITE DETAILS**

Situation: Open Sea  
Depth: 11-13m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology:

**HABITAT DETAILS**

Zone: Circalittoral  
Substratum: Shelly gravel  
Modifiers: small boulders  
Features: fine silt cover on  
boulders

**PHOTOGRAPH(S):**



Photo 22: Gravel and tunicate covered boulder (Site 5A)

**DESCRIPTION:**

Predominantly shelly gravel with occasional boulders (Photo 22). Flat seabed off main reef areas.

**Communities:**

Distinctly different fauna on gravel and boulders. Gravel areas as Habitat P/04 below. Boulders dominated by sponges and tunicates (Photo 22) with lower numbers of hydroids, Dead Men's Mingers and small foliaceous red algae. Fine silty covering over all boulder surfaces.

HABITAT M/01 (continued)

Occurrence

Site 5A - Royal Sovereign Shoal (north west), depth 12m. Lower surface away from main area of reef.

Site 5B - Royal Sovereign Shoal (south west), depth 11-13m. Similar location in relation to reef as 5A.

HABITAT CODE NUMBER: SE/M/02

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: M: Circalittoral Mixed Substrata

SITE TYPE: Boulder and Cobble mixture

LOCATION (SITE NOS): 2, 5B, 7A

DOMINANT COMMUNITY: Hydroid/Tunicate/Sponge/Anemone mix

**SITE DETAILS**

Situation: Open Sea  
Depth: 9.5-14m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology:

**HABITAT DETAILS**

Zone: Circalittoral  
(Infralittoral)  
Substratum: Boulders/Cobbles  
Modifiers: shelly sand &  
gravel  
Features:

**PHOTOGRAPH(S):**

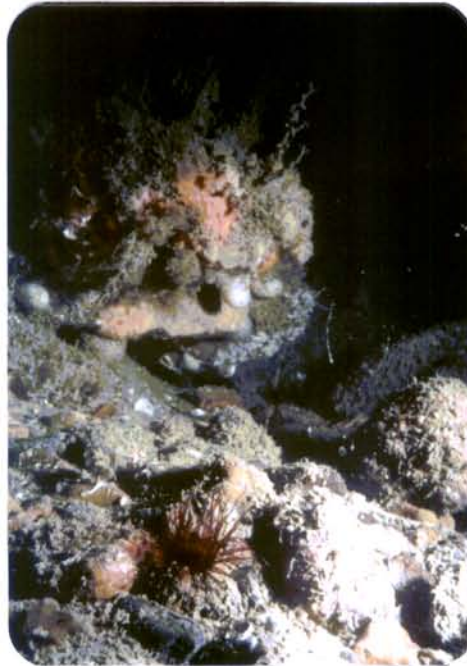


Photo 23: Boulder, cobbles  
and silty sand (Site 5B)

**DESCRIPTION:**

Boulder and cobble mixtures with some shelly sand and gravel.

**Communities.**

Boulders with upper surfaces silt covered with amphipod silt tubes believed to be Jassa falcata. Few small red algae. Other common species, hydroids Nemertesia antennina and Tubularia indivisa (tubes only), sponge Halichondria panicea, colonial tunicate Diplosoma and the small anemone Actinothoe sphyrodeta.



HABITAT M/02 (continued)

Additional Photograph



Photo 24: Silt covered cobbles and small boulders (Site 5B)

Occurrence

Site 2 - Off Elphick Tree, depth 12-12.5m. Large boulders up to 1.5m high on cobble seabed with some shelly sand. Distinct dunes of sand on the eastern side of the boulders.

Site 5B - Royal Sovereign Shoal (south west), depth 14m (Photos 23 & 24). Small boulders and cobbles "welded" together with silty sand and gravel.

Site 7A - Light Tower (north side), depth 9.5m. Mixture of 50% cobble and 50% small boulders (max dimensions 30-100cm). Upper surface quite close to Light Tower and above shelly sand ridge (Habitat P/03).

Site 7A - Light Tower (north), depth 10m. Predominantly sand area mixed with cobbles and small/medium sized boulders. Approx. 100m from Tower and separated from it by an area of sand (Habitat P/02).

HABITAT CODE NUMBER: SE/P/01

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: P: Circalittoral Gravel and Sand

SITE TYPE: Muddy Sand

LOCATION (SITE NOS): 1, 3, 5C, 6

DOMINANT COMMUNITY: Alcyonidium diaphanum and mobile invertebrates

SITE DETAILS

Situation: Open Sea  
Depth: 13m-16m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology:

HABITAT DETAILS

Zone: Circalittoral  
Substratum: Muddy sand  
Modifiers: Shell debris/gravel  
Features:

PHOTOGRAPH(S):



Photo 25. Muddy Sand with Buccinum undatum

DESCRIPTION:

Muddy sand was always found mixed with coarser sediments, principally shell debris and gravel. When muddy sand predominated in such a mixture there was typically a flat featureless surface.

Communities.

No attempt was made to sample the infauna though there was little evidence of burrows and casts. Significant sessile surface fauna comprised the fleshy bryozoan Alcyonidium diaphanum and Dahlia Anemone Urticina felina, Dead Men's Fingers Alcyonium digitatum were also present in smaller numbers. Mobile fauna was dominated by the Common Starfish Asterias rubens together with hermit crabs, small spider crabs and the Common Whelk Buccinum undatum (Photo 25). No algae were recorded in this habitat.

HABITAT P01 (continued)

Occurrence.

Site 1 - Off Langney Point, depth 13m.

This habitat is assumed to be widespread between the shore and the reefs. It is very similar to that recorded offshore from Hastings in a similar depth (Wood, 1986).

Site 3 - Elphick Tree, depth 14m.

Off reef area to west.

Site 5C - Royal Sovereign Shoal (south east), depth 15m.

Site 6 - Sovereign Buoy, depth 16m.

Between the rocky outcrops of the Royal Sovereign Shoal and the Light Tower.

HABITAT CODE NUMBER: SE/P/02

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: P: Circalittoral Gravel and Sand

SITE TYPE: Fine Sand

LOCATION (SITE NOS): 5B, 7A, 7B

DOMINANT COMMUNITY:

**SITE DETAILS**

Situation: Open Sea  
Depth: 8.5-15m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology:

**HABITAT DETAILS**

Zone: Circalittoral  
Substratum: Fine Sand  
Modifiers: Small boulders  
Features:

**PHOTOGRAPH(S):**



Photo 26: Fine Sand (Site 5B)

**DESCRIPTION:**

Fine clean sand (Photo 26) with occasional boulders (Photo 27).

**Communities**

Little fauna visible. Species seen included Sunstar Crossaster papposus, Alyconidium diaphanum, Corymorpha nutans, and Dahlia Anemone Urticina felina. Boulders with attached life, Dead Men's Fingers Alcyonium digitatum prominent (Photo 27).

HABITAT P02 (continued)

Additional Photograph



Photo 27: Boulder on fine sand

Occurrence.

Site 5B - Royal Sovereign Shoal (south west), depth 13-14m.  
To the south west of main reef area.

Site 7A - Light Tower (north), depth 11.5m. An area of flat sand between shallower areas of more mixed substrata (Habitats K/01 & G/H/01).

Site 7A - Light Tower (south east), depth 8.5-13m. A sloping band of sand with pebbles and shell fragments running approximately north-south and to the east of the Light Tower. Top of slope forming a ridge capped with coarse shelly sand & boulders. Bottom of slope interfacing with flat gravel/cobble/sand seabed.

Site 7B - Light Tower (south), depth 12-15m. A band of sand sloping gently from 12-15m. and running parallel with southern side of reef. Exposed rock surfaces both above and below band of sand.

HABITAT CODE NUMBER: SE/P/03

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: P: Circalittoral Gravel and Sand

SITE TYPE: Coarse/Shelly Sand

LOCATION (SITE NOS): 3, 5B, 7A

DOMINANT COMMUNITY:

**SITE DETAILS**

Situation: Open Sea  
Depth: 10-13m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology:

**HABITAT DETAILS**

Zone: Circalittoral  
Substratum: Coarse/shelly  
sand  
Modifiers:  
Features: small boulders

**PHOTOGRAPH(S):**



Photo 28: Coarse sand with Corymorpha nutans (Site 3)

**DESCRIPTION:**

Coarse shelly sand ridge or slope (Photo 28) with small boulders (40-80cm) (Photo 29).

**Communities.**

Most obvious life on boulders rather than on sand. Hydroids Nemertesia sp. and bryozoans on rocks with anemones Actinothoe sphyrodeta and Sagartia troglodytes. Corymorpha nutans on sand (Photo 28). Common Starfish, hermit crabs and Plaice present.

HABITAT P03 (continued)

Additional Photograph



Photo 29: Small boulder on sand (Site 7A).

Occurrence

Site 3 - Elphick Tree, depth 11m. Area of coarse sand off reef to south west.

Site 5B - Royal Sovereign Shoals (south-west), depth 10-12m. Coarse sand with burrowing animals.

Site 7A - Light Tower. As top of north-south ridge at 12m. (See habitat P/02) falling on fine sand to east and to boulder/cobble substratum (13m) to west. Also sloping gently upwards to base of Light Tower on north side.

HABITAT CODE NUMBER: SE/P/04

SURVEY NAME/AREA: Sandstone Reefs off Eastbourne, E. Sussex

HABITAT TYPE: P: Circalittoral Sand and Gravel

SITE TYPE: Gravel, Sand and Cobble mixture

LOCATION (SITE NOS): 2, 3, 5B, 6, 7A

DOMINANT COMMUNITY: Attached/burrowing fauna

SITE DETAILS

Situation: Open Sea  
Depth: 5-16m  
Salinity: Normal  
Wave Exposure: Very Exposed  
Tidal Streams: Mod. Strong  
Geology:

HABITAT DETAILS

Zone: Circalittoral  
(Infralittoral)  
Substratum: Mixed  
Modifiers:  
Features:

PHOTOGRAPH(S):

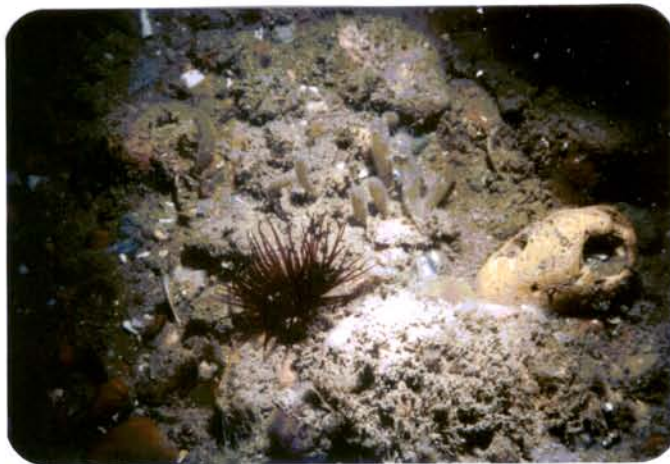


Photo 30: Mixture of cobble, gravel and silty sand with Cerianthus (Site 3)

DESCRIPTION:

Mixtures of gravel (Photo 31), cobble (Photo 30), fine and shelly sand (Photo 32) without signs of bedrock below. Normally occurring on edges of reefs sometimes in distinct bands. The mixed habitat and species mixture is common in the English Channel.

Communities:

Prominent sessile species Alcyonidium diaphanum and barnacles on cobbles. Other species including anemones, Urticina felina, Sagartia troglodytes (Photo 31), Actinothoe sphyrodeta and Cerianthus lloydii (Photo 30); also Corymorpha nutans, Myxicola infundibulum and Lanice conchilega. No algae were present at these sites. Mobile species composition was dominated by Common Starfish, Asterias rubens (Photo 32), in



densities of up to 10 per square metre. They were apparently feeding on barnacles. A variety of crustacea were found in these habitats, Edible Crab, Cancer pagurus, small spider crabs and hermit crabs being the most common. Fish life was poor though Plaice, dragonets and gobies were present.

Additional Photographs.



Photo 31: Clean gravel with Sagartia troglodytes (Site 5B)



Photo 32: Mixture of sand, cobble and gravel with Asterias rubens (Site 3)

#### Occurrence

Site 2 - Off Elphick Tree, depth 12.5-13m.

Mixture of gravel 50%, shelly sand 25% and cobble 25%.  
Flat surface.

Site 3 - Elphick Tree, depth 13m bcd. Mixture of cobble, pebble and silty sand.

Site 5B - Royal Sovereign Shoals (south-west), depth 12m. Flat plain of cobble and shelly sand.

Site 6 - Royal Sovereign buoy, depth 16m. A mixture of gravel and sand with a few small boulders.

Site 7A - Light Tower, 12.5m. Flat lower surface below sandy slope. Mixture of coarse gravel, cobble and sand.

#### 4. DISCUSSION AND CONCLUSIONS

There are relatively few offshore rocky reefs in the eastern English Channel. Most of those that occur are based on Chalk outcrops rather than the harder Sandstone. The nearest comparable Sandstone reefs are at Bognor Regis and Pullar Bank off Selsey Bill, both in West Sussex (Wood, 1984). Both are significantly further west than the Eastbourne reefs. There are parallels in terms of both habitats and species between the West Sussex reefs and those off Eastbourne. The most significant difference between them is the level of siltation which is considerably higher off Eastbourne.

There are significant differences in habitats and species between Eastbourne and the Chalk reefs in East and West Sussex, based largely on the relative hardness of the Sandstone reefs. Species which occur on Sandstone but not on Chalk are slower growing ones. The most prominent are the Ross Coral, Pentapora foliacea and the Elephant Hide Sponge, Pachymatisma johnstonia. Levels of siltation at Eastbourne are similar to the reefs off the Seven Sisters (Wood & Jones, 1986) and at Dover (Wood & Wood, 1986), both of which are on the coastal fringe, but higher than offshore Chalk reefs such as Worthing Lumps (Wood, 1984).

The seabed immediately surrounding the Sandstone reefs, whilst mostly comprising sands and gravels, does include significant areas of exposed flat Chalk bedrock. These support a number of species which are otherwise uncommon in the area, for example the sponge, Ciocalypta penicillus. Similar areas are found offshore from the Seven Sisters.

Further from the reefs the predominant seabed is of muddy sand. This is common in the eastern Channel, with similar areas being recorded off Hastings (Wood, 1986) and Dover (Wood & Wood, 1986).

In the rocky areas the most significant feature is the high diversity of habitats. There is no logical progression from one to another or from sandy to rocky features and a variety of habitats may occur within a small area.

In aesthetic terms the underwater scenery is not remarkable as the reef edges are gradual rather than sudden and there are few major features. However, the area provides reef diving where there are few other opportunities to explore rocky areas and the combination of distance, tidal calculations and the 'target' of the Light Tower combine to present a challenge which adds to the attraction of the area.

Human pressures on the reefs are limited. There is a significant amount of amateur fishing carried out, as witnessed by the discarded line and tackle at the Horse of Wilingdon, and pot fishing also takes place on the reefs. Siltation is the biggest modifier of the habitats and has a significant effect on the species composition. This is presumably the result of both natural and human factors over a wide area, and there is no single obvious local source.

The survey has provided the basis for comparisons between reefs in the eastern English Channel and also between reefs of different rock types within the same broad geographical area. The contrasts set the area out as an interesting one. A combination of the information available from this survey with others carried out by the Marine Conservation Society elsewhere in the eastern English Channel could be used to produce a comprehensive SEASEARCH habitat manual for this area.

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**APPENDIX ONE - SPECIES LIST**

Species Lists were a secondary consideration to the description of the habitats occurring at the various sites. The following list has been compiled from lists made by divers and the photographs but is not intended to be in any way comprehensive. Nomenclature and species numbers follow Howson (1987).

	Site Number									
	1	2	3	4	5A	5B	5C	6	7A	7B
PORIFERA (C)										
27				x						
35				x		x				
167				x						
221				x	x	x				
258				x						
261				x			x			x
302										x
407					x					
429							x			x
484				x	x	x			x	x
492				x		x	x			
523				x	x	x	x			x
583							x			
596				x	x	x	x		x	
647				x						
775				x	x		x			x
809						x				
858				x	x					x
860				x	x	x	x		x	x
862				x						
863							x			
890				x	x	x	x			x
HYDROZOA (D)										
121						x	x			
144					x		x		x	x
523							x			
597					x	x	x	x	x	x
599							x			x
653							x			
677							x			
728							x			
ANTHOZOA (D)										
1024	x	x	x	x	x	x	x	x	x	x
1075						x	x	x		
1107										x
1168	x	x	x	x	x	x				x
1225					x	x				x
1230							x	x		x
1231						x				x
1232						x			x	
1237						x	x	x		
1241					x	x	x	x	x	x

	1	2	3	4	5A	5B	5C	6	7A	7B
PLATYHELMINTHES (F)										
162 Prostheceraeus vittatus				x	x	x	x			
ANNELIDA (P)										
26 Aphrodita aculeata										x
2031 Lanice conchilega		x				x				
2156 Bispira volutacornis				x	x					
2227 Myxicola infundibulum						x				
2304 Pomatoceros triqueter									x	
2326 Filograna implexa				x	x	x	x			x
CRUSTACEA (S)										
955 ? Jassa falcata		x		x		x			x	
2360 Homarus gammarus				x						x
2444 Paguridae sp.	x	x	x		x			x		
2502 Pisidia longicornis				x						
2553 Maja squinado				x						
2582 Macropodia sp.				x		x				
2646 Cancer pagurus		x		x	x	x	x		x	x
2672 Liocarcinus puber				x	x	x	x		x	x
MOLLUSCA (W)										
200 Calliostoma zizyphinum				x		x				
726 Crepidula fornicata						x				
737 Trivia arctica						x				
738 Trivia monacha				x						
844 Buccinum undatum	x		x							
1279 Doto fragilis							x			
1358 Limacea clavigera										x
1362 Polycera faeroensis				x						
1363 Polycera quadrilineata				x		x				
1403 Archidoris pseudoargus				x		x				
1411 Discodoris sp.				x						
1418 Jorunna tomentosa				x						
1460 Flabellina pedata				x						
1515 Eubbranchus tricolor						x				
2393 Sepia officinalis									x	
BRYOZOA (Y)										
137 Alcyonidium diaphanum	x	x				x	x			
351 Pentapora foliacea						x	x		x	
606 Cellepora pumicosa				x	x	x	x			
694 Flustra foliacea		x	x	x	x	x	x			x
705 Chartella papyracea				x	x		x			x
814 Cellaria sinuosa				x					x	
875 Bugula plumosa				x						
875 Bugula turbinata										x
PHORONIDA (ZA)										
4 Phoronis hippocrepia										

	1	2	3	4	5A	5B	5C	6	7A	7B
ECHINODERMATA (ZB)										
149				x	x		x			
165				x		x				x
190	x	x	x	x	x	x	x		x	x
TUNICATA (ZD)										
6				x	x	x				x
12					x	x	x			
17				x						
32				x						
46				x	x					
57				x						
64					x					
68				x		x			x	
96					x		x		x	x
129					x	x	x			
209				x	x	x				x
214				x		x				
252				x	x					x
PISCES - CHONDRICHTHYES (ZF)										
40							x			
PISCES - OSTEICHTHYES (ZG)										
173							x			
208									x	x
218				x	x	x	x	x	x	x
219					x		x		x	x
576				x						x
592							x			
605				x	x	x	x		x	x
609				x	x	x	x		x	x
610							x			x
636				x	x		x		x	x
680				x			x			
700		x		x	x	x			x	x
742							x		x	x
748										x
903				x		x				x
929									x	





APPENDIX TWO - LIST OF PHOTOGRAPHS

Photo Number	Description	Site Number	Photo-grapher
1	Royal Sovereign Light Tower with Beachy Head in background	7A	WH
2	Habitat A/03 - Large sandstone boulder on chalk bedrock overlain with pebbles	5A	WH
3	Habitat B/03 - Tilted sandstone slab	7A	GA
4	Habitat B/03 - Sloping Sandstone slabs with characteristic rectangular profile	7B	PH
5	Habitat B/03 - <u>Alcyonidium diaphanum</u> covered with silt	5B	PH
6	Habitat B/03 Bib amongst rocks	5B	GA
7	Habitat B/04 - Chalk exposed amongst sand and gravel	3	WH
8	Habitat B/04 - <u>Ciocalypa</u> & <u>Urticina</u> on shelly sand overlying bedrock	3	PH
9	Habitat B/04 - Grey clay exposed below gravel	5A	WH
10	Habitat B/04 - Sand, cobbles and boulders over chalk	7B	WH
11	Habitat B/05 - Rich vertical face at top of bedrock ridge	5C	GA
12	Habitat D/01 - Encrusted chain near Light Tower	7B	WH
13	Habitat H/01 - General view of silty boulder bed	5C	GA
14	Habitat H/01 - Boulder pile below Light Tower	7A	GA
15	Habitat G/01 - Algae and silt on shallow reef top	5A	WH
16	Habitat G/H/01 - Boulder with encrusting sponges, Dead Men's Fingers & hydroids	5A	WH
17	Habitat H/01 - <u>Actinothoe sphyrodeta</u> on small boulder amongst cobbles	7B	WH
18	Habitat H/01 - <u>Cellepora pumicosa</u> colony	5B	PH
19	Habitat H/01 - <u>Pentapora foliacea</u> colony	5B	WH
20	Habitat K/01 - Cobble bed with <u>Flustra</u>	5A	WH
21	Habitat K/01 - <u>Diplosoma</u> encrusting over small boulder	5A	WH
22	Habitat M/01 - Gravel and tunicate covered boulder	5A	WH
23	Habitat M/02 - Boulder, cobbles and silty sand	5B	WH
24	Habitat M/02 - Silt covered cobbles and small boulders	5B	WH
25	Habitat P/01 - Sand with <u>Buccinum undatum</u>	3	WH
26	Habitat P/02 - Fine sand	5B	WH
27	Habitat P/02 - Boulder on fine sand	5B	WH
28	Habitat P/03 - Coarse sand with <u>Corymorpha nutans</u>	3	PH
29	Habitat P/03 - Small boulder on sand	7A	GA
30	Habitat P/04 - Mixture of cobble, gravel & silty sand with <u>Cerianthus</u>	3	WH
31	Habitat P/04 - Clean gravel with <u>Sagartia troglodytes</u>	5B	PH

32      Habitat P/04 - Mixture of sand, cobble & 3      WH  
                 gravel with Asterias rubens

\* Key to photographers

GA - Graham Ackers  
PH - Peter Hewitt  
WH - William Hewitt