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SOCIETY

SEASEARCH

Marine Nature Conservation Review



Seasearch is run by the Marine Conservation Society on behalf of the

Joint Nature Conservation Committee as a part of the Marine Nature Conservation Review of Great Britain

SEASEARCH SURVEY OF THE DURHAM COAST

Catherine-Jean Loretto

1992

92/SS/1

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SEASEARCH SURVEY OF THE DURHAM COASTLINE

Catherine-Jean Loretto

1992

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PREFACE

SEASEARCH is a survey of the sublittoral marine habitats of Great Britain. The project is run by the Marine Conservation Society on behalf of the Joint Nature Conservation Committee (JNCC). (JNCC is the statutory body constituted by the Environmental Protection Act 1990 to be responsible for advice on nature conservation at UK and international levels. The JNCC is established by English Nature, the Nature Conservancy Council for Scotland and the Countryside Council for Wales).

The aims of the SEASEARCH project are:

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

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

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

Further details of SEASEARCH can be obtained by writing to:

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

SEASEARCH SURVEY OF THE DURHAM COASTLINE.

C-J Loretto.

February 1992

SYNOPSIS

SEASEARCH survey techniques were used to collect information on the main habitat and community types along the Durham coastline on the north east coast of Britain. Seven different habitat types were identified none of which had been observed on previous SEASEARCH surveys in other areas of Britain.

The coastline of the survey area is open and habitats and communities along its length are affected by tidal streams. The predominant direction of drift is north to south.

The seabed within the survey area is predominantly sedimentary and highly mobile, with great evidence of the impact of mans activities. There are areas of exposed subtidal rock to the north of the survey area, inshore these areas are depleted of life and are affected by colliery waste and spoil dumping.

There is little tourism in the area. The major local industry is coal mining which has had a considerable impact on the coast and on the inshore areas of seabed.

There is a certain degree of smothering of the seabed by colliery waste and dredged spoil and diversity of species is low. Further offshore the seabed is muddy with boulders and mixed sediments dominated by animal communities, particularly the soft coral *Alcyonium digitatum*, on boulders and rocks along with hydroids and bryozoans. The water in these areas is turbid and there is much silt.

The deeper habitats offshore are predominately coarse sediment plains with boulders. Overlying all the sites investigated was a layer of fine dark silt possibly originating from the mine waste water.

Investigation of the southern most area of the survey was not completed due to inclement weather, and difficulties with obtaining and launching boats.

CONTENTS

1.	INTRODUCTION	1
1.1	Large scale characteristics of the area	1
2.	METHODS	2
2.1	Sampling strategy	3
2.2	Access to the sites	5
3.	RESULTS	5
3.1	Introduction	5
3.2	Details of dive sites off the Durham Coast	6
3.3	General description of habitats and communities off the Durham coastline	7
3.4	Human impacts in the survey area	8
3.5	Catalogue of habitats recorded during the survey	16
4.	ACKNOWLEDGMENTS	23
5.	REFERENCES	24
	APPENDIX 1. SEASEARCH recording form.	25
	APPENDIX 2. Plan for the Durham Coastline 1991.	26

1. INTRODUCTION

The main aim of SEASEARCH is to identify and describe the major sublittoral habitat and community types at specific locations around the coast of Great Britain. The survey areas are selected by the Joint Nature Conservation Committee to assist with their Marine Nature Conservation Review programme; the information is collected using volunteer divers. Results are required to give a general impression of the area as well as being sufficiently detailed to enable JNCC staff to identify sites of potential marine nature conservation importance, and sites in need of further investigation. The location of the survey area is shown in Figure 1.

As a part of the 1991 programme, a SEASEARCH survey of the Durham coast was organised which was to be carried out by local divers, over the summer of 1991 with guidance from the project leader on certain dates. A photographic record of the different habitats and communities was made where possible to complement dive site descriptions.

A background literature search for the survey area revealed much useful information in terms of large scale characteristics. However information for the major sublittoral habitats and community types in the area is limited. Much useful information is presented by Eagle *et al.* 1978.

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

1.1 Large scale characteristics of the area

The Durham coastline is approximately 15 km long and is situated on the north east coast of Britain. It is an exposed coast and there is continual erosion of the beaches and the cliffs. There is no major input of freshwater from rivers along the length of the coastline and the water is well mixed. There was no evidence of stratification of the water column at the dive sites. There is input from industrial waste water at Easington and Dawdon and raw sewage outfalls from Seaham. There are mines at Seaham, Vane Tempest, Dawdon and Easington. Several of these mines are scheduled for closure in the near future. Dumping of colliery waste directly onto the beaches at Easington and Dawdon has been carried out for over 70 years.

The area of the survey is unique in many respects; for instance, it is one of the few areas in Britain where coastal magnesian limestone cliffs occur. The cliffs have nature conservation importance for their rare fauna and flora. The bottom of the cliffs are protected from erosion due to wave action by the solid

mine waste that is dumped on the beaches artificially raising the height. In some cases there have been chemical reactions within the mine waste which cause the components of the waste to fuse forming a large solid mound which acts as artificial coastal "protection" (Humphries and Scott 1990). The cliffs and the mine waste provide the beaches with coarse material which is subsequently eroded to provide sand for the beaches along the coast. There are a series of deeply cut valleys or denes along the coast at Seaham, Hawthorne, Foxhole, Castle Eden, and Crimdon Beach. The beaches of the survey area have a low amenity value due to the dumping that takes place, the sand is blackened and coal is washed up on the shore. In the survey area the solid geology is mainly magnesian limestone and also Hartlepool and Roker dolomites. They are faulted against underlying Bunter sandstone approximately 15km offshore to the east (Figure 2), which is 4km outside the survey area (McGraw *et al.* 1963). Although there is much coal mining in the area, coastal land use is predominantly agricultural, although there is industrial development at Seaham.

The coastal drift is from north to south and there are four coastal cells in the area between the Tees and the Tyne (Bullen *pers comm*). Coastal cells are a method to divide and compartmentalise the coast in terms of longshore drift, current flow and wave convergence and divergence. The cells within the survey area run from Sunderland to Seaham, Seaham to Easington and from Easington to Hartlepool. Sea water for washing mine waste is abstracted at Easington and later discharged. There is a major sludge/spoil dumping ground north of the survey area. South of Seaham Harbour there is a smaller dumping ground for the spoil dredged from the harbour.

There is one major port within the survey area, of Seaham Harbour which handles around 460 vessels a year, none of which form part of a regular traffic.

2. METHODS

The Durham coastline was chosen as the survey area by the JNCC's MNCR staff because studies of the NE coastline forms the next phase of the MNCR programme beginning in April 1992. The offshore boundary was set at the 30 metres isobath which gave an approximate survey area of 117km² along approximately 15 km of coastline. The survey was carried out over the summer of 1991 by volunteer divers local to the area under study. A draft recording form was used for much of the survey but all the information collected during the survey has been transferred to the final SEASEARCH recording form and habitat recording form (see Appendix 1).

Team members were instructed to act as Recorders or Photographers and dived at sites previously identified by the project leader as shown Figure 3 (see Plan for Durham Coastline, Appendix 2). Recorders made notes of the habitats encountered and the visually

Figure 1: To show the location of the survey site.

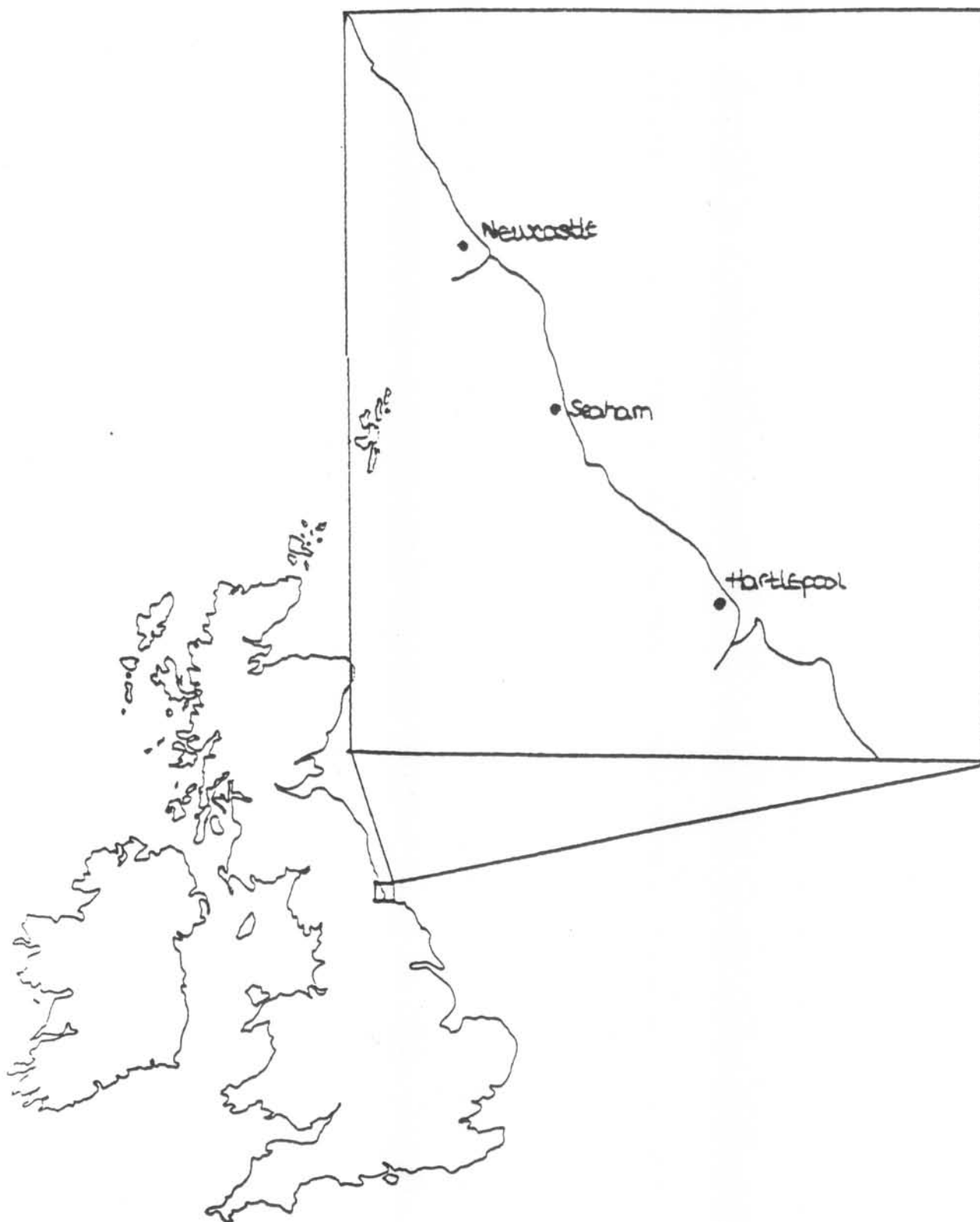
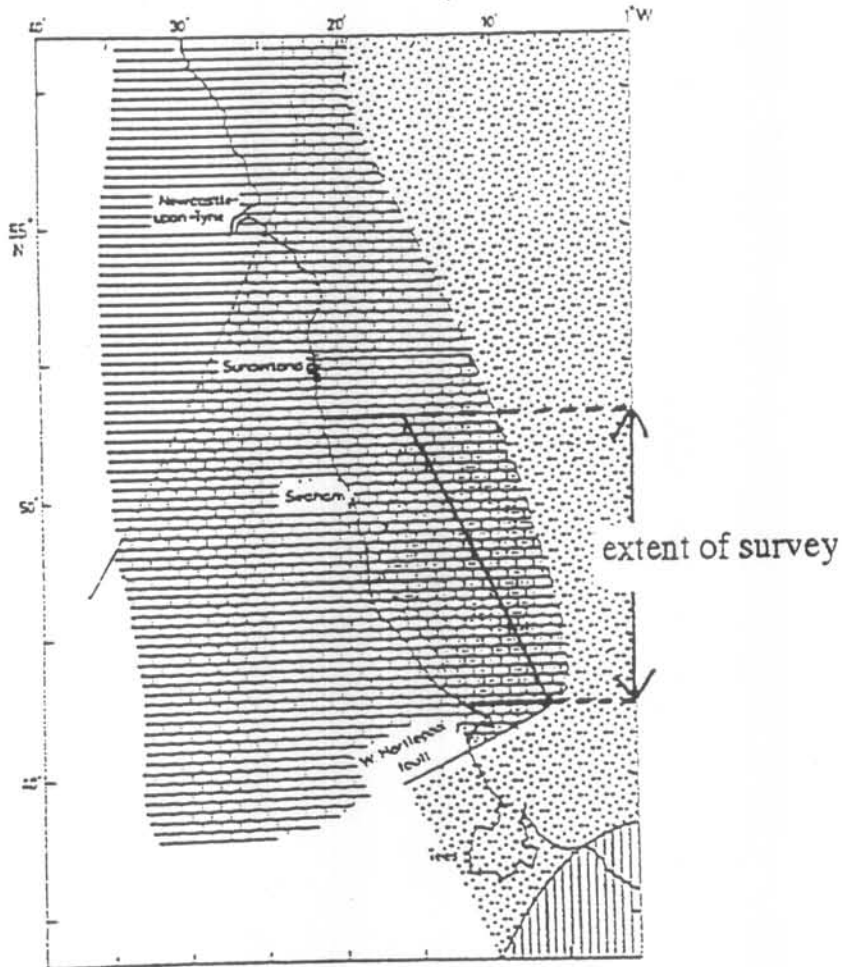


Figure 2: The solid geology of the North East Coast (McGraw *et al* 1963)







	Millstone grit & coal measures	Carboniferous
	Magnesian limestone	
	Hartlepool & Roker dolomites	Permian
	Bunter sandstones	Triassic
	Liassic shales	Jurassic

Figure 3: Transects selected for the survey



underlying fault line

dominant communities during the dive. This information was then transferred to the SEASEARCH form either directly by the dive pair or by a series of questions from a boat based "scribe". The "scribe" method was more effective in terms of accuracy and prompt completion of the form. The SEASEARCH habitat guide (Earll 1990) and the North East Habitat Guide (Foster-Smith unpublished) were used extensively. Previous SEASEARCH survey reports were not as useful as past SEASEARCH surveys considered areas geographically different from those areas covered in the present study. The reports did however give the volunteer divers an idea of how the information they collected was contributing to marine conservation in the UK.

Photographers were asked to take pictures of each habitat and community type encountered during the dive. The recommended area of the photographs was 4m^2 to give an impression of the larger scale habitats such as bedrock and boulders. This proved difficult due to the very low visibility and corresponding back scatter encountered at most sites and the reluctance of photographers to take pictures in such bad conditions.

2.1 Sampling strategy.

Previous survey data (Bellamy et al. 1973) suggested that the waters are very turbid (Table 1) and the boundary between infralittoral and circalittoral is very shallow. This was taken into account when the sites were selected to try to ensure that infralittoral sites would be surveyed.

TABLE 1: EFFECT OF POLLUTION ON DEPTH PENETRATION AND PRODUCTIVITY OF *LAMINARIA HYPERBOREA* FOREST (FROM BELLAMY *et al.* 1973)

Site	Degree of Pollution	Depth of Penetration	Production of Metre Wide Strip	
			g. ash-free dry wt. per annum	% of max measured
Durham coast	Very Polluted	0-3 metres	19.7	8.3
Mid Northumberland Coast	Some Pollution	1-10 metres	101	43
St Abbs Head	Unpolluted	1->12 metres	236	100

The dive sites were selected with a view to achieving an overall impression of the habitats and communities off the Durham coast occurring and to assess their extent. To achieve these aims dives were carried out at regular intervals on preselected transects. Dives were also carried out where it was thought likely that there would be changes in community. The site selection criteria are shown in Table 2 and are fully explained in the Plan for the Durham Coast (Appendix 2).

TABLE 2: SITE SELECTION CRITERIA USED IN THIS SURVEY

Transects A to E are designed to describe normality in the region.

Transects F to I are areas where the habitats and communities are expected to differ from normal eg rocky outcrops etc.

Points J are all the wrecks marked on the Admiralty Charts in the area. Since the substrate off the coast was predominantly sediment wrecks may provide a firm substrate for attachment for sessile species.

2.2 Access to the sites

Diving was carried out mainly from various inflatable and dory type small boats although a large boat (a fishing vessel), sailing from Sunderland, was hired on two occasions. Launching the small boats was a problem since the only area found to be suitable was the slipway at Seaham Harbour which was at the north end of the survey area. This meant that much time was spent travelling to and from the dive sites. The weather over the period of the survey was also very changeable which resulted in several of the diving weekends being cancelled. Due to this only 20 sites were surveyed.

3. RESULTS

3.1 Introduction

The information from completed SEASEARCH forms has been used to build up a general picture of the distribution of habitats and communities in the survey area and of their distribution. SEASEARCH data has been supplemented by referring to other relevant publications. Current data has also been used to provide detailed descriptions of the various habitats and communities which were encountered along the Durham coast. The following data are provided for the area;

(1) Dive site details (summary table 3)

(2) A general description of the distribution of habitats and communities recorded in the survey area (Section 3.3)

(3) Approximate distribution of habitats and communities recorded in the survey area and dive site locations (Figure 4a)

(The summary map is intended to provide an approximate first view of the distribution of habitats and communities in the area (Figure 4a). As such it only intend to act as a guide to phase 2 work which will add to, and refine, the general picture.)

(4) Habitat / community types recorded at each dive site (summary table, Table 5)

(The detailed information collected during the survey is presented in section 3.4 under the major headings used by the Marine Nature Conservation Review. This is accompanied by photographs of the habitat types wherever possible. A summary habitat / community type table is also included in this section.)

(5) Human impact in the area (description, section 3.2 and figures 4b, 5 and 6 and plates 1 and 2).

(6) A catalogue of the habitats recorded during the survey (descriptive text plus photographs Section 3.5)

3.2 Details of dive sites off the Durham Coast

The details of each dive site off the Durham coast are summarised. Where possible depths have been corrected in Table 3 to chart datum, however in some cases this was not possible since the time of dive was not recorded.

TABLE 3: DIVE SITE DETAILS

Site No.	Site Name	Lat./Long.	Date	Max Depth (m)	Recorder
1	Easington Transporter	54 47 60N 1 17 80W	12.7.91	10	CL SM
2	Wreck off Dawdon	54 51 50N 1 14 70W	10.8.91	30	IS SM
3	Wreck off Hawthorn Hive	54 49 40N 1 13 90W	10.8.91	27	RR DE
4	Wreck off Hawthorn Hive 2	54 49 60N 1 14 30W	10.8.91	30	JR GM
5	South of Moorstack Rocks	54 45 90N 1 16 80W	10.8.91	6	PA
6	Spoil Ground	54 49 20N 1 18 30W	11.8.91	8	GL GB
7	Off Peterlee	54 46 10N 1 15 50W	10.8.91	11	IS GB
8	North of Blackhall	54 46 40N 1 14 60W	10.8.91	13	JR GM
9	South of Dogger Rocks	54 46 70N 1 16 80W	10.8.91	10	RR DE
10	Near Moorstack Rocks	54 47 40N 1 17 00W	14.7.91	12	IS
11	Off Moorstack Rocks	54 48 10N 1 14 50W	22.6.91	15	RR JO
12	Off Shot Rocks	54 47 80N 1 15 40W	14.12.91	16	FM SM
13	North of Horden Point	54 48 50N 1 13 30W	10.8.91	25	GL CL
14	Off Beacon Point	54 48 70N 1 14 40W	12.7.91	21	FM SM
15	Near Chourcon Point	54 48 90N 1 18 10W	22.6.91	12	JE
16	Off Kinley Hill	54 49 10N 1 17 20W	22.6.91	12	RJ SR
17	Off Chourcon Point	54 50 20N 1 14 00W	22.6.91	28	GL RR JO
18	Near Feather Rocks	54 51 10N 1 18 70W	22.6.91	13	JL RJ
19	Off Feather Rocks	54 51 60N 1 16 00W	22.6.91	30	DE
20	Off Vane Tempest	54 52 00N 1 15 40W	22.6.91	32	RJ SR

3.3 General description of habitats and communities off the Durham coastline

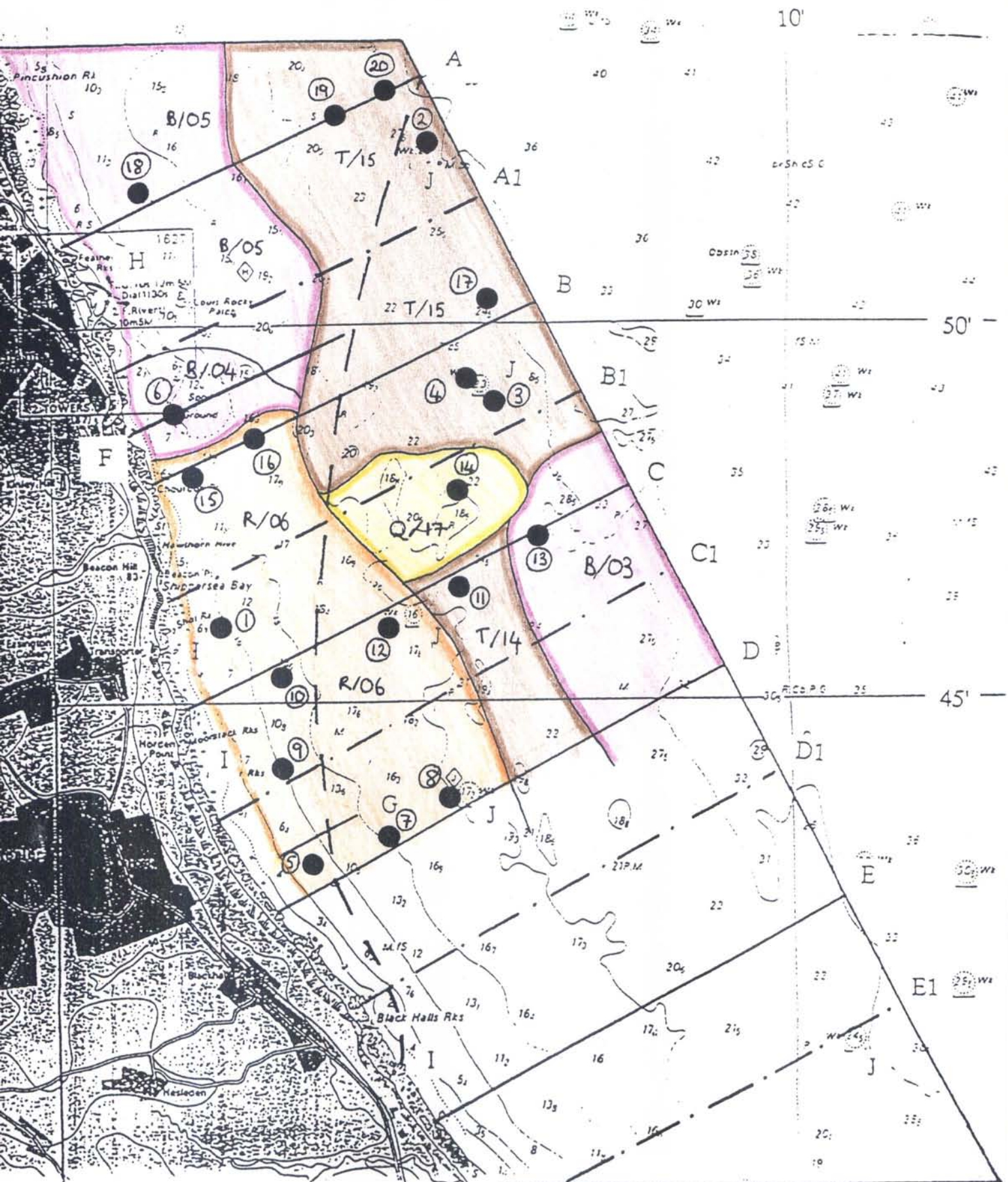
The seabed off the Durham coast consisted of gently sloping seabed. There was an area of exposed sublittoral rock (areas B/04 and B/05 Figure 4a) at 5-10 metres below sea level around the north of the survey area at Seaham. The area was badly affected by industrial activities and sewage discharge. To the north of the Harbour there was stepped bedrock (B/04) with a very low species diversity, silt covered the rock and there were many suspended solids of sewage origin. South of the Harbour the bedrock was covered by thick silt from the spoil ground (B/05). Moving south along the shore, still in the shallow areas the seabed gave way to flat rippled sand at around 24 metres below sea level (R/06). The sand was muddy and very fine. Ripples of approximately 3cm high and 10cm apart were present and along the tops of the ripples there were black lines. There was very little evidence of bioturbation of the sand and little marine life was encountered. The most frequently encountered species were the shore crab (*Carcinus maenus*) and the sand mason worm (*Lanice sp.*).

As the seabed became deeper there was an apparent increase in species richness. To the north of the survey area the bedrock gave way to a muddy sediment at 14 metres (T/14). It was a gently sloping or flat very mixed substrate with occasional boulders of up to 1 metre across. There were two major communities in these areas. Those associated with the boulders and those associated with the sediment. On the boulders there were many spirobid worms and hydroids, the dominant animal appeared to be colonies of the soft coral, *Alcyonium digitatum*. Bryozoans (*Flustara foliacea*), brittle stars and hydroids were also found on the boulders. Beneath the boulders there were many long clawed squat lobsters, *Munida* spp. The sediment in these areas supported *Buccinum undatum* with *Halecium halecinum* where shells and pebbles provided attachment surfaces. Large specimens of *Modiolus modiolus* the horse mussel were found at sites 3 and 4.

At the southern-most extent of habitat T/14 the sediment became predominantly muddy gravel and the boulders gave way to small rocks. The communities were basically the same but sparser and less diverse. A patch of infralittoral fine rippled sand (Q/17) was found at 22 metres approximately 3km offshore from Beacon Point. There is a layer of silt over the sand. A small specimen of the seaweed *Polyides rotundus* was found at this site (site 14).

Exposed bedrock (B/03) was found at site 13 at around 28 metres depth. There were boulders on gently sloping and slightly stepped bedrock. The dominant species was *Alcyonium digitatum* and there was a fine layer of silt. A high density of *Munida* spp. were present beneath the boulders.

Figure 4a: Map of survey sites and projected distribution of habitats and communities off the Durham coast, SEASEARCH colours are keyed in table 5



3.4 Human impacts in the survey area

Human impact in the area of the Durham coast is high. There is little tourist activity in the Durham area and the amenity value of the beaches is low due to the presence of colliery waste. Figure 4b shows the areas of the seabed which appear to have been adversely affected by mans activities.

The area of coast around Durham used to be famous for its shellfishery. This has declined greatly although there is evidence that some potting and dredging (site 13) continues in the area. Angling is also popular. The large mound of shale on the beach is often used by anglers. An abandoned fishing rod was found at site 8. Potting buoys were noted within the survey area and some fishing activity was taking place from boats.

Coal mining is the major industry within this area although there has been a marked decline over the past decade. Location of the mines in the area, both the working and unused mines, are shown in Figure 5. Most of the working mines are located on or near the coast. Coal mining has a major impact on the coast and associated area of sea via the dumping of spoil and minestone directly onto the beaches.

This large scale dumping has taken place for over 70 years. Wastes from coastal collieries in Durham have been tipped directly onto the foreshore (Figure 5) where they have been dispersed by wave action. Similarly wastes from other sources - for example fly ash from power stations and harbour dredgings have been dumped offshore to the north of the survey area (Figure 6).

Plate 1: The transporter at Easington



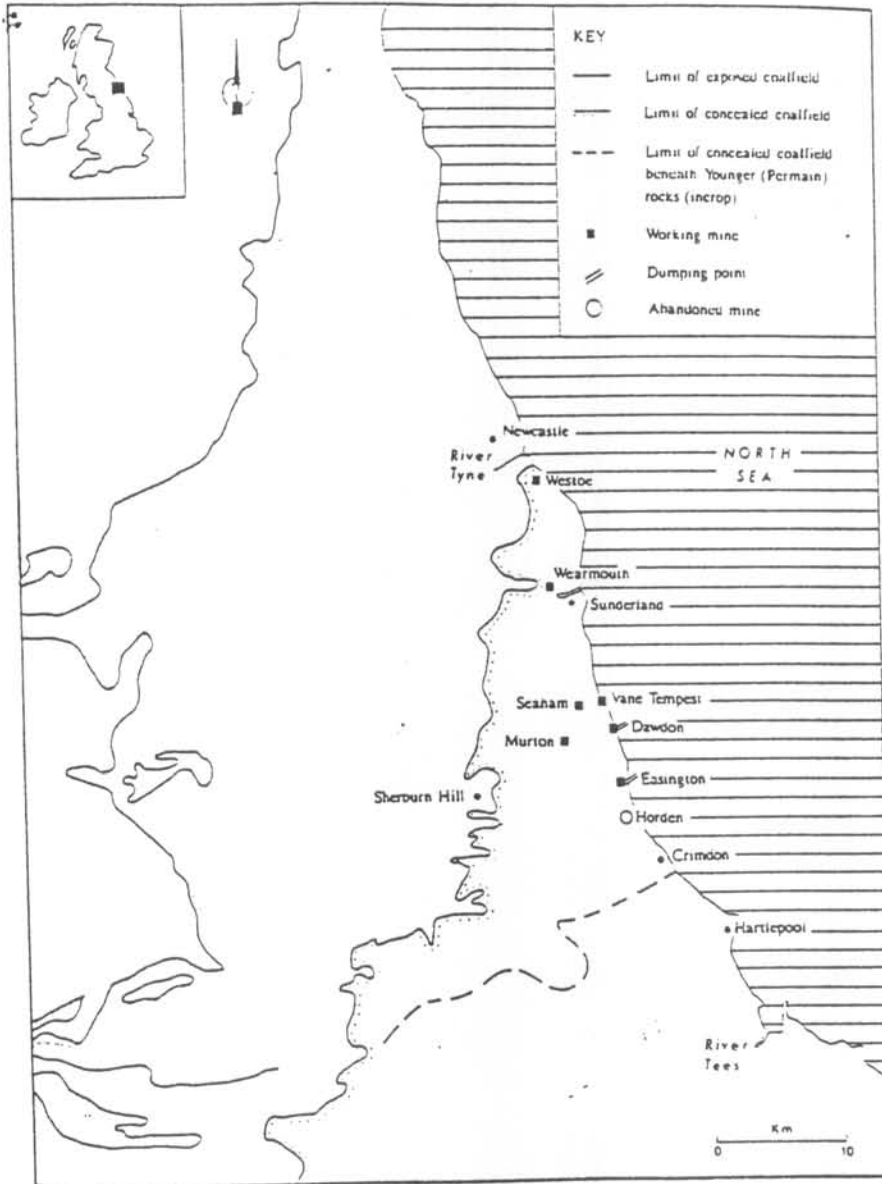
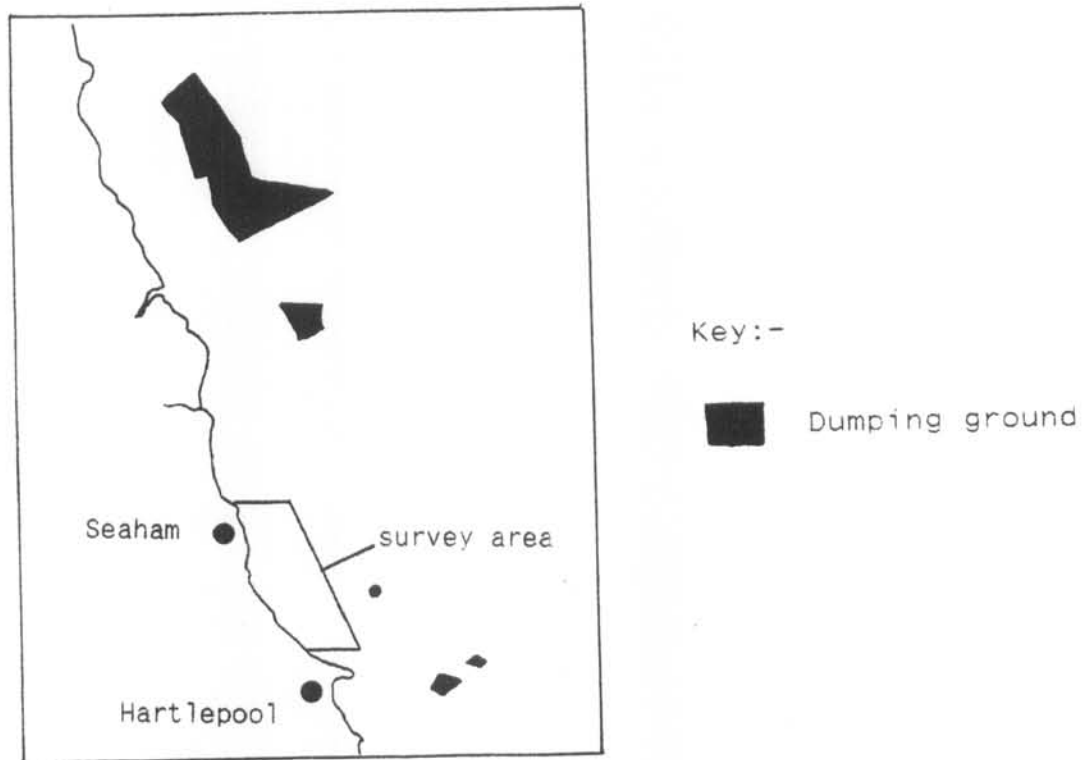


Figure 5: Location of mines and dumping points in north east England (Humphries and Scott 1990)

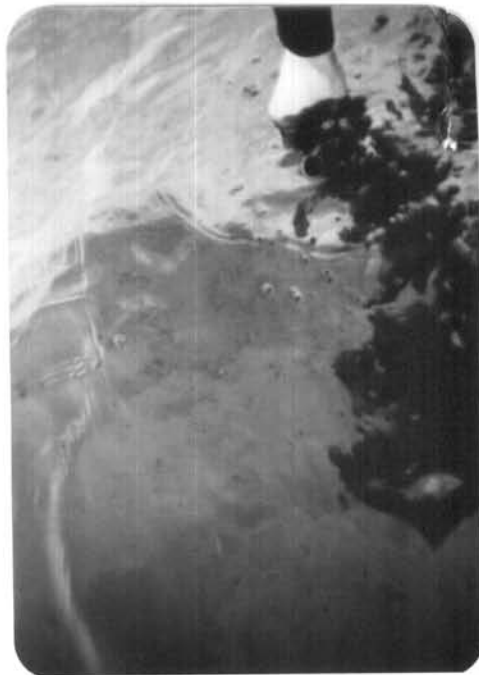
Figure 6: Location of the sludge/dredge spoil dumping grounds off the north east coast.



Dumping on the Durham coast, in most cases, started before statutory controls entered into force with the Dumping at Sea Act (DAS) 1974. Waste dumping has greatly reduced the amenity value of the north east coast and has artificially raised the level of the beaches. Initially the level of dumping was such that the sea washed the waste away within hours of the dumping, but as mining increased the level of dumping increased and the sea could no longer disperse such a large amount of waste causing it to pile up and the level of the beaches to rise. If dumping were to stop then hopefully the level of the beaches would drop as it did during the miners strike of the 1980's.

Coal mining is still a major local industry but it has markedly declined over the past decade. The remaining coal mines are exploiting concealed Upper Carboniferous Coal Measures.

Plate 2: The slick encountered by SEASEARCH divers on the 4th July 1991



During one of the dive weekends (3-4/7/91) a slick of dark suspended solids was observed spreading from Easington 1km south along the coast (Plate 2). A sample of the slick was taken by one of the volunteers and sent to the National Rivers Authority for analysis. The sample contained 3000 g/l-1 solids. The slick was brown/black and was up to 25mm thick and contained large lumps of solid matter. Whether this sort of incident is common place is unknown.

Urban development has affected the coast around Seaham and the area of seabed around the harbour is affected by the discharge of raw sewage. The waters around Seaham Harbour have failed the European Community Directive on Bathing Water Standards for the past five years. On several sites possible sewage related debris was found: plastics were found at sites 6 and 14, and raw sewage at site 18.

3.5 Catalogue of habitats recorded during the survey

Seven habitat / community types were recorded off the Durham coast. These were classified under the headings listed below for consistency with the Marine Nature Conservation Review methods of recording habitats and communities (Hiscock 1990).








TABLE 4: Broad habitat headings used for the SEASEARCH survey of the Durham coast

A	Infralittoral	bedrock
B	Cirralittoral	bedrock
C	Infralittoral	Artificial substrata
D	Cirralittoral	Artificial Substrata
E	Infralittoral	Large Boulders
F	Cirralittoral	Large Boulders
G	Infralittoral	Small Boulders
H	Cirralittoral	Small Boulders
J	Infralittoral	Stones - Cobbles/Pebbles/Slates
K	Cirralittoral	Stones - Cobbles/Pebbles/Slates
L	Infralittoral	Gravel
M	Cirralittoral	Gravel
N	Infralittoral	Very Mixed Substrata - hard and soft
P	Cirralittoral	Very Mixed Substrata - hard and soft
Q	Infralittoral	Sand
R	Cirralittoral	Sand
S	Infralittoral	Mud
T	Cirralittoral	Mud


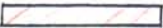




More detailed habitat descriptions have the appropriate code letter followed by a number. Numbers are assigned in a chronological order on identification of a new type and are therefore not intended to show any relationship between the habitats.

 TABLE 5: HABITAT AND COMMUNITY TYPES DESCRIBED BY SEASEARCH SURVEYS

● denotes habitats described by SEASEARCH survey of Durham coast

CODE	GENERAL HEADING
 A	Infralittoral Bedrock
A/01	Stepped Sandstone Bedrock
A/02	Gullied Bedrock
A/03	Stepped Bedrock, <i>L.saccharina</i> , <i>C.Filum</i>
A/04	Gullied Bedrock <i>L.saccharina</i>
A/05	Gullied Bedrock, pock marked
 B	Circalittoral Bedrock
B/01	Stepped Bedrock, <i>C.intestudinalis</i>
B/02	Bedrock Slope, <i>A.aspersa</i>
B/03	● Stepped Bedrock with Boulders
B/04	● Silted Bedrock Slope
B/05	● Stepped Bedrock
 E	Infralittoral Large Boulders
E/01	Occasional large boulders, <i>L.hyperborea</i>
E/02	Dense large boulders
 F	Circalittoral large boulders
F/01	Large boulder slope, <i>Antedon</i> , <i>Munida</i>
 G	Infralittoral Small Boulders
G/01	Densely packed boulders, <i>L.saccharina</i>
G/02	Occasional angular small boulders on coarse sand, kelp forest
G/03	Angular blocks, scree slopes diatom mat
G/04	Rounded boulders on coarse sand and maerl
G/05	Densely packed boulders, <i>L.hyperborea</i>
G/06	Occasional boulders on sand
G/07	Rounded boulders on coarse sand/maerl
G/08	Boulders on sand, <i>L.saccharina</i> , <i>C.filum</i> , <i>S.pavonia</i>
 H	Circalittoral Small Boulders
H/01	Rounded boulder slope, <i>Munida</i> , <i>Antedon</i>
 J	Infralittoral Stones - Cobbles / Pebbles / Slates
J/01	Clean cobbles on sand, <i>Modiolus</i> clumps
J/02	Pebble/cobble bank, occasional boulder, <i>L.hyperborea</i>
J/03	Pebble cobble bank, occasional boulder,

S. polyides
 J/04 Angular pebbles on muddy sand *P. crista*
 J/05 Pebbles on shell sand
 J/06 Pebbles on sand, fucoids

	K	Circalittoral Stones - Cobbles / Pebbles / Slates
	K/01	Pebble clumps on muddy sand
	K/02	Cobbles and pebbles on shell sand
	L	Infralittoral
	L/01	Sandy shell gravel with some pebbles
	N	Infralittoral Very Mixed Substrata
	N/01	Boulder, pebbles and sand
	P	Circalittoral Very Mixed Substrata
	P/01	Boulders, pebbles and sand
	Q	Infralittoral Sand
	Q/01	Coarse sand covered by continuous bed of maerl
	Q/02	Coarse sand with intermittent, living and dead maerl
	Q/03	Sandy mud, filamentous green algae
	Q/04	Muddy sand, <i>Zostera</i>
	Q/05	Coarse sand with occasional pebbles
	Q/06	Coarse sand with shell debris algal debris, well worked
	Q/07	Sand with occasional boulders and exposed bedrock
	Q/08	Coarse sand with occasional boulder, maerl
	Q/09	Clean sand, frequent cobbles, algal tufts
	Q/10	Medium sand, loose algal debris
	Q/11	Muddy sand, shell debris, maerl, <i>Virgularia</i>
	Q/12	Muddy sand, loose algal debris
	Q/13	Clean, coarse, rippled sand, <i>Zostera</i>
	Q/14	Muddy sand, maerl
	Q/15	Sandy mud, filamentous green algae
	Q/16	Fine sand, <i>A. turneri</i>
	Q/17	● Fine rippled sand
	R	Circalittoral sand
	R/01	Clean shell sand
	R/02	Clean coarse sand, shell debris
	R/03	Shell sand with scatter pebbles and cobbles
	R/04	Muddy sand, <i>Virgularia beds</i>
	R/05	Coarse shelly sand waves
	R/06	● Fine Muddy Rippled Sand

	S	Infralittoral Muddy Sediments
	S/01	Sandy mud with algal mat
	S/02	Mud, <i>P. crista</i>
	S/03	Silty mud, <i>Modiolus</i> , <i>Antedon</i>
	S/04	Sandy mud, filamentous green algae
	S/05	Clay mud, <i>S. pavonina</i> & filamentous green algae
	T	Circalittoral Muddy Sediments
	T/01	Muddy slope, with small boulders, <i>Munida</i> dominated
	T/02	Silty mud with occasional stones and boulders, <i>Munida</i> and <i>Ascidrella</i>
	T/03	Muddy slope with extremely abundant shell debris
	T/04	Sandy mud with shell debris and pebbles. <i>Ascidrella</i> dominated
	T/05	Silty mud with shell debris. <i>Aequipecten</i>
	T/06	Fine mud slope with occasional shell debris
	T/07	Fine sticky mud, worked surface, <i>Pennatula</i> beds
	T/08	Slightly worked sandy mud
	T/09	Sandy mud, occasional large boulder
	T/10	Silty mud, algal debris
	T/11	Flocculent mud
	T/12	Clay mud, <i>S. pavonina</i> , <i>A. aspersa</i>
	T/13	Clay mud, <i>V. mirabilis</i>
	T/14	● Mud with gravel
	T/15	● Mud with coarse mixed sediment and boulders

The following section gives a more detailed description of the habitat / community types found off the Durham coastline. A photograph has been included wherever possible to give a general impression of the type of habitat being described.

NORTH EAST ENGLAND

SURVEY AREA: THE DURHAM COASTLINE

HABITAT CODE NUMBER: B/03

HABITAT TYPE: B : Circalittoral Bedrock

SITE TYPE: Stepped bedrock

LOCATION (site nos.): 13

DEPTH: 24m

VISUALLY DOMINANT COMMUNITY: *Alcyonium digitatum*

SITE DETAILS

Situation: Open coast
Salinity: Normal
Wave exposure: Exposed
Tidal streams: 1-3 knots
Geology:

HABITAT DETAILS

Zone: Circalittoral
Substratum: Bedrock
Modifiers: Silt
Features:

PHOTOGRAPH;

There is slightly sloping bedrock with occasional small boulders. The dominant species is *Alcyonium digitatum* found on the boulders.

NORTH EAST ENGLAND

SURVEY AREA: THE DURHAM COASTLINE

HABITAT CODE NUMBER: B/04

HABITAT TYPE: B : Circalittoral bedrock

SITE TYPE: Silted bedrock slope

LOCATION (site nos.): 6

DEPTH: 8m

VISUALLY DOMINANT COMMUNITY: none

SITE DETAILS

HABITAT DETAILS

Situation: Open coast
Salinity: Normal
Wave exposure: Exposed
Tidal streams: 3-6 knots
Geology:

Zone: Circalittoral
Substratum: Bedrock
Modifiers: Silt
Features:

PHOTOGRAPH;



This habitat consists of bedrock with a very thick layer of silt overlying it, this layer is up to 50 cm deep in places. Where the bedrock protrudes through the silt there are occasional spirobid worms.

NORTH EAST ENGLAND

SURVEY AREA: THE DURHAM COASTLINE

HABITAT CODE NUMBER: B/05

HABITAT TYPE: B :Circalittoral bedrock

SITE TYPE: Stepped bedrock

LOCATION (site nos.): 18

DEPTH: 13m

VISUALLY DOMINANT COMMUNITY:

SITE DETAILS

Situation: Open coast
Salinity: Normal
Wave exposure: Exposed
Tidal streams: 1-3 knots
Geology:

HABITAT DETAILS

Zone: Circalittoral
Substratum: Bedrock
Modifiers: Sewage
Features: Stepped

PHOTOGRAPH;



Stepped bedrock with very little life. A few starfish were found and some anemones in cracks and fissures. The site is affected with sewage pollution.

NORTH EAST ENGLAND

SURVEY AREA: THE DURHAM COASTLINE

HABITAT CODE NUMBER:Q/17

HABITAT TYPE:Q :Infralittoral sand

SITE TYPE:Fine rippled sand

LOCATION (site nos.):14

DEPTH:15m

VISUALLY DOMINANT COMMUNITY:

SITE DETAILS

HABITAT DETAILS

Situation: Open coast

Zone: Infralittoral

Salinity: Normal

Substratum: Sand

Wave exposure: Exposed

Modifiers:

Tidal streams: 1-3 knots

Features:

Geology:

PHOTOGRAPH;

The seabed is level fine sand with small tidal ripples. There is a small amount of silt mixed with the sand. Occasional *Polyides rotundus*.

NORTH EAST ENGLAND

SURVEY AREA: THE DURHAM COASTLINE

HABITAT CODE NUMBER:R/06

HABITAT TYPE:R :Cirralittoral sand

SITE TYPE:Fine muddy rippled sand

LOCATION (site nos.):1,5,7,8,9,10,12,15,16 DEPTH:24m

VISUALLY DOMINANT COMMUNITY:

SITE DETAILS

HABITAT DETAILS

Situation:	Open coast	Zone:	Cirralittoral
Salinity:	Normal	Substratum:	Sand
Wave exposure:	Exposed	Modifiers:	Silt
Tidal streams:	1-3 knots	Features:	Ripples
Geology:			

PHOTOGRAPH;

The habitat consists of fine sand / clay in ripples approximatley 3cm hight and 10cm apart. Fine black lines of coal waste / black silt along the peaks of the ripples.

NORTH EAST ENGLAND

SURVEY AREA: THE DURHAM COASTLINE

HABITAT CODE NUMBER:T/14

HABITAT TYPE:T :Circalittoral muddy sediments

SITE TYPE:Mud with gravel

LOCATION (site nos.):11

DEPTH:14m

VISUALLY DOMINANT COMMUNITY:*Thuria spp.*

SITE DETAILS

HABITAT DETAILS

Situation: Open coast

Zone: Circalittoral

Salinity: Normal

Substratum:

Wave exposure: Exposed

Modifiers: Silt

Tidal streams: 1-3 knots

Features:

Geology:

PHOTOGRAPH;



This habitat has not been recorded by previous SEASEARCH surveys. The habitat consists of flat or gently sloping gravel with mud. There are occasional small rocks. There is very little marine life, what there is is associated with the rocks.

NORTH EAST ENGLAND

SURVEY AREA: THE DURHAM COASTLINE

HABITAT CODE NUMBER:T/15

HABITAT TYPE:T :Circalittoral muddy sediments

SITE TYPE:Circalittoral coarse mixed sediment with boulders

LOCATION (site nos.):2,3,4,17,19,20DEPTH:28-33m

VISUALLY DOMINANT COMMUNITY:*Alcyonium digitatum*

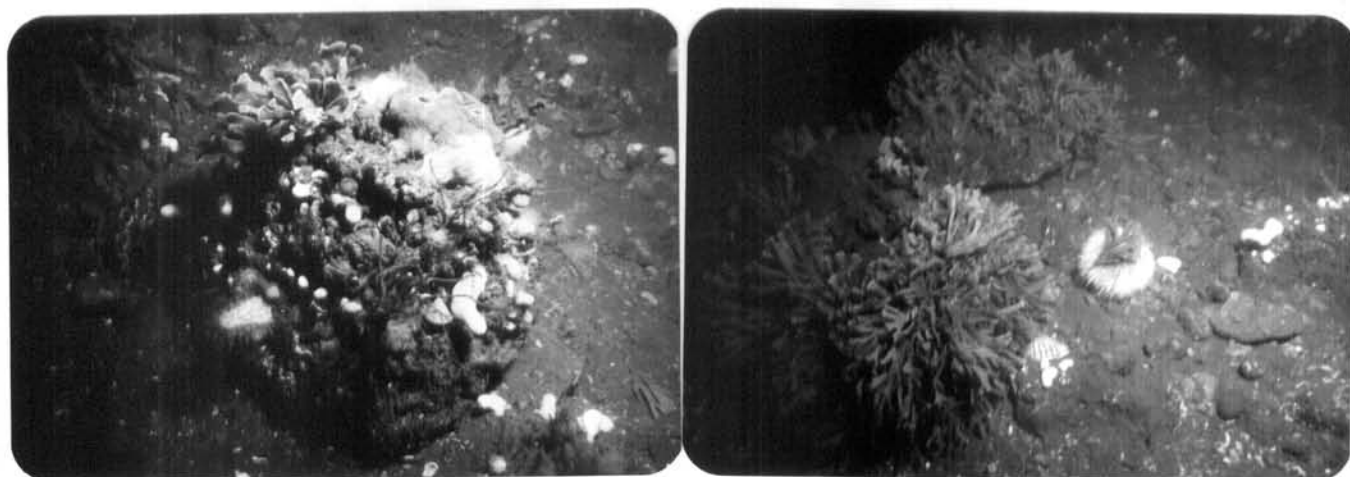
SITE DETAILS

Situation: Open coast
Salinity: Normal
Wave exposure: Exposed
Tidal streams: 1-3 knots
Geology:

HABITAT DETAILS

Zone: Circalittoral
Substratum:
Modifiers: Silt
Features:

PHOTOGRAPH;



A flat or gently sloping habitat of very mixed substrate of cobbles, mud and broken shells with occasional boulders up to 1 metre square. Many spirobid worms and hydroids are present on the boulders with *Alcyonium* and brittle stars. *Flustara foliacea* is also present. Beneath the boulders are many squat lobsters *Munida* sp. On the sediment there is *Buccinum undatum* and *Halecium halecinum*. Specimens of *Modiolus* sp. were found at sites 3 and 4.

4. ACKNOWLEDGEMENTS

Firstly I would like to thank all the divers who took part in the survey who ended up diving in places they never thought they would! I would also like to thank those people who suffered from a cancelled weekends diving. My particular thanks go to Garath Lewis and Rumana Ramzan who gave much of their time and energy to the project. I would like to thank all who lent their boats to the SEASEARCH divers, and to Analytical Environmental Services for letting us use their cameras. Particular thanks must go to Donald Miller and the Seaham Harbour Dock Company for giving us permission to use the Seaham Harbour Coastal Centre and the launching facilities at Seaham Harbour. I would also like to thank Bob Foster-Smith and the staff at the Marine Conservation Society for their advice on running a survey of this sort. Thanks also to staff of the Marine Nature Conservation Review for useful comments and suggestions during the write up of this report.

My special thanks go to Stephen Ridgway for shore support, moral support, boat handling, co-driving and sacrificing valuable climbing weekends for SEASEARCH.

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APPENDIX 1. SEASEARCH recording form.



Survey name: _____ Date of survey: _____
Site name: _____ Site number: _____
Name of recorder: _____
Address of recorder: _____
Time of dive (24hr clock please): Start: _____ Finish: _____ Duration: _____
Depth range below sea level: From: _____ To: _____
Depth range below chart datum: From: _____ To: _____
Underwater visibility: _____

Site location: OS Grid reference: _____
or Latitude: _____ Longitude: _____
Decca: _____

Map of area:

Please insert here a photocopy of a map or chart, or sketch of the area, please mark in transit marks where applicable. Please mark on the map the dive location.

Reasons for dive site selection: _____
Objectives of dive: _____
Were these objectives achieved?: _____

Was any information, other than on this form, collected? photographs specimens
species list other

If yes please describe briefly: _____
Where can this information be found?: _____

To be completed by the project leader.

Has this form been checked by the project leader? Yes/No

Have the cirralittoral / infralittoral habitats been identified and has page four been completed? If not complete.

Further comments: _____

Site description:

*Draw the seabed profile on the page opposite and refer to this in your description.

*Describe below the following four points for each habitat in turn by including key words - refer to the checklist. Please start with the shallowest. (The Project Leader should identify whether the habitats described are infralittoral or circalittoral).

1. the substratum (rock / sediment) eg bedrock, gravel, or mixtures - gravel with mud
2. the depth range of the substratum types from / to below sea level
3. the communities in terms of the dominant species or species groups eg kelp
4. any habitat features (eg silt) or modifiers (eg grazing)

Your assessment of the site:

If you feel able, drawing on your diving experience in this area or from around the UK, comment on the following in your own words:

1. underwater scenery (eg typical, unusual, spectacular) _____

2. diversity of habitats _____

3. diversity of marine life _____

Site number: _____ Site name: _____ Habitat number: _____

**To be filled in by the project leader:
SEASEARCH HABITAT RECORD**

Depth limits		Substratum	Features - Rock		
sea level	upper	bedrock	<input type="checkbox"/>	mobile	<input type="checkbox"/>
	lower	boulders	<input type="checkbox"/>	scoured	<input type="checkbox"/>
chart datum	upper	cobbles	<input type="checkbox"/>	silted	<input type="checkbox"/>
	lower	slates	<input type="checkbox"/>	fissures	<input type="checkbox"/>
		pebbles	<input type="checkbox"/>	crevices	<input type="checkbox"/>
Biological subzone		gravel:	<input type="checkbox"/>	gully	<input type="checkbox"/>
		stone	<input type="checkbox"/>	cave	<input type="checkbox"/>
sublittoral fringe	<input type="checkbox"/>	shell	<input type="checkbox"/>	tunnel	<input type="checkbox"/>
infralittoral	<input type="checkbox"/>	dead maerl	<input type="checkbox"/>	rockmill	<input type="checkbox"/>
	upper	sand	<input type="checkbox"/>	boulder / cobble	
	lower	mud	<input type="checkbox"/>	on rock	<input type="checkbox"/>
circalittoral	<input type="checkbox"/>	peat	<input type="checkbox"/>	on sediment	<input type="checkbox"/>
	upper	shells (empty)	<input type="checkbox"/>	boulder holes	<input type="checkbox"/>
	lower	artificial	<input type="checkbox"/>	sediment on rock	<input type="checkbox"/>
not applicable	<input type="checkbox"/>	tree / branch	<input type="checkbox"/>		
not known	<input type="checkbox"/>	algae	<input type="checkbox"/>	Features - sediment	
		live maerl	<input type="checkbox"/>	mounds / casts	<input type="checkbox"/>
		Modifiers		burrows / holes	<input type="checkbox"/>
		freshwater run off	<input type="checkbox"/>	tubes	<input type="checkbox"/>
		wave surge	<input type="checkbox"/>	algal mat	<input type="checkbox"/>
		grazing	<input type="checkbox"/>	waves / dunes	<input type="checkbox"/>
		shading	<input type="checkbox"/>	ripples	<input type="checkbox"/>
		pollution	<input type="checkbox"/>	vertical layering:	
				black layer	<input type="checkbox"/>
				subsurface coarse layer	<input type="checkbox"/>
				subsurface clay / mud	<input type="checkbox"/>
				surface silt / flocculant	<input type="checkbox"/>

Habitat Description (include description of substratum and dominant species or groups eg kelp)

MCS habitat type (if known)

Survey name: _____ Site number: _____

Sketch sheet:

Please sketch the dive profile to illustrate the features of the seabed. Draw in any habitats, communities or peculiar features marking depths at areas of change in the features and number from shallow to deep. Use more than one sheet if necessary. Please be careful to mark depth in metres, and give a compatible distance scale. If any evidence of stratification was seen (eg halocline or thermocline) please include it in your sketch. Make your sketch as simple as possible.

depth (below sea level) in metres

distance in metres

Please fill in this section to the best of your knowledge:

Site protection designation of the area:

Is the area of the dive:-

- open coast
- straits / narrows or sounds
- shallow rapids
- enclosed coast
- saline lagoon
- other (please describe)

Is the salinity:-

- normal
- variable
- low
- unknown

Is there stratification of the water column:

- thermocline
- halocline
- not stratified
- unknown

Is the wave exposure at this site:-

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

Is the maximum tidal current at this site:-

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

Is the geology of the seabed:-

- Hard:**
- igneous
- chert / flint
- slate
- sand/mudstone
- Medium**
- limestone
- friable
- slate / shale
- Soft:**
- sand/mudstone
- chalk
- Very soft:**
- clay
- not known

Human usage and impact at the dive site.

Please tick the boxes if you saw any evidence of the following activities at the dive site or adjacent to the dive site.

- | | | | |
|---|--------------------------|----------------------------|--------------------------|
| fishing | <input type="checkbox"/> | sewage dumping | <input type="checkbox"/> |
| trawling | <input type="checkbox"/> | waste dumping | <input type="checkbox"/> |
| angling | <input type="checkbox"/> | industrial discharge | <input type="checkbox"/> |
| potting | <input type="checkbox"/> | litter and debris | <input type="checkbox"/> |
| collection of shellfish | <input type="checkbox"/> | oil | <input type="checkbox"/> |
| collection of algae | <input type="checkbox"/> | tar | <input type="checkbox"/> |
| extraction of sand/gravel | <input type="checkbox"/> | chemicals | <input type="checkbox"/> |
| extraction of maerl | <input type="checkbox"/> | education/scientific study | <input type="checkbox"/> |
| extraction of oil/gas | <input type="checkbox"/> | recreational facilities | <input type="checkbox"/> |
| fishfarming of fin fish | <input type="checkbox"/> | resort | <input type="checkbox"/> |
| fishfarming of shellfish | <input type="checkbox"/> | marina | <input type="checkbox"/> |
| farming of algae | <input type="checkbox"/> | beach | <input type="checkbox"/> |
| coastal defence in the form sea walls | <input type="checkbox"/> | water sports | <input type="checkbox"/> |
| coastal defence in the form of dredging | <input type="checkbox"/> | popular dive site | <input type="checkbox"/> |
| coastal defence in the form of groynes | <input type="checkbox"/> | mooring | <input type="checkbox"/> |
| coastal defence in the form of land claim | <input type="checkbox"/> | beaching for boats | <input type="checkbox"/> |
| military use | <input type="checkbox"/> | launching site | <input type="checkbox"/> |
| | | other (please describe) | <input type="checkbox"/> |

Is access to the site: easy difficult very difficult

Your comments on human impact in the area:

APPENDIX 2. Plan of Action for the Durham Coastline

PLAN OF ACTION
FOR THE
SEASEARCH SURVEY
OF THE
DURHAM COASTLINE
1991/1992.

Project Leader

Catherine-Jean Loretto.

Prepared for the Nature Conservancy Council by the Marine
Biological Consultants Ltd., February 1991.

CONTENTS

1. Background to the survey
2. Result of the training weekend 8/9th December 1990
3. Geology of the area
4. Human usage of the area
5. Access
6. Sampling strategy
7. Timetable
8. Projected costing

1. Background to the survey.

A Seasearch survey of the coast is to be undertaken to map the habitats in the area shown on Fig. 1.

This survey will be undertaken as an ongoing survey done by volunteers at weekends, not as an expedition as in previous SEASEARCH surveys. The Durham coast line is of particular interest as it has had large quantities of mine waste dumped either directly on to the shore or some miles off the coast (Fig. 2.). The type of waste dumped on the Durham coast line is mainly colliery spoil.

So far the following steps have been taken towards the survey:-

1.1. A series of talks was held in October 1990 to increase awareness of the Seasearch project and to recruit volunteer divers, particularly those with experience of photography, from the North-East region.

1.2. The talks were followed up by a training weekend which was held on the 8th and 9th of December 1990 in Newcastle at the Dove Marine Laboratory with the help of Bob Foster-Smith and also Teresa Bennett of the Nature Conservancy Council.

2. Result of the training weekend 8/9th December 1990.

The training weekend was very successful despite the severe weather with approximately 20 people attending the event. The results of this weekend were as follows:-

2.1. The extent of the survey was explained and agreed on (see Fig.1.).

2.2. A Regional Coordinator for the survey was selected, Gareth Lewis, a biologist working for Northumbrian Water Analytical and Environmental Services.

2.3. It was decided that the Regional Coordinator will be in charge of distributing the forms (see appendix one for form) and collecting them for checking and also for sending progress reports to the Seasearch Project Leader.

2.4. The Project Leader will then check the forms and provide feed back to the Regional Coordinator.

2.5. The Project Leader will collate the forms and then produce the report by February 1992.

2.6. The report that I have received from the Regional Coordinator outlines the progress of the local divers so far. Due to the weather there have not yet been any dives on the project but there has been a meeting of the survey teams in January 1991.

Fig. 1. Extent of the survey.

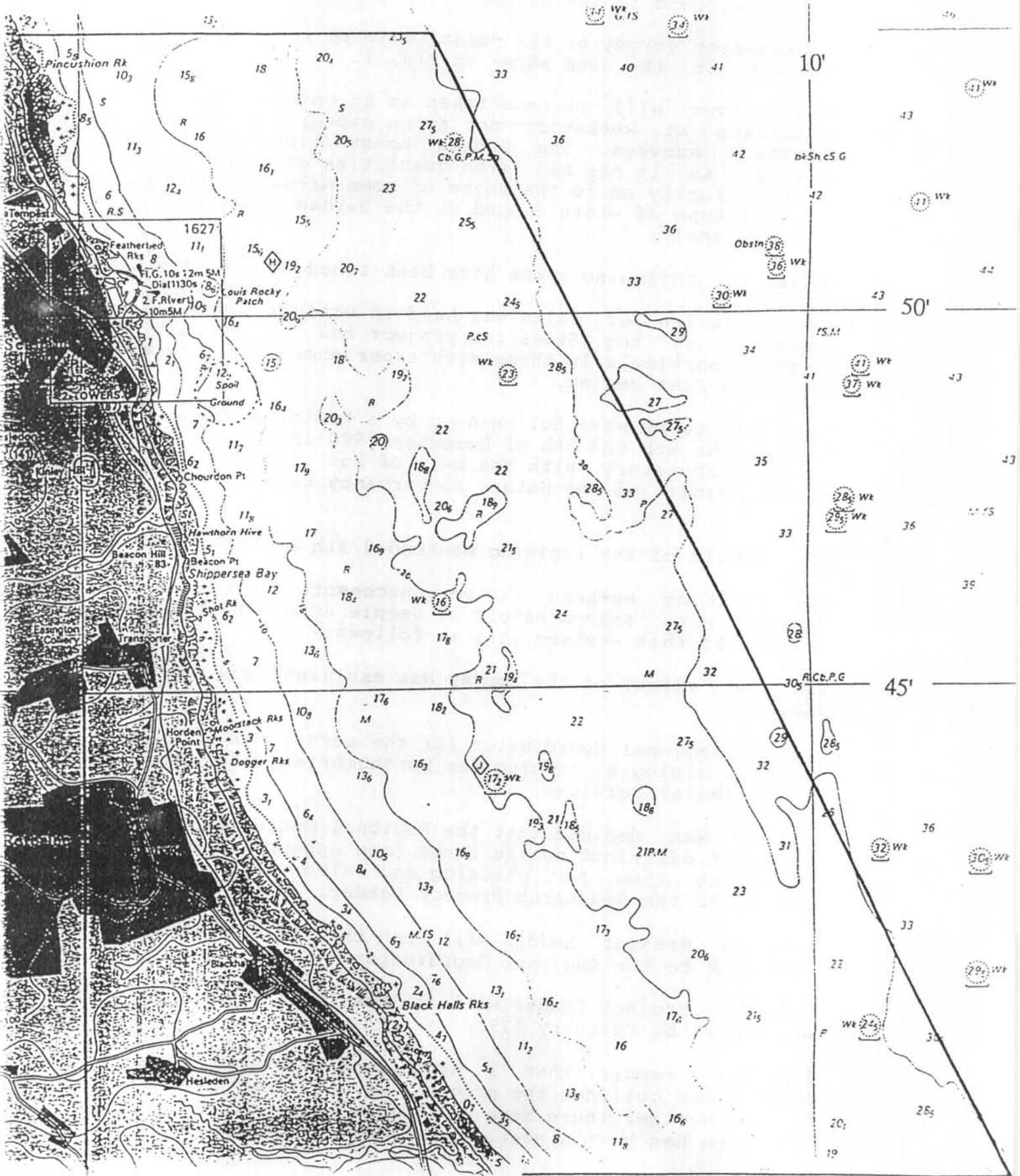
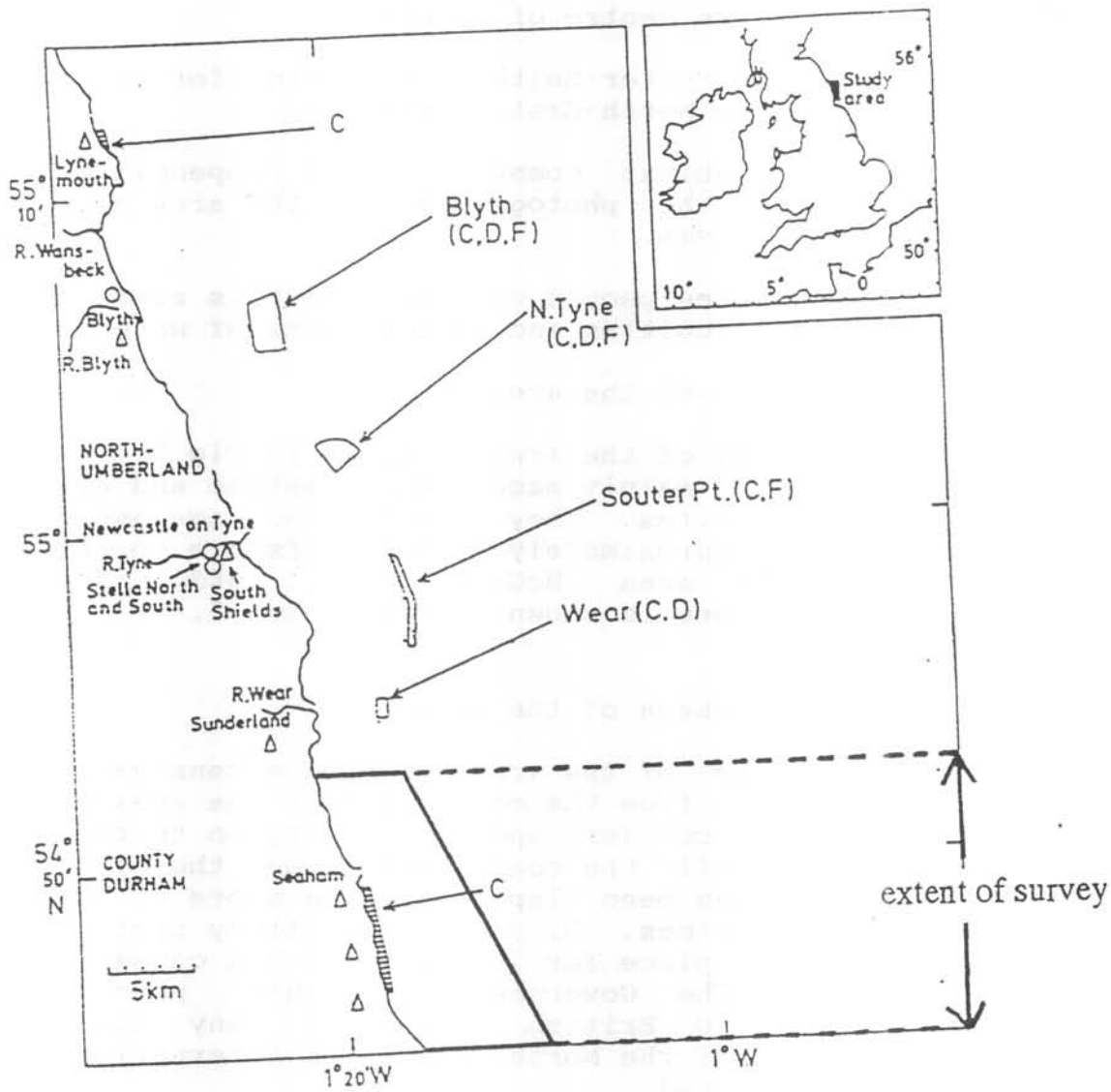


Fig. 2. Location of the dumping grounds.



Dumping sites; (C) Colliery waste (D) Dredge spoil (F) Fly ash
 □ Shore tipping sites
 □ Dumping grounds
 Waste sources; △ Colliery ○ Power station

A newsletter has been collated and is being distributed to the MCS members in the region, local dive clubs and other volunteers. The purpose of this newsletter is to recruit more divers and equipment (mainly boats) and to set up a convenient meeting place for following meetings of the Regional Coordinator and the divers in the centre of Newcastle.

2.7. Dr. R.Foster-Smith is preparing for the survey a "Habitat Guide To The North-East Coastline".

2.8. The habitat community sheet [appendix 2] will be used to cope with the photographs from the area not taken on formal SEASEARCH dives.

2.9. Very few people seem to dive this area, mainly because of access difficulties and also because of water quality.

3. Geology of the area

The geology of the area is shown in Fig.3. The survey area rock consists of mainly magnesian limestone and also Hartlepool and Roker dolomites. They are faulted against underlying Bunter sandstone approximately 10-15km offshore to the east 4 km out of the survey area (McGraw et al, 1963). The distribution of sediment types is shown in Fig. 4 and 5.

4. Human usage of the area

Human usage of the area has been extensive. There has been a great impact from the collieries in the area due to the extensive dumping of colliery spoil, directly on to the beaches at Seaham and just off the coast further up the coastline (Fig. 2.). Minestone has been tipped onto the shore at the Dee Estuary since Victorian times. Disposal of colliery spoil on Durham beaches has taken place for 70 years and has caused outcry from many quarters. The Governments "polluter pays" principle would, according to British Coal, put many jobs at risk in the collieries of the North-East if an alternative method of disposal was implemented.

The beach at Seaham used to be sandy but is now black with coal. Locals can recall the area as one of the finest fishing areas on the North East coast. This has all been destroyed by the particulate colliery waste and liquid slurry from pipes.

The scale of the dumping programme has declined since the late 70's. Dumping is now carried out at a rate of 2million tones per year. The Government has set a seven year deadline for the expiry of sea dumping licences.

Recreational usage of the area has been minimal in recent years due to the state of the area following the dumping of spoil.

Fig. 3. The geology of the north east coast.

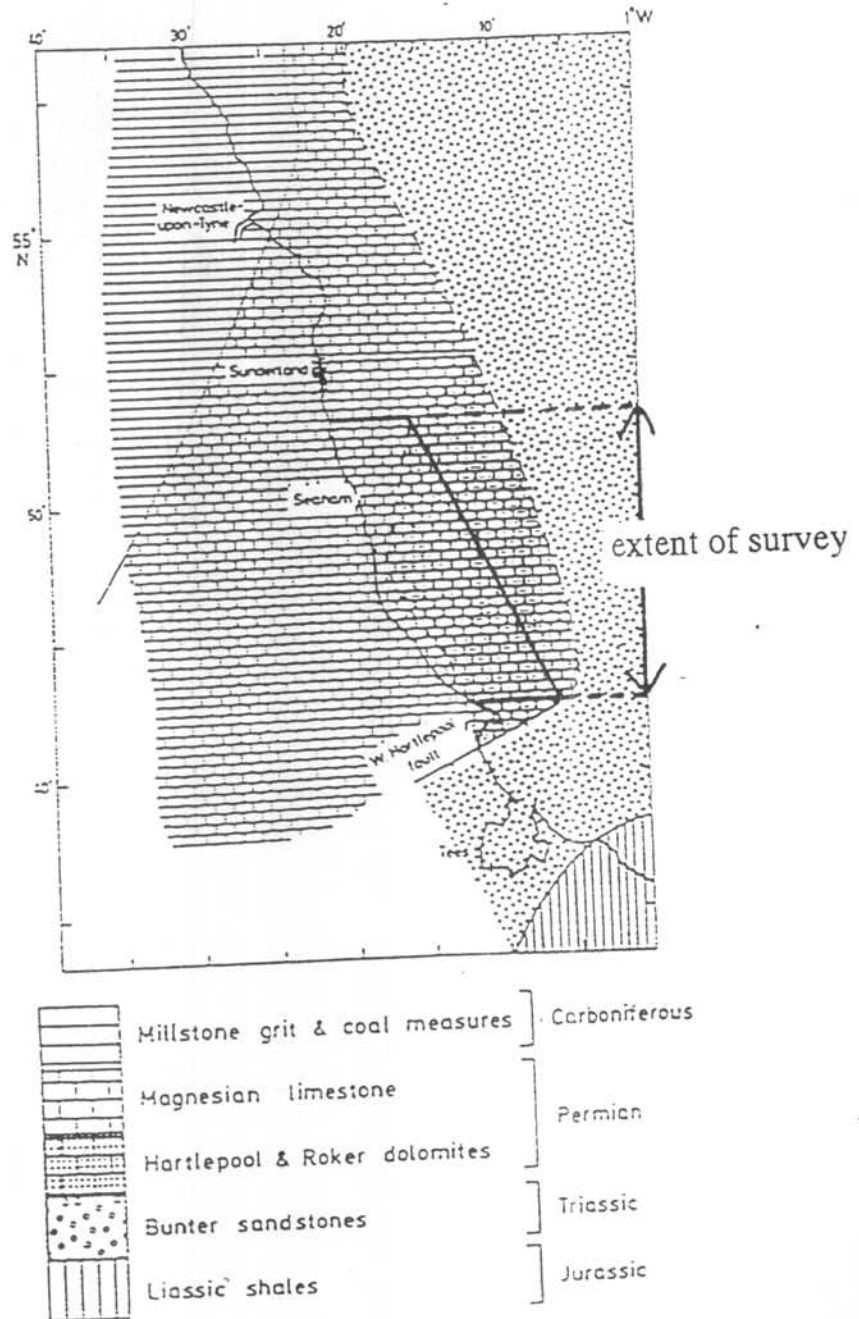
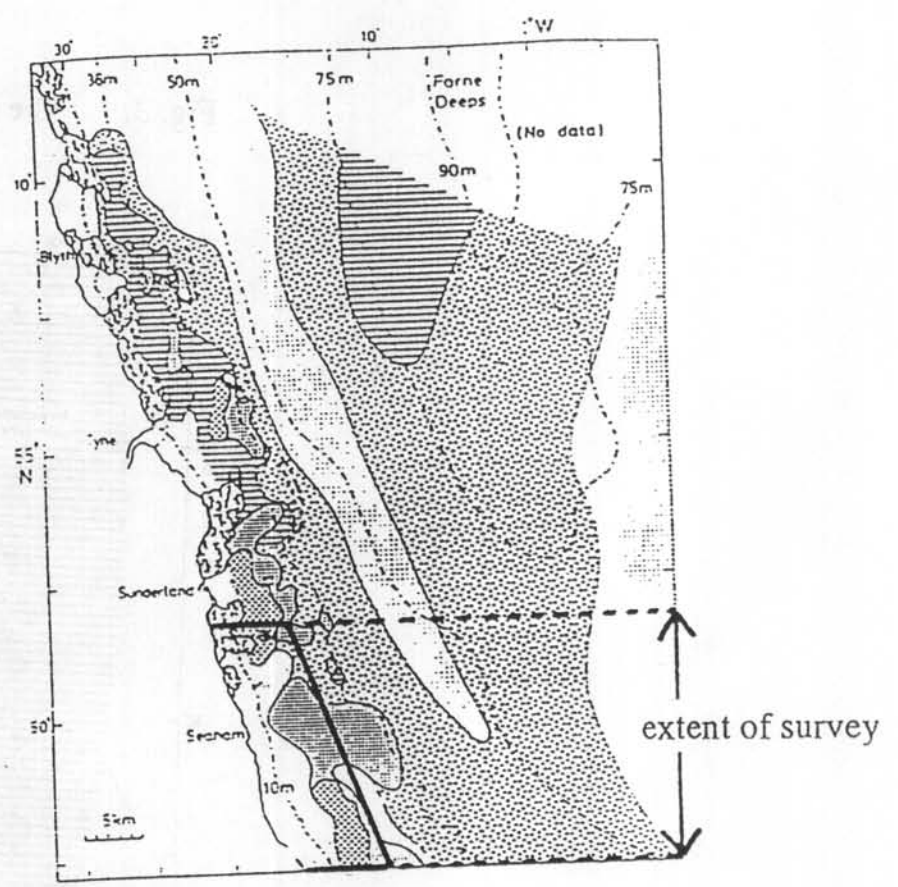


Fig. 4. The distribution of sediment types around the survey area.



--- Dumping areas Rocky outcrops

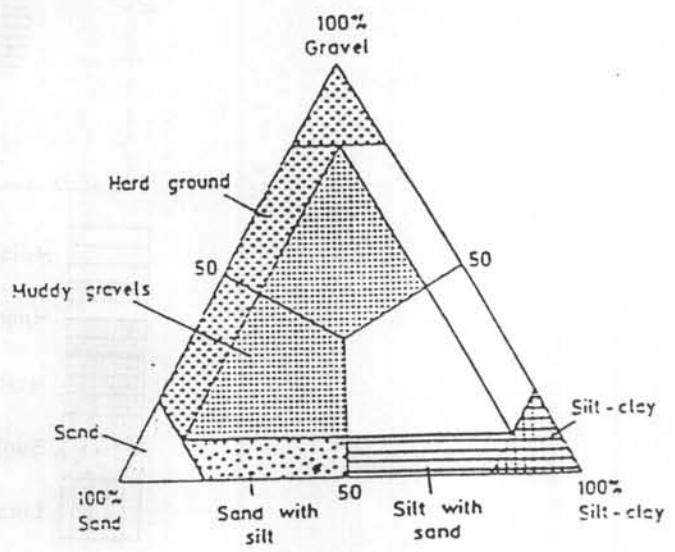


Fig. 5. Distribution of rock and gravel deposits in the survey area.

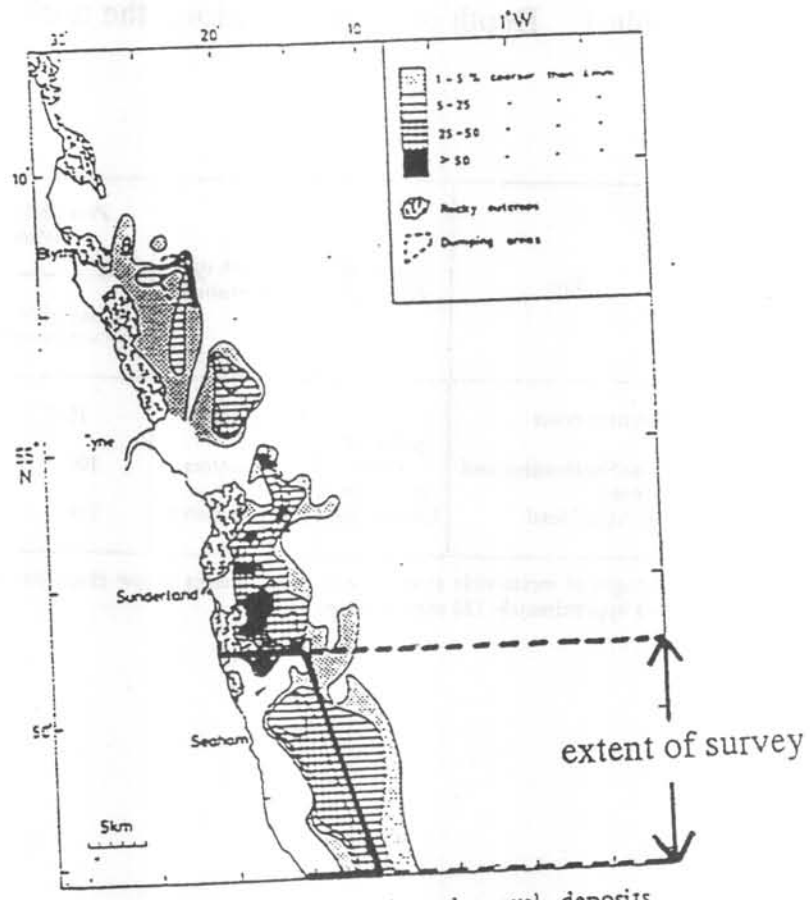


Figure 9 The distribution of rock and gravel deposits (material >4 mm).

Table 1. Depth of kelp zone along the north east coastline.

Site	Degree of Pollution	Depth of Penetration	Production of Metre Wide Strip	
			g. ash-free dry wt./annum	% of max. measured
Durham coast	Very polluted	0-3 metres	19.7	8.3
Mid-Northumberland coast	Some pollution	1-10 metres	101	43
St. Abbs Head	Unpolluted	1->12 metres	236	100

Length of metre-wide strip from 0 to 12 metres below chart datum in all three cases approximately 120 metres (slope 1:10).

Fig 6: The proposed survey transects.



----- underlying fault line

5. Access

The most likely problem to arise is that of access to the foreshore both for shore dives and for launching, since a lot of the land is privately owned, much of it by British Coal.

A local contact is investigating launch sites and will be approaching private land owners to obtain permission. I have already gained permission to launch inflatables from Seaham.

6. Sampling strategy

The survey area of the "Durham Coastline" was decided on by the Nature Conservancy Council's Marine Nature Conservation Review staff, and the offshore boundary was set at the 30m depth contour. This gives a survey area of 117km² along a coastline of approximately 15km.

Previous survey data (Bellamy and Whittick, unpublished) suggests that the waters are very turbid (Table 1.) and the boundary between infralittoral and circalittoral is very shallow.

The first set of transects (A to E) are designed to describe normality in the region. These transects will be dived on five spot dives along the transect line. If there is evidence of extreme differences along the transects then fill in dives along the transects will be dived, if there is extreme differences between the transects then "fill-in" transects (A1 to E1) will be dived. If not the divers will move onto the second set of transects (F to I) which are in areas where the "normal" habitats for the area are anticipated to differ.

Transect F has been chosen since it runs through a spoil ground and will present a unique chance to study the impact of the spoil ground on the surrounding communities

Transect G has been selected to target areas in which there is a possible change in the geology of the area in the form of intrusions etc.

Transect H includes a series of dives to study the harbour walls of Seaham.

Transects "I" include areas such as Pincushion Rocks, Moorstack Rocks, Dogger Rocks and other rocky out crops close to the shore.

Transects J are all the wrecks in the survey area, 24, 17, 16, 23, 28.

Number of dives:

Transects A to E	25 with 10 "reserve" for fill in dives.
Transect F	5 dives
Transect G	5 dives
Transect H	5 dives
Transects I	4 dives
Transects J	5 dives
Total	49 dives, 59 with "reserve" dives

Human usage and impact at the dive site.

Please tick the boxes if you saw any evidence of the following activities at the dive site or adjacent to the dive site.

Fishing	<input type="checkbox"/>	Sewage dumping	<input type="checkbox"/>
Trawling	<input type="checkbox"/>	Waste dumping	<input type="checkbox"/>
Angling	<input type="checkbox"/>	Industrial discharge	<input type="checkbox"/>
Potting	<input type="checkbox"/>	Litter and debris	<input type="checkbox"/>
Collection of shellfish	<input type="checkbox"/>	Oil	<input type="checkbox"/>
Collection of algae	<input type="checkbox"/>	Tar	<input type="checkbox"/>
Extraction of sand / gravel	<input type="checkbox"/>	Chemicals	<input type="checkbox"/>
Extraction of maerl	<input type="checkbox"/>	Education / scientific study	<input type="checkbox"/>
Extraction of oil or gas	<input type="checkbox"/>	Recreational facilities	<input type="checkbox"/>
Fishfarming of finfish	<input type="checkbox"/>	Resort	<input type="checkbox"/>
Fishfarming of shellfish	<input type="checkbox"/>	Marina	<input type="checkbox"/>
Farming of algae	<input type="checkbox"/>	Beach	<input type="checkbox"/>
Coastal defence in the form of seawalls	<input type="checkbox"/>	Water sports	<input type="checkbox"/>
Coastal defence in the form of dredging	<input type="checkbox"/>	Popular dive site	<input type="checkbox"/>
Coastal defence in the form of groynes	<input type="checkbox"/>	Mooring	<input type="checkbox"/>
Coastal defence in the form of land claim	<input type="checkbox"/>	Beaching	<input type="checkbox"/>
Military use	<input type="checkbox"/>	Launching site	<input type="checkbox"/>
	<input type="checkbox"/>	Other	<input type="checkbox"/>

Your comments on human impact on the seabed:

Please fill this section in to the best of your knowledge:

Site designation of the area:

Is the area of the dive:-	Is the salinity:-	Is the maximum tidal current at this site:-	Sand/mudstone <input type="checkbox"/>
Open coast <input type="checkbox"/>	Normal <input type="checkbox"/>	Very strong	Medium: <input type="checkbox"/>
Straits <input type="checkbox"/>	Variable <input type="checkbox"/>	(6kn) <input type="checkbox"/>	Limestone <input type="checkbox"/>
Narrows <input type="checkbox"/>	Low <input type="checkbox"/>	Strong	Friable: <input type="checkbox"/>
Sounds <input type="checkbox"/>	Unknown <input type="checkbox"/>	(3-6kn) <input type="checkbox"/>	Slate/shale <input type="checkbox"/>
Shallow rapids <input type="checkbox"/>	Is the area:-	Moderately strong	Soft: <input type="checkbox"/>
Enclosed coast <input type="checkbox"/>	Extremely exposed <input type="checkbox"/>	(1-3kn) <input type="checkbox"/>	Sand/mudstone <input type="checkbox"/>
Saline lagoon <input type="checkbox"/>	Very exposed <input type="checkbox"/>	Weak (<1kn) <input type="checkbox"/>	Chalk <input type="checkbox"/>
Other <input type="checkbox"/>	exposed <input type="checkbox"/>	Very Weak	Very soft <input type="checkbox"/>
Is Access:	Exposed <input type="checkbox"/>	(neg) <input type="checkbox"/>	Clay <input type="checkbox"/>
Easy <input type="checkbox"/>	Moderately exposed <input type="checkbox"/>	Uncertain <input type="checkbox"/>	Not known <input type="checkbox"/>
Difficult <input type="checkbox"/>	Sheltered <input type="checkbox"/>	Is the seabed:-	Stratification: <input type="checkbox"/>
Very difficult <input type="checkbox"/>	Very sheltered <input type="checkbox"/>	Hard:	Thermocline <input type="checkbox"/>
	Extremely sheltered <input type="checkbox"/>	Igneous <input type="checkbox"/>	Halocline <input type="checkbox"/>
	sheltered <input type="checkbox"/>	Chert/Flint <input type="checkbox"/>	Not stratified <input type="checkbox"/>
		Slate <input type="checkbox"/>	Unknown <input type="checkbox"/>

Sketch sheet:

Please sketch the dive profile to illustrate the features of the seabed. Draw in any habitats, communities, or peculiar features. Use more than one sheet if necessary. Please be careful to mark depth in metres, and give a compatible distance scale. If any evidence of stratification was seen please include it on your sketch. Make your sketch as simple as possible.

distance in metres

The sketch area is a large, empty rectangular frame. The top-left corner is labeled 'distance in metres'. The frame is intended for a hand-drawn sketch of a dive profile, showing depth on the vertical axis and distance on the horizontal axis. The sketch should illustrate the features of the seabed, including any habitats, communities, or peculiar features. The drawing should be simple and clear, with a compatible distance scale and depth markings in metres.

Site number:.....

Site description:

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

Your assessment of the site:

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

SEASEARCH



Marine Nature Conservation Review

SEASEARCH is run by the Marine Conservation Society on behalf of
the Nature Conservancy Council.

Date of survey:.....
Site name:.....
Site number:.....
Name of recorder:.....
Address of recorder:.....
District / Area:.....
Time of dive am/pm:..... Start:..... Finish:.....
Duration of dive:.....
Depth Range:.....
Maximum depth below chart datum:.....
Site location:.....

Map of area:

Please insert here a photocopy or sketch of the area, please mark in transect lines.

Reason for site selection:.....
Objectives of dive:.....
Were these objectives achieved?:.....
Was any other information collected?:.....
If yes please outline briefly:.....
Where can this information be found?:.....
Project leader comments:.....

Tick here if the form has been checked by the project leader:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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Appendix 1.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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It is anticipated that approximately 60 dives will be carried out with 60 forms being produced.

7. Timetable

Diving is due to start on the project in early March, as mentioned earlier this is dependent on the weather. The bulk of the diving will be completed by the end of August 1991. The Project Leader will spend the following dates working on the project on site:

May	17th/18th/19th
July	12th/13th/14th
July	26th/27th/28th
August	9th/10th/11th

Total of 12 days spent on site.

The report will then be collated in September 1991 by the Project Leader.

8. Projected costing

Staff Time	(12 days on site (10 days on write up)	£ 1,210
Project Leader travel (diesel)		£ 200
Project Leader accommodation		£ 200
Film (to volunteers)		£ 200
Fuel (boats, to volunteers)		£ 250
Miniprints for reports (20 reports, 10 with miniprints, approximately 40 miniprints per report)		£ 550
Total		£ 2610

9. References.

Eagle R.A., Hardiman P.A., Norton M.G., Nunny R.S., Rolfe M.S..
FISHERIES TECHNICAL REPORT No. 51. The field assessment of
effects of dumping wastes at sea: 5 The disposal of solid wastes
off the NE Coast of England.

Bellamy and Whittick (unpublished).

Foster-Smith R. Habitat Guide to the North East Coast. 1991.