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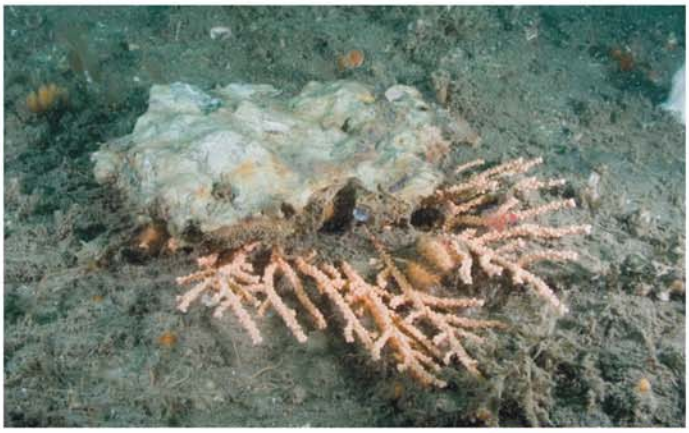
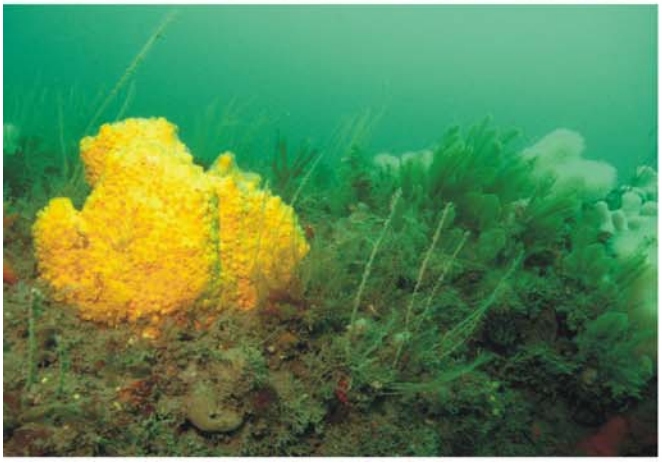
Lyme Bay

June 2007





A Report for Natural England

NATURAL ENGLAND

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Seasearch Surveys in Lyme Bay

June 2007

A report to Natural England

by

Chris Wood

August 2007

Seasearch

Seasearch is a volunteer underwater survey project for recreational divers to record observations of marine habitats and the life they support. The information gathered is used to increase our knowledge of the marine environment and contribute towards its conservation. Seasearch is coordinated by a Steering Group led by the Marine Conservation Society and including representatives from the UK statutory conservation bodies (CCW, EHS(NI), JNCC, NE, SNH), the Environment Agency, The Wildlife Trusts, the Marine Biological Association, the diver training agencies (BSAC, PADI, SAA, SSAC), Nautical Archaeology Society and independent marine life experts. Seasearch is supported financially by all of the UK statutory conservation agencies and the Environment Agency. Volunteer divers can participate in training courses and this is one of many surveys organized during the diving season. For more information www.seasearch.org.uk

The objectives of the Seasearch programme are to:

- Gather information on seabed habitats and associated wildlife throughout Britain and Ireland, by the participation of recreational SCUBA divers,
- Provide standardized training to enable volunteer divers to participate in Seasearch surveys,
- Ensure the quality of the data gathered,
- Make the data available through websites and reports,
- Raise awareness of the diversity of marine life in Britain and Ireland and its environment through participation of volunteer divers and dissemination of information.

Marine Conservation Society

The Marine Conservation Society (MCS) is the UK Charity dedicated to the protection of the marine environment and its wildlife. Since its formation in 1983, MCS has become a recognized authority on marine and coastal conservation and produces the annual *Good Beach Guide*, as well as promoting public participation in volunteer projects and surveys such as *Adopt-a-Beach*, *Seasearch* and *Basking Shark Watch*.
This Seasearch survey was carried out by members of the MCS as a part of the MCS Member's Dives Programme.
Marine Conservation Society, Unit 3, Wolf Business Park, Alton Road, Ross-on-Wye, HR9 5NB. Tel: 01989 566017, Website www.mcsuk.org

Reference:
Wood, C. (2007). Seasearch surveys in Lyme Bay, June 2007, A Report to Natural England. Marine Conservation Society.

Cover Images:
Top left: Sunset cup-corals at Sunset Ledge, Chris Wood
Top right: Edible crab at Sunset ledge, Chris Wood
Mid left: Dead pink sea fan in scallop dredge, Lyme Regis harbour, Steve Trewhella
Mid right: Healthy pink sea fans, West Tennant's Reef, Mike Markey
Bottom left: Rich faunal tuft on top of Sunset Ledge, Chris Wood
Bottom right: broken boulder and overturned pink sea fan, Beer Home Ground, Mike Markey

Contents

Introduction

1.1 Background to the survey

This is a report to Natural England of surveys carried out in by Seasearch volunteers in Lyme Bay which have been partly supported by Natural England because of their interest in the effects of the grounding of the Napoli off Branscombe Beach in East Devon.

Seasearch has also carried out surveys of sites in Lyme Bay concentrating on the pink sea fan population and these surveys repeat those made in 2004 and 2006 at a number of the same sites. The main spur for this work has been the reported impact of scallop fishing on diversity of sessile fauna on the low lying reefs which make up much of Lyme Bay, and in particular on the pink sea fan, *Eunicella verrucosa*, which is a nationally scarce, slow growing, Biodiversity Action Plan species which occurs in significant numbers throughout the rocky areas in the bay.

The surveys reported here and carried out with support from Natural England took place on 16th and 17th June 2007. Additional information has also been included from unsupported surveys carried out off Exmouth and Budleigh Salterton in April 2007.

1.2 The Survey Area

Lyme Bay is an open stretch of southerly facing coastline in East Devon and West Dorset extending 65kms from Exmouth in the west to the Isle of Portland in the east.

The Bay is exposed to south-westerly swells and contains substantial areas of soft rock reefs as well as sediment habitats.

Figure 1 below shows the sites dived during this survey, the position of the grounded MCS Napoli and the voluntary no scalloping areas agreed between Defra and fishermen in the bay.

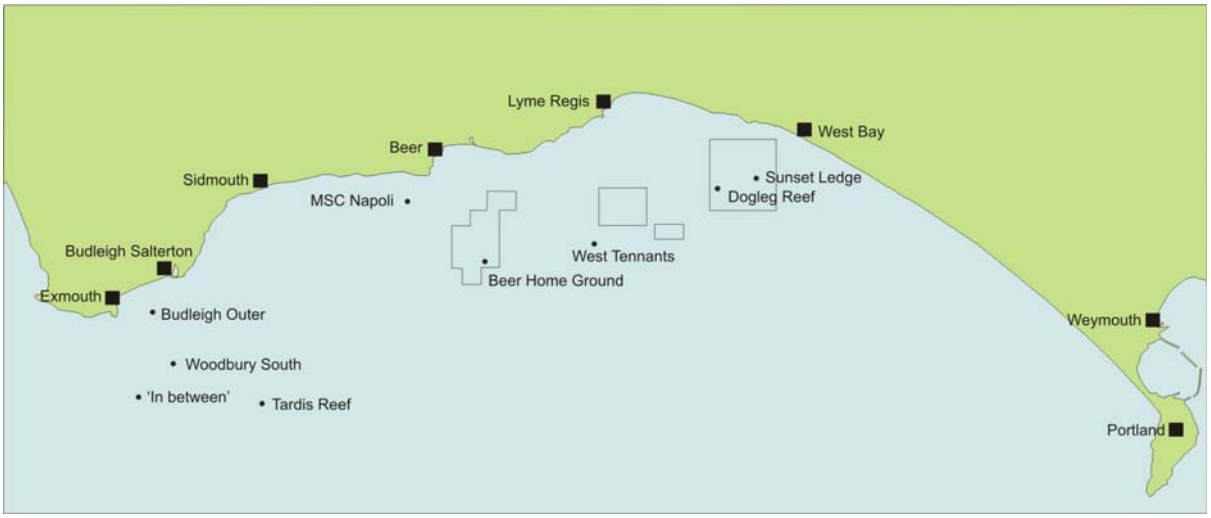

Figure 1: Lyme Bay study area

1.3 Methods

The surveys used established Seasearch volunteer survey methodologies involving different dive pairs completing general Seasearch Survey forms, or Seasearch Pink Sea Fan Survey forms with other divers taking photographs. This ensured that at least one survey form and one sea fan form was completed at each site.

The survey team consisted of 8 Seasearch surveyors:

Chris Wood – National Coordinator (survey forms, sea fan forms and photography)
Sally Sharrock – Devon Seasearch Coordinator (17th only) (sea fan forms & photos)
Alison Bessell – Seasearch volunteer, Bath (17th only) (survey form)
Mike Markey – Seasearch volunteer, Dorset (photography)
Rob Spray – Seasearch volunteer (survey forms and photography)
Steve Trewhella – Seasearch volunteer (Dorset) (photography)
Dawn Watson – Seasearch volunteer (survey forms)
Chris Webb – Seasearch volunteer (sea fan forms)

Information was recorded underwater using a slate and pencil. Data was transferred to either Survey or sea fan forms on the surface.

In the case of Seasearch Survey forms the information recorded is as follows:

- recorders divide the site into separate habitats and provide a description and qualitative information about seabed composition and features
- Species are recorded in separate lists for each habitat using the SACFOR (Superabundant-abundant-common-frequent-occasional-rare) scale
- Positions for each dive are recorded by GPS and dive times recorded. Depths are recorded by surveyors using dive computers, which also provide minimum temperature information.
- After the survey all depths are been adjusted to chart datum, JNCC biotopes identified for each habitat and all of the data entered into the Marine Recorder database.

In the case of Pink Sea Fan forms the surveyors record general information about the depth, habitat and density of sea fans at the site and detailed information about individual colonies comprising width, height, whether or not polyps extended, colour, condition (using a 1-5 scale), fouling species attached, fishing debris attached, and the presence of sea fan sea slugs or anemones and their numbers.

The additional records from the western part of the bay from April 2007 are Seasearch Observation records. These are less complex than the survey forms and involve the recording of dive position and details and a description of the habitat as a whole using a sketch and tick boxes and species recorded in a single list using a simplified COR (common-occasional-rare) scale.

During the compilation of the Survey forms extensive use was made of images taken on the dives using digital cameras, and identifications have been checked in keys and identification guides. Additional species have been added where appropriate.

1.4 Data analysis and quality control

All of the participants were experienced Seasearch surveyors and could be relied upon to produce a good level of accuracy with both habitat descriptions and species names. No specimens were collected and identifications were made *in situ*, backed up with photographs. Some life cannot be reliably identified to species level underwater and smaller species, including infauna and crevice dwellers, are generally under recorded in visual surveys. Identification guides were available on site to check identifications and all forms were completed the same day whilst fresh in people's minds.

Scientific names generally follow the nomenclature of the MCS Species Directory (Howson & Picton, 1997), however in some cases this is now out of date and the most recent authoritative name has been used with the previous name in brackets in the species lists. Common names have been included in the report where they exist to aid accessibility and follow the names in the Seasearch Guide to Marine Life (Wood, 2007).

The data on the recording forms have been subsequently validated and entered into the Marine Recorder database by the author. JNCC biotopes have been assigned to each habitat on the Survey forms as a part of this process.

3.0 Results

3.1 Habitat and species information

A summary description of each site dived is included in this section and representative sketches drawn by divers have been included.

General locations of the dive sites are shown in Figure 1 Species lists for each site with abundances are included in Appendix 1 and tables giving details of dive site positions and other data about the dive are given in Appendix 2. The original 'raw' data forms are held by the Marine Conservation Society.

Site 1 Beer Home Ground

(50^0 38.27'N 003^0 02.79'W)

Physical Environment

Smooth, flat mudstone bedrock at 20m below chart datum (bcd). Rock with thin covering of fine silt with sparse and damaged growth of sea fans and dead men's fingers. Small straight ledge (did not appear to be a natural feature) down to rock covered by small boulders, some obviously broken, cobbles and pebbles, again with a fine silt cover.

Habitat/Community Types

This site had the lowest number of species recorded during the survey weekend. Fauna was generally sparse with low, fast growing hydroids and bryozoans dominating. Amongst longer lived species pink sea fans were frequent, though a number were growing at an unnaturally flat angle with the sea bed and some were broken off at the base. King scallops were present in significant numbers.

Observations/Features of interest

This site has clearly been extensively dredged in the past. The flat surfaces are an un-natural feature and the preponderance of smaller species and damaged and bent sea fans are also the result of trawling. The site is currently within the voluntary closed zone for scalloping and the damage may well have been caused some time ago. There are numbers of small sea fans, dead men's fingers and potato crisp bryozoans all of which are signs of regeneration. However, overall, this is currently a highly degraded site.

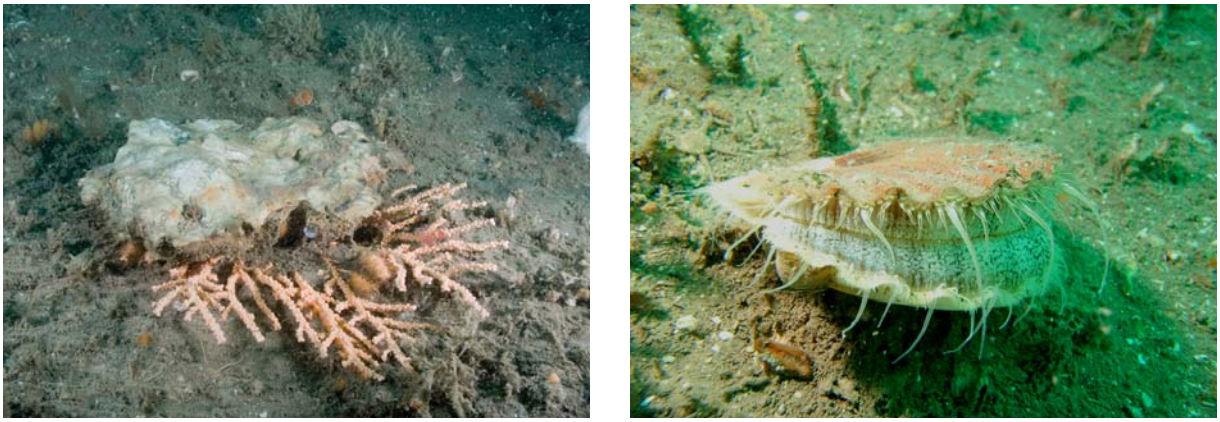

Figure 2: Images from Beer Home Ground. Left - pink sea fan crushed by broken piece of rock (Mike Markey). Right - king scallop, *Pecten maximus*, (Chris Wood).

Site 2: West Tennants Reef
(50^0 38.80'N 002^0 57.78'W)

Physical Environment
An area of raised bedrock about 1.5m higher than the surrounding seabed and 21m bcd on its top. The rock had a flat plateau-like upper surface about 10m across with a length of at least 50m (the extent was not surveyed). There was a light cover of silt on the upper surfaces. The steep sides of the plateau had fissures and small overhangs inhabited by crabs and lobster. The lower surface surrounding the reef (23m bcd) had a mixture of small boulders, cobbles and pebbles lying on flat rock with a thicker covering of silt than on the rocky plateau.

Habitat/Community Types
The number and range of species recorded here was similar to Beer Home Ground. However the density of pink sea fans, soft corals and larger hydroids (especially antenna hydroid) was much higher. The raised rocky reef had a high density of pink sea fans with up to 5 colonies per square metre. Some sea fans were bent over or broken off. The lower surface had a considerable amount of broken fauna present. This included broken sea fans and many parchment worm tubes.

Observations/Features of Interest
This site had both the highest density of sea fans of any of the sites surveyed in the bay and also the highest level of visible damage to the habitat. It was also surveyed in July 2006 and similar or worse conditions were recorded. The site has clearly suffered physical damage, but it seems unlikely that it has been in the last year. However it is not within the voluntary closed areas and could thus be dredged at any time. It may be that the height of the plateau above the surrounding seabed has provided a measure of protection.

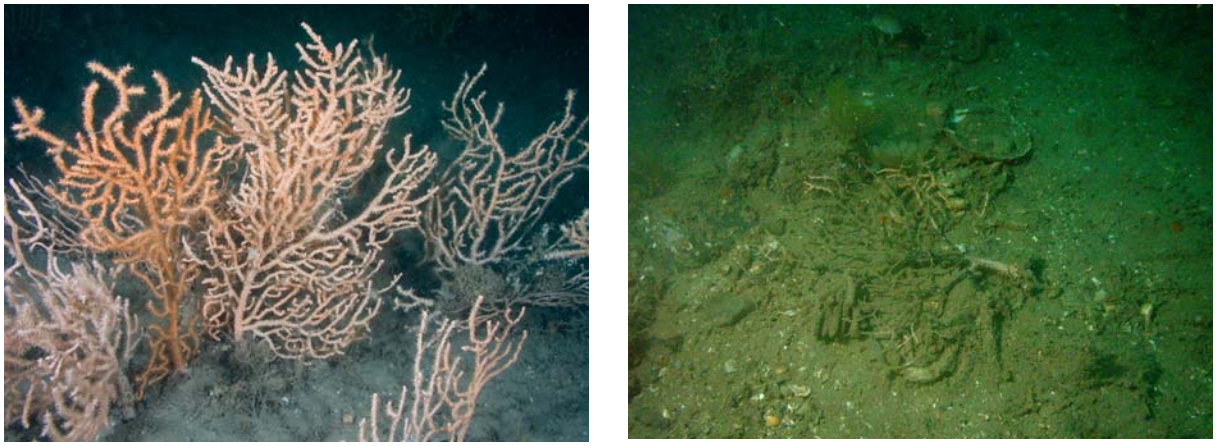

Figure 3: Images from West Tennant's Reef. Left: healthy sea fans on the top of the reef (Mike Markey), Right: dead sea fans and broken parchment worm tubes on the lower seabed (Chris Wood).

Site 3: Dogleg Reef, West Bay, Dorset
(50^0 40.76'N 002^0 50.14'W)

Physical Environment
The site comprised of a gently sloping silted rocky surface facing south-east. It was relatively smooth and featureless. At the upper end it was broken up into huge flat blocks of rock with vertical fissures between them. The rock is understood to be Blue Lias and is relatively soft

and heavily bored with many small burrows in the surface, though it was not clear what the main boring organism is.

Habitat/Community Types

The smooth sloping rock surface was relatively sparsely covered in sessile fauna, though pink sea fans were common. Bryozoan crusts and chimney sponge, *Polymastia mamillaris*, were both common but whilst there was a good range of other sponges, hydroids, anemones, and sea squirts none were very numerous. The broken blocks had very little sessile fauna but were a habitat for fishes which were numerous and the fissures also provided a habitat for red tube worms, *Protula tubularia*.

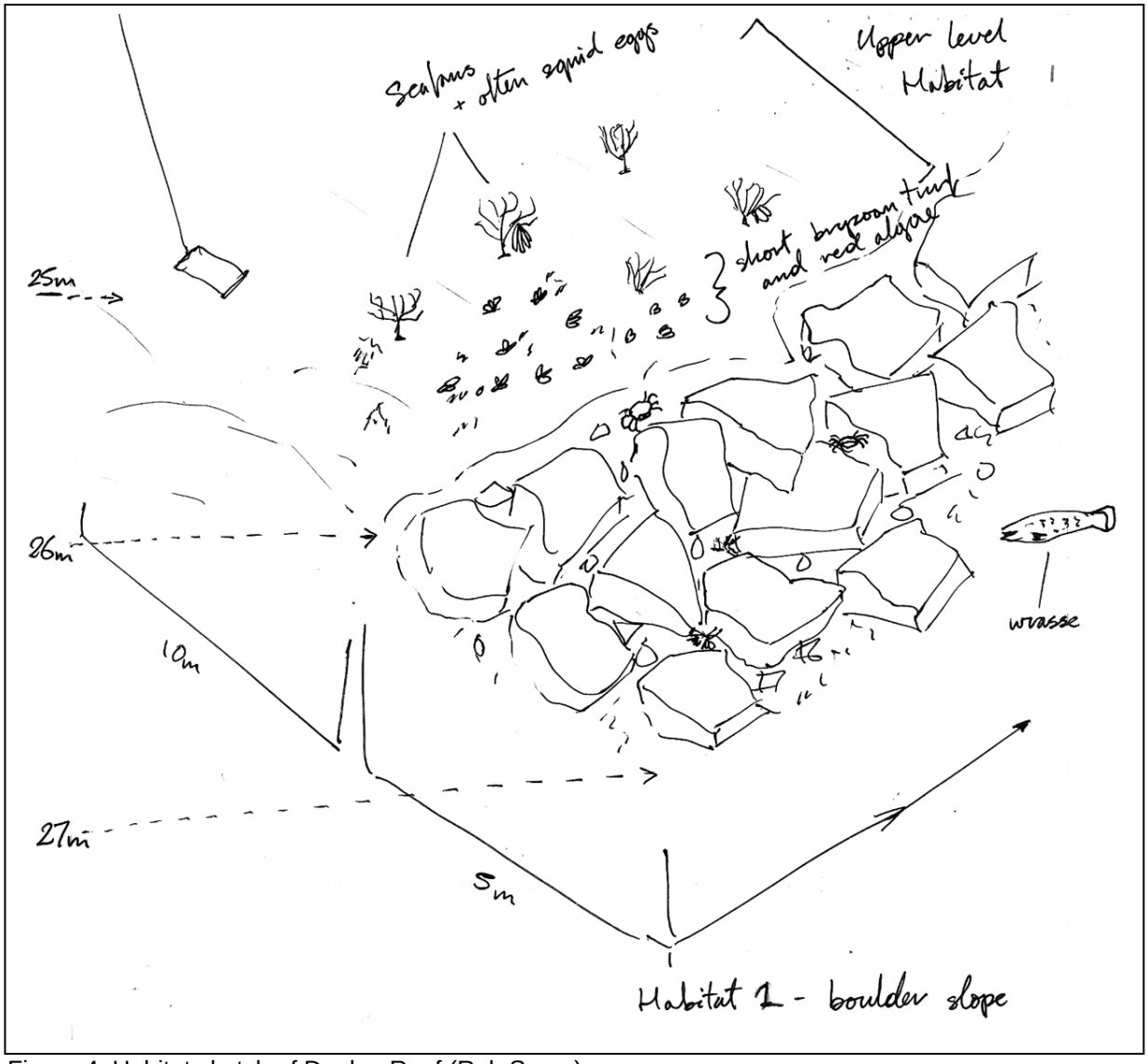

Figure 4: Habitat sketch of Dogleg Reef (Rob Spray)

Observations/Features of Interest

The site had been previously dived in 2004 and no significant changes were noted. There was a number of sea fans detached and lying on the seabed. One intact colony had a plastic bag wrapped around it which was carefully removed (see Figure 5). Others had strings of squid eggs attached.


Figure 5: Images from Dogleg Reef. Left: plastic bag wrapped around pink sea fan (Chris Wood). Right: red tube worm, *Protula tubularia* (Chris Wood).

Of particular interest at this site was the presence of the snapping prawn, *Alpheus macrocheles,* a rarely recorded species which was photographed by Steve Trewhella and is shown in Figure 6 below.

Figure 6. Snapping prawn, *Alpheus macrocheles*, Dogleg Reef (Steve Trewhella)

Site 4: Sunset Ledge, West Bay, Dorset

(50^0 41.08'N 002^0 48.03'W)

Physical Environment

The site comprised of an elongated rocky ridge running east-west with a 3m high vertical face on the northern side and a gently sloping face on the south side. The top of the reef had a depth of 15.5m bcd (the shallowest of the 4 sites surveyed) and the surrounding lower seabed to the north a depth of 22m bcd. The north-facing face (17.5-21.5m bcd) was overhanging in places and had many longitudinal fissures and crevices.

Habitat/Community Types

The upward facing surface of the ridge had a rich mixed faunal and flora turf characterised by dead men's fingers, sponges, anemones and low growing red seaweeds. The vertical/overhanging face had large numbers of anemones (especially the sandy creeplet, *Epizoanthus couchi*) and cup-corals (sunset, *Leptopsammia pruvoti*, and southern, *Caryophyllia inornata*) amongst sponges and bryozoans.

The lower surface to the north of the ledge has a depth of 22m bcd. There were areas of exposed rock and boulders at the base of the wall. Away from the ledge the seabed consisted of poorly sorted sand and gravel ridges with occasional boulders and cobbles. Sea fans were present on this lower surface in small numbers.

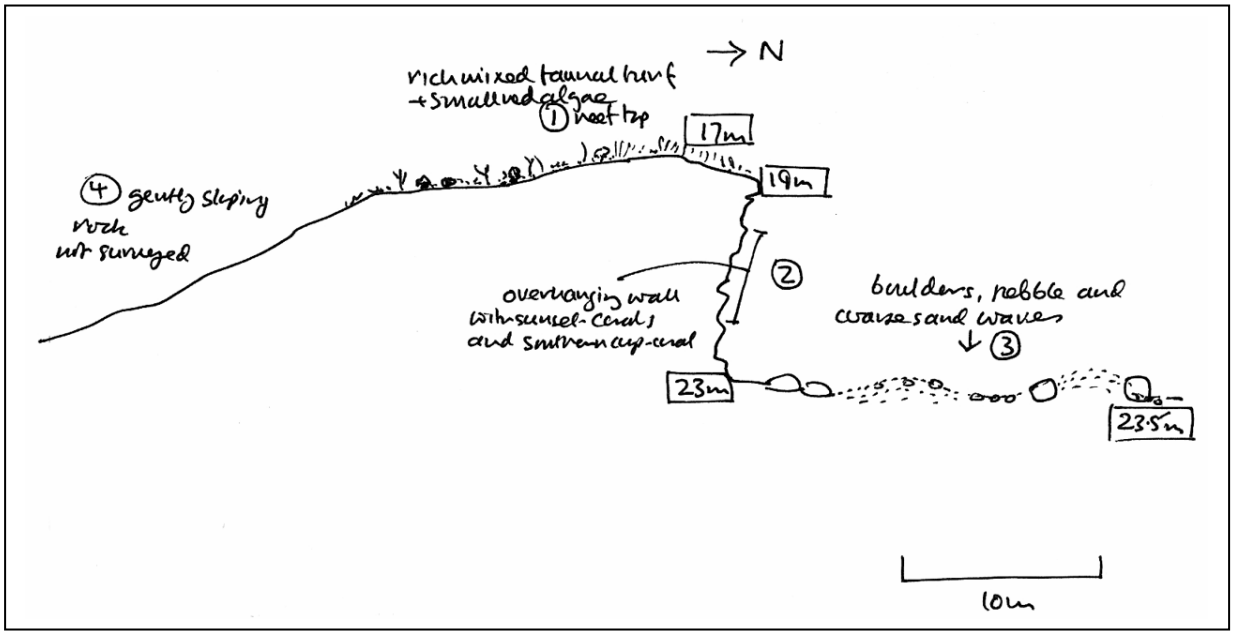

Figure7: Sketch profile through Sunset ledge (Chris Wood)

Observations/Features of Interest

The main feature of the site is the abundance of the nationally rare sunset cup-coral, *Leptopsammia pruvoti* and the southern cup-coral, *Caryophyllia inornata*. Lyme Bay is one of only five areas in the British Isles where the sunset cup-coral is known to occur. The others are Lundy, Isles of Scilly, Plymouth Drop Off and Sark (Channel Islands). The range of species recorded at this site was significantly higher than any other during the survey. It was also the one site with no evidence of recent or past damage from dredging activities. It is within one of the voluntary closed areas.

Figure 8: Cup-coral images from Sunset Ledge. Left: sunset cup-coral, *Leptopsammia pruvoti*, (Mike Markey).Right: southern cup-coral *Caryophyllia inornata*, (Chris Wood)

3.2 Additional information from westerly sites

The information from earlier dives west of the MSC Napoli is summarised here. The species are not included in the species list in Appendix 1.

Site 5: Budleigh Outer Reef

(50^0 37.204'N 003^0 18.798'W)

A flat area of seabed with a recorded depth of 13m comprising small boulders, cobbles and sand, the latter formed into waves. Antenna and other hydroids were common on the boulders and there were patches of the ross worm, *Sabellaria spinulosa*, on the tops of the sand waves

.

Site 6: Woodbury's Ground

(50^0 34.760'N 003^0 18.496'W)

A flat area of seabed with a recorded depth of 19.5m comprising maerl which was less than 10% living, with occasional cobbles and broken shells. The maerl was formed into waves 20cm high. A rare species sighting was the bright red sea slug, *Lomanotus genei.*

There was evidence of trawling across the site and a trawler was working nearby at the time of the survey.

Site 7: 'In between'

(50^0 33.922'N 003^0 19.685'W)

An area of flat seabed with a recorded depth of 21.5m comprised of sand, gravel and mud with much silt. Abundant burrowing anemones, *Cerianthus lloydii* and sand mason worms, *Lanice conchilega*. Also frequent sand grain tubes of an unidentified worm.

Site 8: Tardis Reef

(50^0 33.265'N 003^0 16.475'W)

An area of low lying rocky outcrops up to 50cm high amongst a seabed of coarse sand/gravel and broken shell with a recorded depth of 23m. The rocky outcrops had a cover of hydroids with occasional dead men's fingers, *Alcyonium digitatum*, and pink sea fans, *Eunicella verrucosa*. The surrounding sediment was notable for the large number of burrowing anemones, *Cerianthus lloydii*, sand mason worms, *Lanice conchilega*, and the presence of the scarce policeman anemone, *Mesacmaea mitchellii*.

3.3 Pink Sea Fan records

Detailed records of sea fans were made at all four sites surveyed and repeat previous records. The results are shown below:

Site	Number recorded	Max width	Mean width	Max height	Mean height	Average condition	Abundance
Beer Home Ground	28	28	18.1	25	16.9	4.29	occasional
West Tennants (upper surface)	22	58	24.4	42	26.0	4.35	forest
West Tennants (lower surface)	9	45	21.3	32	19.4	3.00	occasional
Dogleg Reef	47	35	13.9	30	14.9	4.19	common
Sunset Ledge	14	40	18.9	30	15.5	3.5	occasional
Total	**120**	**58**	**17.9**	**42**	**17.8**	**4.07**	**-**

A comparison with previous records may be made at each site

Beer Home Ground							
Date	**Number recorded**	**Max width**	**Mean width**	**Max height**	**Mean height**	**Average condition**	**Abundance**
June 2007	28	28	18.1	25	16.9	4.29	occasional
August 2004	13	25	13.1	20	13.5	4.23	occasional

West Tennants							
Date	**Number recorded**	**Max width**	**Mean width**	**Max height**	**Mean height**	**Average condition**	**Abundance**
(upper surface) June 2007	22	58	24.4	42	26.0	4.35	forest
(lower surface) June 2007	9	45	21.3	32	19.4	3.00	occasional
July 2006	24	50	24.0	20	13.5	3.42	common

Dogleg Reef							
Date	**Number recorded**	**Max width**	**Mean width**	**Max height**	**Mean height**	**Average condition**	**Abundance**
June 2007	47	35	13.9	30	14.9	4.19	common
August 2004	7	41	21.6	25	18.1	4.29	forest

Sunset Ledge							
Date	**Number recorded**	**Max width**	**Mean width**	**Max height**	**Mean height**	**Average condition**	**Abundance**
June 2007	14	40	18.9	30	15.5	3.50	occasional
July 2006	18	70	26.0	35	24.1	2.61	common

These figures suggest that there has been little change in the density or condition of the sea fan populations at these sites since 2004 in the case of Beer Home Ground and Dogleg Reef and since 2006 in the case of West Tennants and Sunset Ledge. We do not have earlier figure collected from the same sites.

Comparison with the situation in 2001-2 for Lyme Bay in general suggests that there has been a fall in condition from 4.36 to 4.07 for this survey. (2001-2 figures in Wood, 2003).

There are two main causes of declines in sea fan populations, benthic fishing and disease. Benthic fishing activities, scallop dredging in the case of Lyme Bay, lead to physical damage to sea fan colonies including breaking them off from the seabed and entanglement in fishing gear. There was ample evidence from Beer Home Ground, West Tennant's and Dogleg Reefs that such damage has been an issue at these sites. Broken sea fan colonies, in some cases still living, were photographed in 2006 and during this survey and examples are shown on the cover and in Figure 9 below.

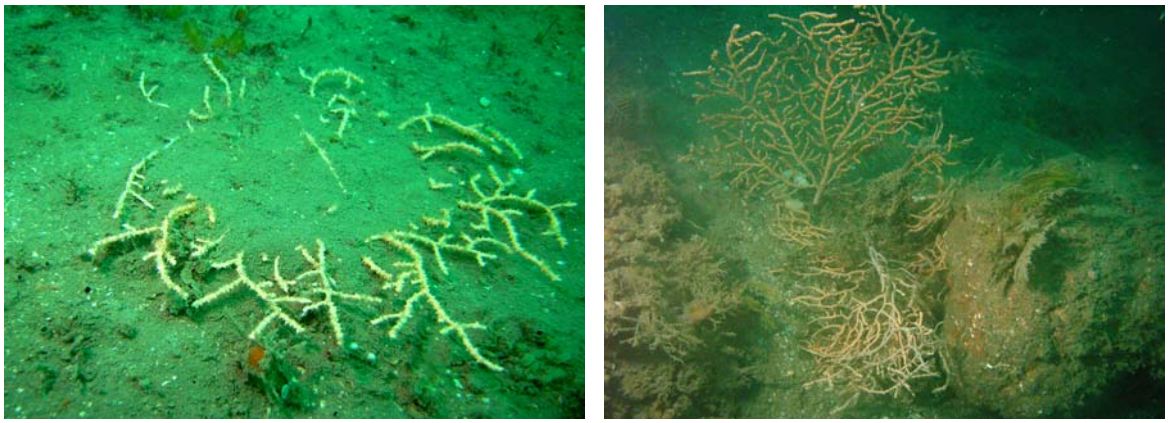

Figure 9: Damaged sea fans. Left: broken colony covered in silt, Dogleg Reef (Chris Wood), Right: One erect and one detached sea fan, both alive, West Tennants (Chris Wood).

We also photographed dead sea fans entangled in scallop fishing gear in Lyme Regis harbour in 2007. Again these can be seen on the cover and in Figure 10 below.

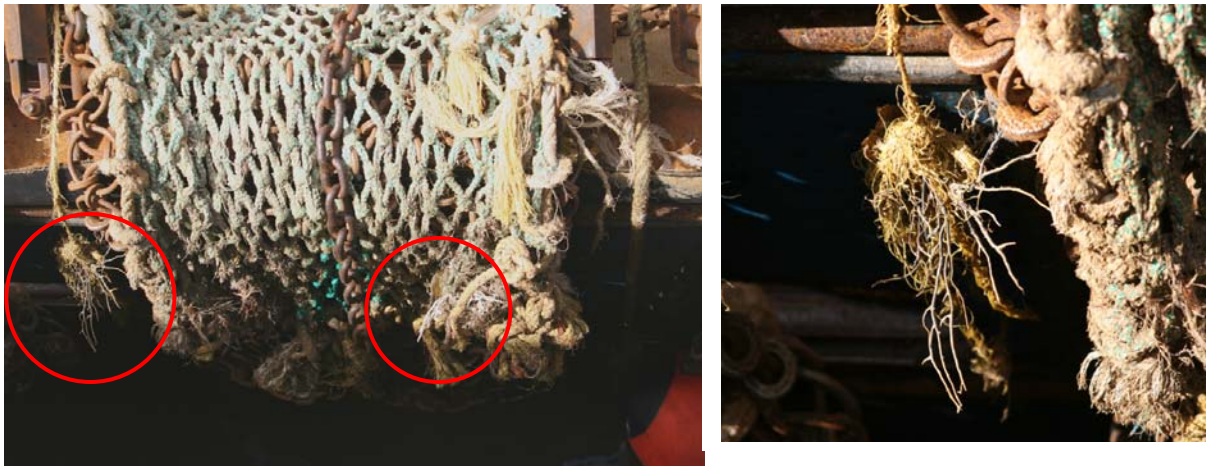

Figure 10. Sea fans in fishing gear in Lyme Regis. Left: one fan with all living tissue dead back to the skeleton (left) and one with blanched tissue still intact (right), (Steve Trewhella). Right: close up of sea fan skeleton entangled in frayed rope, (Steve Trewhella).

The impact of disease is quite different to that of fishing activities in that it causes colonies to lose their living tissue, but remain affixed to the seabed, usually becoming heavily fouled by silty 'turf' and attached animals. This appears to be the main cause for concern at Sunset Ledge where in 2006 a surveyor noted that: *"a large proportion (about 75%) of the sea fans on the southward sloping reef were either dead or severely 'sick' i.e. thin and white."*
At that time sea fans were assessed as common at the site. In the 2007 survey they were only assessed as occasional and of the 14 colonies looked at in detail:

1 standing completely dead and totally fouled
1 almost completed fouled, with one small living area
1 70% fouled, with one side only alive
1 with the centre completely fouled and dead with living parts at the side.

The average condition score for 2006 was 2.61 and for 2007 3.5, both significantly below average for sea fan populations (Wood, 2003 & Wood in press).

The methodology used in these studies is able to accurately record standing dead and damaged sea fans, such as those affected by disease; but is unable to record colonies that have been completely removed as a result of physical disturbance. It is paradoxical that at the sites where fishing activity has caused physical damage, some of the remaining fans, though completely broken off, are still alive, whilst at Sunset Ledge there are undamaged colonies which are completely dead.

Some idea of the number of sea fans which have been physically removed can be gained from the observations of sea fans washed up dead on Chesil Beach (Hatcher & Trewhella, 2006)

3.4 Marine Litter

Natural England was interested in identifying any impacts of the stranding of the container ship MSC Napoli at Branscombe Beach, just west of Beer on the surrounding seabed. The tidal streams in this area run parallel with the coastline and thus litter and other pollutants from the Napoli, where not washed up on the beach, would be expected to be found to the east and west of the site with only the heavier items, such as containers, remaining on the seabed in the immediate vicinity. This survey looked at 4 sites to the east of the stranding location and the earlier surveys reported here covered 4 sites to the west. Some litter was recorded during both surveys but none of it could be linked to the Napoli and levels were no higher than would be expected.
Items recorded were:

Beer Home Ground:
- none

West Tennants:
- none

Dogleg Reef:
- Plastic bag wrapped around sea fan (removed)

Sunset Ledge;
- Angling weight

Budleigh Outer Reef
- none

Woodbury's South
- none

'In between'
- none

Tardis Reef
- Abandoned lobster pots
- Angling line (including wrapped around one sea fan)

4 Discussion

For all of the sites recorded the main conservation issue is the impact of bottom trawling of scallops. Evidence of the impact on sessile species is most obvious in the number of detached sea fans and the paucity of longer lived species in most areas. Sunset Ledge, which is high enough to be avoided by trawlers is the most diverse of all of the sites and West Tennants, also a significant area of reef, the second most diverse. The surveys do not record any increased damage from previous records in 2004 and 2006 but it is important that sites continue to be monitored in the event of further damaging activities taking place. It is notable that the West Tennants reef, which had the best pink sea fan population of any of the sites surveyed, lies outside the voluntary closed areas agreed between fishermen's representatives and Defra. This is a significant anomaly which should be resolved if the policy of voluntary closed areas is to be continued, and a wider ban is not to be introduced.

Paradoxically the site with the poorest sea fan population is one which has not been affected by scallop dredging, Sunset Ledge. This appears to have suffered from the wasting disease in sea fans which as been reported from Lundy (Wood 2003), Bigbury Bay (Wood 2005) and elsewhere. The cause of the disease is believed to be bacteriological and may be linked to increased water temperature (Hall-Spencer *et.al*. 2007). Whilst there is nothing that can be done to prevent further outbreaks of disease it is important that a range of sites continue to be monitored for it.

The grounding of the MCS Napoli does not appear to have had any long-term impact on any of the sites surveyed. Whilst it is clear that any works in connection with the removal of the Napoli should avoid these areas, and indeed any areas with sea fan populations, it is likely that, apart from very limited physical impact in the area of the grounding and where containers remain on the sea bed, the impact of the Napoli on sea bed communities is likely to have been very limited. The day to day damage from scallop trawling, which covers a wide area, is a much more important conservation issue.

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6. Acknowledgements

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The financial contribution from Natural England enabled the survey to go ahead.

Appendix 1 Species List

Species Name	Taxonomic Order	Common Name	Beer Home Ground	West Tennants	Dogleg Reef	Sunset Ledge
POIFERA		**Sponges**				
Scypha cilaita	C010023010020030020	purse sponge	O			
Pachymatisma johnstonia	C020053060020050010	elephant hide sponge			CO	CCOR
Dercitus bucklandi	C020053060030020010	black tar sponge				FR
Thymosia guernei	C020053090010010010	mashed potato sponge				R
Tethya aurantium	C020053090015050010	golf ball sponge			R	OOO
Polymastia boletiformis	C020053090030030040	hedgehog sponge			O	R
Polymastia mamillaris	C020053090030030070	chimney sponge			C	
Stelligera rigida	C020053090055080010				O	
Stelligera stuposa	C020053090055080020				P	OO
Cliona celata	C020053090090020050	boring sponge	FF	CF	O	CFF
Axinella dissimilis	C020103110010050040	yellow staghorn sponge	OO	FO	R	FOO
Ciocalypta penicillus	C020103110040060010	tapered chimney sponge	PP		RPP	R
Hymeniacidon perleve	C020103110040090100					O
Esperiopsis fucorum	C020103120010065030	shredded carrot sponge	O	OR		ACFFP
Hymedesmia paupertas	C020103120080040190	blue sponge				P
Hemimycale columella	C020103120090050010	crater sponge	O	OO	R	OR
Iophonopsis nigricans	C020103120110220010				O	O
Raspailia hispida	C020103120130280060		P	P		
Raspailia ramosa	C020103120130280100	chocolate finger sponge	FF	FO		O
Haliclona fistulosa	C020103130020130050					O
Haliclona oculata	C020103130020130070	mermaid's glove			R	OOO
Haliclona simulans	C020103130020130100					C
Dysidea fragilis	C020103160030020030	goosebump sponge			O	OOOO
Halisarca	C020103160040010					P
Porifera indet crusts	C09200					C
			8	6	13	21

Species Name	TaxonomicOrder	Common Name	Beer Home Ground	West Tennants	Dogleg Reef	Sunset Ledge
CNIDARIA		**Jellyfish, hydroids, anemones & corals**				
Chrysaora hysoscella	D005020030010020010	compass jellyfish	P	R		
Hydrozoa	D043	feathery hydroids indet.	AA	FF	O	CO
Halecium	D043020030102030010370010					P
Halecium halecinum	D043020030102030010370010030	herringbone hydroid			F	
Abietinaria abietina	D043020030102040010420010010					P
Sertularella gayi	D043020030102040010420070030				O	P
Nemertesia antennina	D043020030102040020460030050010	antenna hydroid	OO	FF		FFFOOO
Aglaophenia pluma	D043020030102040020470010050			P	O	
Gymnangium montagui	D043020030102040020470020010	indian feathers hydroid				O
Alcyonium digitatum	D140150170010010010	dead men's fingers	FO	AO	FR	CFOOR
Eunicella verrucosa	D140150180020010010	pink sea fan	FO	AF	CF	CFOOR
Epizoanthus couchii	D140200230010010010	sandy creeplet		FO	FO	AAFF
Isozoanthus sulcatus	D140200230020020010	peppercorn anemone			R	
Aureliania heterocera	D140200240020040010010	imperial anemone	P			
Aiptasia mutabilis	D140200240020060010010	trumpet anemone				FFOR
Sagartia elegans	D140200240020090010010	elegant anemone				F
Cereus pedunculatus	D140200240020090020010	daisy anemone	O			
Actinothoe sphyrodeta	D140200240020090030010	white striped anemone	OO	OO	R	CFO
Sagartiogeton undatus	D140200240020090040020				R	
Corynactis viridis	D140200250010010010	jewel anemone				F
Caryophyllia inornata	D140200260020010010	southern cup-coral				CO
Caryophyllia smithii	D140200260020010020	Devonshire cup-coral	OO	OO		C
Hoplangia durotrix	D140200260020040010	carpet coral				R
Leptopsammia pruvoti	D140200260050030020	sunset coral				ACF
			9	9	10	17
PLATYHELMINTHES		**Flatworms**				
Prostheceraeus vittatus	F010003020020080020020	candy stripe flatworm	R		OR	RRRR
			1	0	1	1

Species Name	TaxonomicOrder	Common Name	Beer Home Ground	West Tennants	Dogleg Reef	Sunset Ledge
ANNELIDA		**Segmented worms**				
Chaetopterus	P001003070030070010					OP
Bispira volutacornis	P001003220010020010	double spiral worm	FF	FO	FO	OOOOR
Myxicola infundibulum	P001003220010130020	eyelash worm	R		O	R
Sabella	P001003220010190	peacock worm				P
Pomatoceros	P001003220030010070	keelworm	CC	OO		
Serpula vermicularis	P0010032200300100800 10	organ pipe worm		O	O	OR
Filograna	P001003220030020120				OO	OOR
Filograna implexa	P0010032200300201200 10	coral worm				O
Protula tubularia	P0010032200300201600 10				FO	OO
Salmacina dysteri	P0010032200300201700 10	coral worm			O	
			3	3	6	8
CRUSTACEA		**Crabs, lobsters, shrimps & prawns**				
Balanomorpha	R015020030	barnacles	CC	OO		PP
Solidobalanus fallax	R0150200300300700400 10				O	
Boscia anglica	R0150200300300900100 10	cup-coral barnacle				F
Alpheus macrocheles	S0100200900200100400800100 20	snapping prawn			P	
Homarus gammarus	S0100200900200200101300100 10	lobster	O	O		
Paguridae	S010020090020050010230	hermit crabs		OO		
Maja squinado	S0100200900200600400103100100200 10	spiny spider crab	O	FO	O	OOO
Macropodia	S010020090020060040010310030090		CF	OO		R
Cancer pagurus	S010020090020060050010370010020	edible crab	O	OO	O	OORR
Necora puber	S0100200900200600600103800200650 60	velvet swimming crab	O	OO	OR	R
			6	7	5	6

Species Name	TaxonomicOrder	Common Name	Beer Home Ground	West Tennants	Dogleg Reef	Sunset Ledge
MOLLUSCA						
Calliostoma zizyphinum	W040058060050130060130010030	painted topshell	OO	OO	RR	ORRP
Trivia	W040058070080190010010	cowries		PP		
Trivia monacha	W040058070080190010010010040	european cowrie			R	
Hinia reticulata	W040058080010030040140010020	netted dog whelk			P	
Tritonia lineata	W040170010010010010050					R
Tritonia nilsodhneri	W040170010010010010070	sea fan nudibranch		FO		
Crimora papillata	W040170030110010010010			O	O	O
Polycera faeroensis	W040170030130010010	yellow edged polycera	O			R
Pecten maximus	W060270020030010010020	king scallop	CC	OF		R
Chlamys	W060270020030030					P
Hiatella arctica	W060290030040010010	red nose piddock				P
Loligo	W070320010010	squid (eggs)			O	
			3	5	5	7
BRYOZOA		**Sea mats and moss animals**				
Alcyonidium diaphanum	Y020010010010010030	finger bryozoan				F
Electra pilosa	Y020020030010070010030	frosty sea mat				OO
Flustra foliacea	Y020020040010080010010	hornwrack	O	CO	FO	AOO
Securiflustra	Y020020040010080040					C
Securiflustra securifrons	Y020020040010080040010	square-end hornwrack				O
Bugula	Y020020040030120010	spiral bryozoans		CC		
Bugula flabellata	Y020020040030120010030					P
Bugula plumosa	Y020020040030120010060					CO
Bicellariella ciliata	Y020020040030120030010					P
Cellaria	Y020020040050200010		C	PP		
Pentapora foliacea	Y020020050040010400020010	potato crisp bryozoan	CO	FF	OR	CORR
Cellepora pumicosa	Y020020050040030480010010	orange pumice bryozoan	CO	FF		CC
Bryozoa indet crusts	Y08880				C	C
			4	5	3	11
PHORONIDA		**Horseshoe worms**				
Phoronis hippocrepia	ZA010010010010	horseshoe worm				AFOOP

			0	0	0	1
Species Name	**TaxonomicOrder**	**Common Name**	**Beer Home Ground**	**West Tennants**	**Dogleg Reef**	**Sunset Ledge**
ECHINODERMATA		**Echinoderms**				
Asterias rubens	ZB020080010020010	common starfish	FO	FF		
Ophiuroidea	ZB030	brittlestars				
Ophiura	ZB030110070010		FO			
Ophiura albida	ZB030110070010020		P			
Thyone roscovita	ZB050190030020030				R	
Ocnus	ZB050190040040			P		
Aslia lefevrei	ZB050190040050010	brown crevice sea cucumber			R	
			3	2	2	0
TUNICATA:						
Ascidiacea		**Sea Squirts**				
Clavelina lepadiformis	ZD010010010010010010	light bulb sea squirt	P		O	OR
Pycnoclavella aurilucens	ZD010010010010020010	sparkling sea squirt			R	
Sidnyum elegans	ZD010010010020040010				O	FOO
Aplidium punctum	ZD010010010020050070	club head sea squirt		O		
Didemnidae	ZD010010010030					
Didemnum	ZD010010010030030			OO		
Diplosoma	ZD010010010030050		O			O
Lissoclinum perforatum	ZD010010010030070010					R
Corella parallelogramma	ZD010010020070010010	gas mantle sea squirt	O			
Ascidia mentula	ZD010010020080020020	red sea squirt		OO		
Phallusia mammillata	ZD010010020080030020			OO	R	OR
Styela clava	ZD010020010010020010				R	
Dendrodoa grossularia	ZD010020010010050010	gooseberry sea squirt			P	
Stolonica socialis	ZD010020010010070010	orange sea squirt		P	C	
Botryllus schlosseri	ZD010020010010080010	star sea squirt	P		FO	
Pyura microcosmus	ZD010020010020040010					P
			4	5	8	6

Species Name	TaxonomicOrder	Common Name	Beer Home Ground	West Tennants	Dogleg Reef	Sunset Ledge
PISCES		**Fishes**				
Scyliorhinus canicula	ZF010030010020010	lesser spotted catshark	P			
Scyliorhinus canicula	ZF010030010020010	lesser spotted catshark (eggcases)	O	O	R	
Trisopterus luscus	ZG010020100010160020	bib		OO	FRR	FO
Trisopterus minutus	ZG010020100010160030	poor cod			FO	FO
Syngnathus acus	ZG010020190020040010		P			
Taurulus bubalis	ZG010020200030050010	long spined sea scorpion				R
Centrolabrus exoletus	ZG010020210120020010	rock cook			O	F
Ctenolabrus rupestris	ZG010020210120050010	goldsinny	OO	FF	FF	FOOO
Labrus bergylta	ZG010020210120060010	ballan wrasse	OO	OO	FR	OR
Labrus mixtus	ZG010020210120060020	cuckoo wrasse	OO	FF	FF	FO
Parablennius gattorugine	ZG010020210140040010	tompot blenny	O	OO		FFOO
Thorogobius ephippiatus	ZG010020210220090010	leopard spotted goby				CF
			7	6	7	9
RHODOPHYCOTA		**Red Seaweeds**				
Rhodophycota	ZM	mixed red seaweeds				CF
Palmaria palmata	ZM010020040010020010	dulse		O?	AO	
Corallinales	ZM010020070	pink encrusting algae			OO	O
Calliblepharis ciliata	ZM010020080060010010	red fringe weed				FP
Delesseria sanguinea	ZM010020100020050010	sea beech				F
			0	1	2	4
Total species recorded			48	49	62	91

Appendix 2: Dive positions and details

Name	Position	Date	Time In	Surveyors	Records made
Beer Home Ground	50^0 38.27'N 003^{0}02.79'W	16/06/07	1330	Rob Spray Dawn Watson Chris Webb Chris Wood	2 Survey 2 Sea Fan
West Tennants	50^{0}38.80'N 002^{0}57.78'W	16/06/07	1010	Rob Spray Dawn Watson Chris Webb Chris Wood	2 Survey 3 Sea Fan
Dogleg Reef	50^{0}40.76'N 002^0 50.14'W	17/06/07	1000	Sally Sharrock Rob Spray Dawn Watson Chris Webb Chris Wood	3 Survey 2 Sea Fan
Sunset Ledge	50^{0}41.08'N 002^{0}48.03'W	17/06/07	1300	Alison Bessell Sally Sharrock Rob Spray Dawn Watson Chris Webb Chris Wood	4 Survey 1 Sea Fan
Photographs were taken by Sally Sharrock, Mike Markey, Steve Trewhella and Chris Wood					
Additional sites off Exmouth and Budleigh Salterton surveyed in April 2007					
Budleigh Outer Reef	50^{0}37.204'N 03^{0}18.798'W	9/04/07	1335	Ian Johnson Sally Sharrock	2 Obs
Woodbury's Ground	50^{0}34.760'N 03^{0}18.496'W	28/04/07	1000	Bob Jones Sally Sharrock	1 Survey 1 Obs
In Between	50^0 33.922'N 03^{0}19.685'W	29/04/07	1315	Sally Sharrock	1 Survey
Tardis Reef	50^0 33.265'N 03^{0}16.4075W	9/04/07 29/04/07	1130 1000	Ian Johnson Andrew Mack Sally Sharrock Bob Jones Sally Sharrock	3 Obs 1 Sea Fan 1 Survey 1Obs

Appendix 3: JNCC Biotopes identified.

Biotopes have been allocated to each site as follows:

Beer Home Ground

Habitat 1 – upper level of bedrock
CR.HCR.XFa.ByErSp.Eun
Habitat 2 – lower level of rock and mixed sediment
CR.HCR.XFa (it was not possible to identify a more detailed habitat in this case because of the sparse nature of the fauna present)

West Tennants Reef

Habitat 1 – upper level of bedrock
CR.HCR.XFa.ByErSp.Eun
Habitat 2 – lower level of rock and mixed sediment
CR.HCR.XFa (it was not possible to identify a more detailed habitat in this case)

Dogleg Reef

Habitat 1 – slightly sloping rock
CR.HCR.XFa.ByErSp.Eun
Habitat 2 – broken rock slabs
CR.HCR (it was not possible to identify a more detailed habitat in this case because of the sparse nature of the sessile fauna present)

Sunset Ledge

Habitat 1 – upper surface of rocky ridge
CR.HCR.XFa.ByErSp
Habitat 2 – vertical/overhanging face
CR.FCR.Cv.SpCp
Habitat 2 – lower surface, boulders and sediment
CR.HCR.XFa.ByErSp.Eun (part)
SS.SCS.CCS (part)