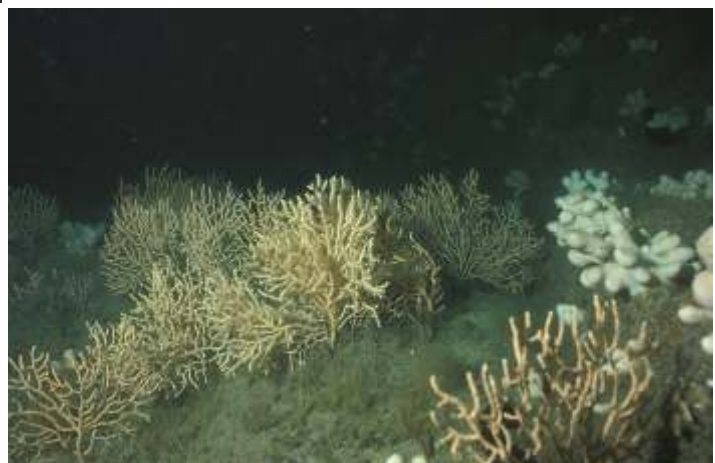
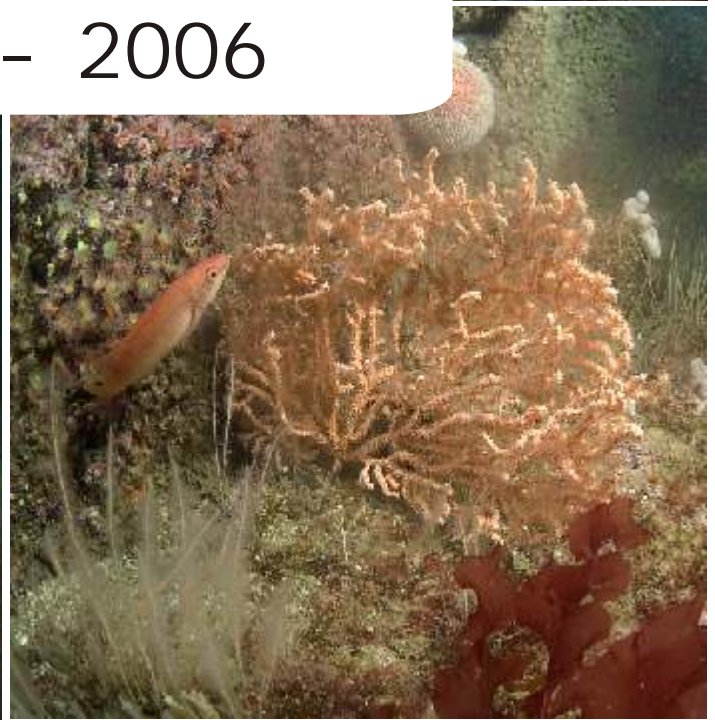


Pink Sea Fan Surveys  
2004 - 2006





# PINK SEA FAN SURVEYS 2004-2006

A report by Chris Wood for Seasearch

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All photographs are by the author except where stated.



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Top left: diver recording pink sea fan, Bigbury Bay, Devon – Rohan Holt  
Top right: healthy pink sea fan, Manacles, Cornwall – Chris Wood  
Centre left: diseased sea fan re-growing, Lundy, Devon – Chris Wood  
Centre right: sea fan and jewel anemones, Hatt Rock, Cornwall – Sally Sharrock  
Bottom left: sea fan anemones growing on pink sea fan, Whitsand Bay, Cornwall – Sally Sharrock  
Bottom right: sea fan forest – Manacles, Cornwall – Chris Wood

Reference:

Wood, C. (2008). Seasearch pink sea fan surveys 2004/6.

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## 1.0 Executive Summary and Acknowledgements

### Executive Summary

- 1.01 This report presents the findings of the second part of a five-year study of the Pink sea fan, *Eunicella verrucosa*, and associated species, based on records of sea fans made by volunteer divers. The first part (2001-2002) was the subject of an earlier report (Wood, 2003/1), and this second report covers the period 2004-2006.
- 1.02 Both the pink sea fan and the sea fan anemone, *Amphianthus dohrnii*, are UK BAP species, the first is classified as nationally scarce and vulnerable and the latter is nationally rare, and dependent on sea fans. The surveys were carried out to help fulfil BAP actions for both species which pointed to the need for additional data.
- 1.03 Chapter 2 of the report records the methodology used to collect the data and the two types of recording form used for different situations. 156 of the standard recording forms were received during 2004-6 containing details of 1,378 individual sea fans. 36 Wreck recording forms were received from sites as deep as 75m.
- 1.04 Chapter 3 contains the conclusions and recommendations from the earlier report (Wood, 2003/1) together with a commentary on changes as a result of the present studies and recording what progress has been made with conservation measures since that time.
- 1.05 Chapter 4 contains a summary of the data received. In this study records have been made in a number of locations not previously surveyed, including Donegal (Eire), Isles of Scilly, North Cornwall, Whitsand Bay and from deep wrecks off Cornwall, Devon and Dorset. In terms of distribution it includes minor extensions of range both further to the north in South Wales and to the east in Dorset than had been recorded in the first report. The depth range of sea fans recorded is from 3m to 75m below chart datum with the shallowest records coming from more sheltered sites. All of the dense sea fan 'forests' were below 20m and include a number of wrecks, which are an important habitat for sea fans in south Devon and Cornwall. The great majority of pink sea fans are pink in colour with only 1.45% being white. However in the Isles of Scilly 18% are white.
- 1.06 The sea fan anemone, *Amphianthus dohrnii*, is rare, occurring on only 1.24% of sea fans observed. Almost all of the records were from south Cornwall and Devon. The sea fan nudibranch, *Tritonia nilsodhneri*, is much more common, occurring on up to 20% of the sea fans in Devon and Cornwall. However there was a dramatic reduction in nudibranchs recorded in 2006 compared to previous years.
- 1.07 Human impact is difficult to assess in most cases as only sea fans which remain attached are recorded and colonies that have been physically removed are not included. 2% of colonies had fishing line attached to them

and it may be assumed that other colonies had been detached as a result of entanglement. In the case of Lyme Bay there is ample evidence, backed up by photographs, of significant damage due to trawling during 2006.

- 1.08 Chapter 5 sets out specific studies undertaken in different areas. Areas where populations were thought to be under threat were surveyed at Lundy, Bigbury Bay and Dartmouth. At Lundy there is evidence of some recovery after catastrophic disease in 2001-2, though it is still the population with the lowest overall condition. In Bigbury Bay there have been significant losses of population at one site, but other sites in the same area retain a healthy population. It is not clear if the reason for decline was physical damage or disease, but physical damage seems the more likely explanation.
- 1.09 Areas of dense populations were surveyed at the Manacles, Plymouth Drop Off and a number of wrecks in Penzance Bay and the Plymouth area. The condition of the population at the Manacles was average whilst that at the Plymouth Drop Off was above average. None of these sites have conservation measures in place to protect their sea fan populations.
- 1.10 Studies of sea fan anemones were undertaken at the Manacles and in Whitsand Bay. The Whitsand Bay study is continuing but suggests that sea fan anemones cause partial mortality of sea fans by smothering and attracting fouling debris.
- 1.11 The reduction in condition of the population in Lyme Bay is demonstrated. In the 2001-2 report the Lyme Bay populations were above average for condition whereas by 2006 they were significantly below average. Photographic evidence is available showing significant physical damage.
- 1.12 Chapter 6 provides a brief summary of complementary studies involving volunteers in Cornwall, Worbarrow Bay Dorset, and of the northern sea fan, *Swiftia pallida*, in the Firth of Lorn, Argyl.
- 1.13 Chapter 7 contains conclusions and recommendations arising from the surveys. It concludes that the main change since 2001-2 has been physical damage by mobile fishing gear. Whilst this has been largely confined to Lyme Bay other important areas such as the Plymouth Drop Off and the Manacles are unprotected. Recommendations are made for new conservation site designations and sites which should be the subject of regular monitoring are suggested.

## **Acknowledgements**

This survey was greatly assisted by the financial support from English Nature and the support given to Seasearch as a whole by the Joint Nature Conservation Committee and the country conservation agencies.

The great majority of the data was collected by volunteer divers, without whom the objectives of the survey would not have been achieved. Those who completed forms in each area are:

**Eire** – Chris Wood.

**Pembrokeshire** – Kate Lock, Kerry Lewis, Steve Bound.

**Lundy** – Chris Webb, Chris Wood, Ellie Hardman, Gavin Black, Keith Denby, Rachel Locklin, Sally Sharrock, Susan Howson.

**North Cornwall** – Chris Whitworth, Helen Spring, Joana Doyle, Keith Denby, Peter Hewitt, Phil Reynolds, Steve Adams.

**Isles of Scilly** – Christine Harling, Chris Wood, Fiona Crouch, Mike Flavell, Robin Smith, Sally Sharrock.

**Lands End** – Brod Mason, Richard Stoddern, Simon Angrove.

**Lizard & S Cornwall** – Chris Wood, Darren Murray, Graham Bates, Joana Doyle, John Abbott, Mark Milburn, Ruth Williams, Sam Cook, Susan Howson, Vicki Billings.

**Plymouth** – Allen Murray, AmyBugg, Brod Mason, Carole Tudor, Christine Harling, Chris Webb, Chris Wood, Deb Baukham, Dominic Flint, Fiona Ravenscroft, Gemma Brice, John Dunford, Kristina Leake, Liz Morris, Marko Hranilovich, Paula Jones, Pete Holt, Rosemarie Longfield, Ruth Swarbrick, Sally Sharrock.

**East Devon and Lyme Bay** – Charlie Sandercock, Chris Webb, Chris Wood, James Pike, Jenny Mallinson, Katherine Brice, Lin Baldock, Mary Restell, Nick Reed, Robin Plowman, Robin Smith, Sarah Lee, Simon Coe, Teign Diving Centre.

**East Dorset** – Brod Mason, Jenny Mallinson, Lucy Kay, William Hewitt.

We also thank the Skomer Marine Nature Reserve staff for provision of additional data from their sea fan monitoring.

The author would like to thank Sally Sharrock for the study of sea fan anemones on the Rosehill, and Mike Markey, Rohan Holt and Sally Sharrock for additional photographs.



## 2.00 Background

2.01 This report is the second to record the studies carried out on the pink sea fan through Seasearch and covers records made since the first report which covered records in 2001 and 2002. The methodology used has evolved since the first report, but continues to be the results of the efforts of volunteer divers. The surveys reported here are based on records obtained from two types of survey form.

2.02 The *Pink Sea Fan Recording Form* was used for most of the records and is shown in Appendix 1. The form includes:

- details of the recorder and their contacts
- dive name and position
- date and start time for dive (to convert observed depths to chart datum)
- depth range of sea fans observed
- habitat in which sea fan found (sloping rock, flattish rock, wreck, sediment covered rock, boulders and other )
- density of sea fans at the site (forest, common, occasional, rare)
- details of individual sea fans comprising
  - width
  - height
  - whether or not feeding
  - colour (pink or white)
  - condition (on a scale of D=dead and 1 little living tissue – 5 perfect condition)
  - fouling species present
  - fishing debris present
  - sea fan anemones present
  - sea fan sea slug eggs and adults present

2.03 In order to obtain a fair representation of the population, recorders were encouraged to record the details of a group of sea fans in the same area rather than pick individual colonies on the basis of size or condition. 156 of these forms were completed providing details of 1,378 individual colonies.

2.04 The *Pink Sea Fan Wreck Recording Form* was designed to be used by volunteers recording sea fans on wrecks in deeper water where there would not be sufficient bottom time available to carry out measurements. This form is shown in Appendix 2. The form includes;

- details of the recorder and their contacts
- dive name and position
- date and start time for dive (to convert observed depths to chart datum)
- depth range of sea fans observed
- habitat in which sea fan found (sloping or vertical wreckage, flattish rock, protected by wreck, rocks around wreck and other )
- density of sea fans at the site (forest, common, occasional, rare)
- the number of fans counted on the dive



- the number of fans with sea fan anemones and sea fan sea slug adults or eggs
- 2.05 36 of these forms were completed and provide information from sites as deep as 75m.
- 2.06 The pink sea fan, *Eunicella verrucosa* is one of only two gorgonian corals found in inshore waters in Britain and Ireland. It has a largely western and southern distribution which extends from Donegal in north-west Ireland to Dorset and the Channel Islands in the south. It is a long lived and slow growing species which is easily damaged physically, and in recent years has also been shown to suffer from disease. The species received much publicity in 2006 as a result of damaging fishing practices in Lyme Bay which led Natural England (then English Nature) to call for a ban on bottom trawling in the area. This proposal was not successful.
- 2.07 The importance of the pink sea fan to our marine biodiversity is reflected in the fact that it is a Biodiversity Action Plan (BAP) species and is also protected by the Wildlife and Countryside Act. The surveys carried out by Seasearch have been designed to contribute to the BAP by providing up-to-date information on distribution, density, size structure, colour, fouling, percentage infestation by predators and the occurrence and density of sea fan anemones, *Amphianthus dohrnii*, itself also a BAP species.



Figure 1: pink sea fans fouled by monofilament netting – James Eagan Layne, Whitsand Bay, Cornwall

### 3.00 Conclusions and Recommendations from 2001-2002 report

- 3.01 In the previous report a number of conclusions were reached and recommendations made. These are repeated below (in italics) with a summary of changes reported in this report and any conservation actions taken in the intervening period (plain text).

#### Conclusions

- 3.02 *The study has extended the range of the Pink sea fan beyond recently recorded limits both in South Wales at the northerly extent and Dorset at the easterly extent. The most significant population outside previously known areas is near Worbarrow Tout on the Isle of Purbeck (Dorset). A report of a single sea fan in North Wales cannot be confirmed but further dives should be undertaken in that area as its presence there would be significantly outside the previously recorded distribution.*

This report includes minor extensions of range, both further to the north in South Wales and to the east in Dorset, than had been recorded in the first report and previous surveys. In both cases these are most likely to be the result of better recording rather than changes in distribution as in both extremes the fans recorded were mature specimens which must have been at least 20 years old. However, as a result of better recording we now have a very good idea of the distribution of pink sea fans in England and Wales against which any future distribution changes can be measured.

- 3.03 *The great majority of the sea fan records are from depths greater than 10m as expected. However sea fans were recorded from depths less than 10m below chart datum for a number of areas. In Pembrokeshire, at Skomer North Wall, fans were found as shallow as 7.8m and at Penlee Point near Plymouth a single specimen was found at 8.2m. In the Channel Islands the shallow depth of some sea fan colonies in relation to chart datum may be explained by the wide tidal range in this area.*  
*The sea fan colonies on and adjacent to the fort inside the Plymouth Breakwater are by far the shallowest sea fans seen, living in depths from 3.7m bcd to 7.9m bcd. This is a completely artificial environment comprising granite walls, metal wreckage and introduced boulders. It is however a well established and stable habitat and, as the fort appears to be unused, is not one where much disturbance takes place. It is likely to be isolated from other populations, however, and would not be likely to re-recruit if the existing population were to die back.*

No additional similarly shallow populations have been recorded.

- 3.04 *The densest beds of sea fans, with densities as high as 25 colonies per square metre were all recorded from deeper habitats and on largely horizontal bedrock or metal wreckage. Dense sites included the flat open seabed below The Voices on The Manacles and on Pencra Reef nearby, the Drop Off south of Plymouth and the wreck of The Persier in Bigbury Bay. All of these sites were at least 20m below chart datum.*

Equally dense sea fan 'forests' are now known from a number of wrecks in deep water of the south coast of Devon and Cornwall.

- 3.05 *There are significant differences in the maximum size attained by sea fans in different areas. Fans in the Purbeck and Lands End areas are the smallest, not exceeding 30cm in either width or height. Most of the areas are in the middle group, with a maximum size of up to about 50cm wide and high. The Channel Islands have the largest sea fans with a maximum size of 100cm wide and 75cm high.*

In this report the smallest average size of colonies was from Donegal and the Isles of Scilly, both areas not covered in the previous report.

- 3.06 *In all areas except Lundy the fans are in good condition with an average score in excess of 4 on a 1-5 scale. It should be noted that this survey only records fans which are in situ. It cannot record fans which have been broken off and dispersed whether as a result of storm damage or physical damage from fishing gear or diver's fins. It should not therefore be assumed that the high average condition of the living fans means that the population is not under pressure, though it does suggest that in all of the areas with a high score for condition that the prevailing conditions in terms of water quality, nutrients and lack of siltation are suitable for sea fans to thrive.*

*In the case of Lundy a very different picture emerges. With an average score for condition of a little over 2 out of 5 the Lundy population is clearly under significant threat. This is clearly not a physical threat as such as the colonies remain attached and partially living. It seems rather to be a loss of living tissue, which is most likely to have resulted from changes in water quality.*

The overall condition of the population has changed little since the 2001-2002 report. However, other areas which have suffered in the same way as the Lundy population are now known and included in this report. The mortality of these fans is believed to have been the result of bacteriological based disease (Hall-Spencer *et.al.* 2007) and there is evidence of recovery in the Lundy population. The greatest fall in condition between the two reports has been experienced in Lyme Bay and is a result of mobile fishing gear damaging low lying reefs on which sea fans have thrived in the past.

- 3.07 *Species associated with Pink sea fans fall into four categories:*
- *Drift organisms which become attached to sea fans (algae),*
  - *Opportunistic organisms which grow on dead branches (hydroids, bryozoans, sponges, soft corals, barnacles, sea squirts),*
  - *Species which feed or live on sea fans (nudibranchs, sea fan anemones, false cowrie, featherstars),*
  - *Egg cases which are deliberately attached to sea fans (dogfishes).*

*Our records confirm the rarity of the sea fan anemone, *Amphianthus dohrnii*. 29 sea fans were found on which they were present, representing only 0.07% of the fans counted. Sea fan anemones were found only in three areas; Lands End, The Manacles and Plymouth, but were extremely rare at Lands End (1 anemone out of 173 – 0.6% ) and Plymouth (2 anemones out of 1222 – 0.2%). At The Manacles they were recorded on 26 fans at three different sites – Woodfords Wall (1), Pen-Win (16) and Pencra Reef (9). However this only represents 1.2% of the 2,091 fans searched for them in this area. No sea fan anemones were recorded at all from Pembrokeshire, Lundy, Lyme Bay, Purbeck or the Channel Islands. There is some evidence that individual anemones have a short life cycle.*

This report includes additional data on the sea fan anemone and the results of *in situ* studies in Cornwall and Devon.

- 3.08 *Sea fan nudibranchs, *Tritonia nilsodhneri*, were present, either as adults or egg masses on 17% of the sea fans recorded. Their geographic distribution is uneven. They were most common in Devon and Cornwall, with The Manacles having the highest density of 26%. Lundy and Plymouth had 20% and Lands End 11%. The Channel Islands has a similar density of 15%. However no nudibranchs at all were observed in Pembrokeshire and they were rare in Lyme Bay (5%) and Purbeck (6%).*

The distribution data on the sea fan nudibranch remains unchanged, however there was a dramatic reduction in numbers observed throughout the range, during the 2006 surveys.

- 3.09 *Very little evidence of direct human impacts on sea fans was observed during the survey. A small number of living but broken off fans were seen, but the reason could not be deduced. Only 7 fans were seen with human debris attached – fishing line (4), fishing net (1), rope (1) and a piece of hessian sacking (1). However, it should not be assumed that direct human impacts are not occurring. In the majority of cases where fishing gear or careless divers impact on sea fans the whole colony would become quickly detached and would rapidly die and decompose. Our survey would not pick up such damage unless it had occurred very recently before the observations were made.*

*The population most at risk from human activities appears to be that in Lyme Bay. In March 2002 a large number of broken sea fans were washed up on Chesil Beach, many of which were entangled in monofilament nets.*

This has proved to be the case with the damage caused in 2006 by scallop dredging in Lyme Bay. Sadly this issue has not been satisfactorily addressed and damage is likely to continue.

## **Recommendations**

- 3.10 *Further dives should be undertaken at The Skerries, Anglesey in order to confirm whether or not sea fans are present in that area.*

No sea fans have been recorded either from this location or elsewhere in the northern Irish Sea and it must be assumed that the original report was incorrect.

- 3.11 *The Countryside Council for Wales should reconsider the northern boundary of the Pembrokeshire Marine SAC as at present it excludes the new sea fan sites we have identified in this survey. Since these are probably the most northerly occurrences in England and Wales this omission, though understandable in the light of knowledge at the time, is regrettable.*

No action taken

- 3.12 *The regular monitoring programme carried out by Countryside Council for Wales at Skomer should be continued. In the light of the very limited number of new colonies, further research should take place both here and elsewhere on the reproduction strategy of the Pink sea fan in order to ascertain why there appears to be a lack of larval distribution in South Wales. In the long term the current population may be unsustainable.*

Monitoring has continued and new sites at Skomer have been identified and recorded. They include new colonies.

- 3.13 *In view of the fact that Lundy is the area where sea fans appear to be most in decline, identifying the cause of decline and determining the action to be taken should be a priority for the monitoring undertaken by English Nature in the Marine Nature Reserve. A regular monitoring programme should be initiated and maintained, similar to that already undertaken at Skomer.*

Monitoring at Lundy has concentrated on the no take zone. However additional surveys have been carried out by Seasearch and are reported here. There is some evidence of recovery.

- 3.14 *The Manacles and Pencra Reef on the East side of the Lizard Peninsular are good examples of dense sea fan 'forests' and match the highest densities of sea fans found anywhere in our studies. Whilst the Pencra Reef population is just within the Fal and Helford SAC the similar populations at The Voices on the Manacles are excluded. This area also has the highest level of occurrence of Amphianthus dohrnii, which appears to be a very rare species indeed.*

*The importance of these sites ought to be recognised, at least by SAC designation and they should be included in monitoring programmes. However they do not sit well within the primary reasons for the designation of the Fal and Helford SAC and would be better recognised and protected in a new SAC that included Pencra Reef and The Manacles and had the biodiversity of its reefs as a primary reason for designation.*

No action taken

- 3.15 *The Plymouth Sound and Estuaries SAC specifies sea fans in the approaches to Plymouth amongst the primary reasons for selection of the area. However the southern boundary of the SAC does not extend sufficiently far south to include the rich populations on The Drop Off, as it is formed by a straight line between Rame Head and Yealm Head and this site is south of that line. In view of the fact that it was clearly the intention to include these populations we believe this boundary should be reviewed and extended.*

No action taken

- 3.16 *The offshore sea fan sites at Hand Deeps, The Eddystone and the dense sea fan 'forest' on The Persier are all outside SAC designated areas. There is at present no appropriate legislation to protect isolated sites such as these but they should be considered should legislation like that envisaged by the 2002 Marine Wildlife Conservation Bill become established in the future.*

Natural England and the JNCC have considered the identification of new offshore SACs to include reef features. No proposals have yet been made.

- 3.17 *The populations on open sites such as The Drop Off and The Persier are vulnerable to damage by mobile fishing gear, particularly rock hopper dredges. We believe they are sufficiently important populations to justify a restriction on fishing activity around them. This would have to be done by a fisheries byelaw which could be an outcome of SAC designation.*

No action taken

- 3.18 *The Lyme Bay populations are probably those at greatest risk from fishing damage. The initiative undertaken by Devon Wildlife Trust is applauded but it does not apply to all of the known sites and, in view of the relatively slow growth rates for sea fans, regeneration is likely to be slow. Again preventing further damage by fisheries byelaws to exclude rock hopper dredging from the rocky areas is likely to be the only effective solution.*

In 2006 the government would not support statutory restrictions on dredging in Lyme Bay contrary to the request and evidence of English Nature and others. Significant damage to the populations in the bay has occurred.

- 3.19 *The Worbarrow sea fan populations are adjacent to, but not within an SAC, the Isle of Portland to Studland Cliffs SAC. It is unfortunate that the most easterly significant*

*populations of sea fans are not protected by inclusion in a SAC and we recommend that English Nature extend the existing coastal SAC to include at least these sites. In view of the work carried out within the Kimmeridge VMCR further evidence of the desirability of the inclusion of reef habitats in this SAC may well exist.*

No action taken



Figure 2: Location of pink sea fan records received 2001-2006

## **4.00 General Findings**

### **a. Data received**

- 4.01 The data on which this report is based comprises 156 pink fan survey forms and 36 pink fan wreck survey forms with detailed observations of 1,378 individual sea fan colonies and 3,311 additional colonies checked for sea fan anemones and nudibranchs, a total of 4,689 colonies observed. In addition to this data the distribution information includes all of the pink sea fans observed on general Seasearch Observation and Survey forms during 2004, 2005 and 2006. A summary of the data included in the two pink sea fan recording forms is contained in Appendix 3 and the locations of all of the records, together with other records from Seasearch general recording and the 2001-2 survey are shown in Figure 2

### **b. Distribution**

- 4.02 Only one recording from was received from the Republic of Ireland, from St John's Point in County Donegal, close to the most northerly record of pink sea fans at Rathlin O' Birne Island, Co. Donegal (BioMar data).
- 4.03 The most northerly record in Wales was from Tri-Maen-trai, Strumble Head, Pembrokeshire, about 1.5km north of the previous record in our 2001-2 report, but on the same westward facing stretch of coast just south of Strumble Head.
- 4.04 New records are also included from within Skomer Marine Nature Reserve, collected as a part of the regular monitoring carried out by reserve staff. Most notable here are four new colonies recorded in 2006 at Bull Hole, each only 3-4cm high, and, together with two small colonies recorded at the same site in 2005, demonstrate that new colonies are being formed at this relatively outlying location. Previous records had all been of mature colonies.
- 4.05 Records are included from a number of previously poorly recorded sites in North Cornwall. These include sites near Padstow, Newquay and St. Agnes.
- 4.06 Records are included from 12 different sites in the Isles of Scilly. However numbers at most sites are small with fans recorded as common at only one, on the wreckage of the Plympton, south-west of St Agnes.
- 4.07 Only one record is included from the Lands End peninsula, from a site which had been previously recorded in the 2001-2 surveys. However records were received from 7 offshore wrecks in this area and Mounts Bay. Sea fans were abundant at 4 of the wrecks, all lying in depths between 48m and 60m. They were common at one other wreck in 40-45m, rare at a sixth wreck in Mounts Bay at 22m and absent from a seventh off the Runnel Stone in 27-31m. This confirms our previous conclusion that this stretch of coastline is very exposed to Atlantic swells and storms and sea



fans only occur in locations with some shelter or on the deep wrecks where they are not affected by storm surge conditions.

- 4.08 The Manacles is a well-known site for sea fans and records were made from 6 sites in our previous report and an additional 6 sites in this study. In this area sea fans appear to be common on any flattish rock surfaces below 20m and this, together with the Plymouth Drop Off is probably the area with the highest density of sea fans of any in Britain or Ireland.
- 4.09 Records are included from 4 previously unrecorded wrecks south of Falmouth lying in depths of between 50m and 75m. Sea fans were common on one wreck but only occasional on the other three.
- 4.10 No sea fan recording forms were received from sites on the south coast of Cornwall between Falmouth and Looe, however sea fans were recorded from 3 sites on Seasearch Observation and Survey forms.
- 4.11 There were no sites with sea fans in Whitsand Bay in the 2001-2 report. Sites in this report are Hatt Rock, an isolated pinnacle south of Looe and two wrecks, the Rosehill and the James Eagan Layne. General Seasearch records of pink sea fan include other sites around Rame Head.
- 4.12 Offshore rocky sites to the south of Plymouth, Hand Deepes, the Eddystone and the Drop Off all had previous records. Many have been re-surveyed with similar results. An additional site is the deep wreck of the Claverley which lies in 60m., where sea fans were reported as abundant.
- 4.13 A number of new sea fan sites close to Plymouth are included in this survey, including additional sites within Plymouth Sound. To the east Bigbury Bay has been the focus of condition monitoring studies described elsewhere in this report and four additional sites have been surveyed. The stretch of coast east of Salcombe to Prawle Point has not been recorded due to boat failure on the weekend of the intended survey, though sites with sea fans are known to occur there.
- 4.15 New records are included from the Dartmouth Mewstone and from two wrecks off Babbacombe and Teignmouth.
- 4.16 Records are included from 8 sites in Lyme Bay, 3 of which had been previously recorded. Small numbers of fans are also included from sites around and to the east of Portland Bill, including the two most easterly records to date from Southbourne Rough, south of Bournemouth.
- 4.17 Other areas which have not been surveyed and where sea fans are known to occur are: Eire (Donegal Bay, Connemara, Aran Islands, Clare, Kerry Head Shoals and isolated sites in Cork and Wexford), other parts of south Cornwall between Falmouth and Looe, and around Prawle Point, South Devon.

4.18 There are also records on the National Biodiversity Network which we believe to be erroneous. Most of them date from the 1970s and were made by volunteers. The records from North Uist and Skye were almost certainly mis-identifications of the northern sea fan, *Swiftia pallida*. Other doubtful records were from St Abbs (Borders), Menai Strait, Llyn Peninsula and the Isle of Man all of which have been the subject of more recent surveys. The records from the Crouch estuary and Southampton Water are both outside the geographic area established by our, more recent, surveys and would not have suitable habitats for sea fans.

### **c. Depth Range**

4.19 The depth range of sea fans recorded in this survey is between 3m below chart datum (Breakwater Fort, Plymouth Sound) and 75m below chart datum (wreck of NK south-east of Falmouth). The expected depth range for *Eunicella verrucosa*, is given by Manuel (1981) as from 10m to 200m.

4.20 Records of sea fans in less than 10m were made in five locations:

- Hog Bay, Skokholm, Pembrokeshire
- Gull Rock and Knoll Pins, Lundy, North Devon
- Pinnacle near Dean Quarry, Lizard, Cornwall
- Breakwater fort and inner wall, Plymouth Sound
- Mewstone, Dartmouth

In each case these are relatively sheltered locations either on the sheltered east sides of islands (Skokholm, Lundy) on east facing mainland coasts (Lizard, Dartmouth, or on the sheltered inner side of a breakwater (Plymouth).

4.21 In exposed locations such as the rocky pinnacles off south Devon and Cornwall the minimum depth of sea fans is much greater (Hatt Rock 26.5m, Hand Deeps 20.5m, Eddystone 18.5m, East Rutts 20.0m). In such locations the shallowest sea fans are generally found in gullies where they receive some protection from swells. In other offshore situations, such as deep wrecks, there appears to be a correlation between depth/exposure and the presence of sea fans. On the south coast of Cornwall, close to Lands End, sea fans were absent from the wreck of the Jose de Arambura (27.5 - 31.5m bcd) but common on deeper wrecks in similarly exposed locations (Slaatero, Underwood, Kilmaho & John R Park all 48 - 58m bcd).

4.22 There is also a correlation between depth and density of sea fans. All of the sites where sea fans were recorded as abundant were below 20m bcd except for two sites at the Manacles (Lizard, Cornwall) and on the James Eagan Layne (Whitsand Bay, Cornwall). At the Manacles generally density increases with depth so that the densest 'forests' are on flat rocky ground away from the main pinnacles. Of the 16 areas where sea fans were recorded as abundant 9 were on wrecks. This demonstrates the importance of artificial substrata for sea fans in areas where there are no suitable rocky surfaces. The fact that many of these wrecks are isolated and surrounded by flat sediment sea bed demonstrates the ability of sea

fans to colonise new areas a considerable distance from established populations.

- 4.23 The six areas where sea fans were described as abundant on reefs were in five cases found on areas of flattish bedrock, often close to sediment. These were Outer Gulland (21.5 - 25.5m), Maen Garrick and Pencra Reef near the Manacles (14 – 20m), west of the Eddystone pinnacle (24.5m), the Plymouth Drop Off (28 - 35m) and Dogleg Reef, Lyme Bay (21.5). The sixth reef was Mewstone Ledges, Plymouth and was also where the reef began to flatten out away from the sloping rock surfaces found elsewhere at this site (21 - 21.5m).

**d. Habitat**

- 4.24 The main surfaces to which sea fans are attached are rock, however the number of records from wrecks demonstrate that stable metal surfaces are equally suitable. There are also records from stable boulders and cobbles, mostly from Lyme Bay, where they were recorded on boulders at three sites, on cobbles at one and apparently growing in sand near a wreck west of the Isle of Portland. At a number of sites sea fans were found on low lying flat bedrock which may at times be covered with sand or gravel (St John’s Point, Donegal, 2 sites on the Isles of Scilly), or silt (3 sites on Lundy & West Tennants, Lyme Bay).

- 4.25 When growing on rock, sea fans are most often found on flat or gently sloping surfaces but they can occur on steep or vertical faces (e.g. Breakwater Fort, Plymouth and Hilsea Point Rock). In areas exposed to wave and storm surge the shallower colonies will be in areas offering some protection, often in gullies, whereas deeper down they will be in more open situations where they can benefit from water currents but not be damaged by wave action.

**e. Abundance**

- 4.26 The abundance of sea fans at any site appears to be determined by the habitat available, depth, exposure, and geographic location. At the extremes of the range, for instance in North Pembrokeshire and Poole Bay, only individual fans are encountered in habitats and depths where many more would occur on the south coast of Devon and Cornwall. The optimum geographic areas for sea fans within the UK are in south-west England and are in areas of bedrock below 20m on moderately exposed sites and on deeper hard surfaces, mostly wrecks, in more exposed locations.

- 4.27 The sites in this survey where sea fans were recorded as abundant are shown in the table below.

Site name	General location	habitat	depth (below chart datum)
Outer Gulland	Padstow, N. Cornwall	sloping and flattish rock	21.5-25.5
Wreck of Slaatero	SW Cornwall	flattish wreckage	54-57
Wreck of	SW Cornwall	wreckage – sloping and vertical	48-52

Underwood		and within wreck	
Wreck of Kilmaho	SW Cornwall	wreckage – sloping and vertical and within wreck	54.5-58.5
Wreck of John R Park	SW Cornwall	wreckage – flat and sloping plates and within wreck	48-52
Maen Garrick	Manacles, S Cornwall	flattish rocks and boulders	14-19
Pencra Reef	Manacles, S Cornwall	sloping and flattish rocks and boulders	14-22
Wreck of Rosehill	Whitsand Bay, SE Cornwall	flattish wreckage	22-28
Wreck of James Egan Layne	Whitsand Bay, SE Cornwall	flattish wreckage and within wreck	11.5-19.5
Eddystone (West)	S Devon	flattish rock	24.5
Wreck of Claverley	East of Eddystone, S Devon	sloping and vertical wreckage	60-63
The Drop Off	Plymouth, S Devon	flattish rocks	28-35.5
Wreck of Persier	Bigbury Bay, S Devon	flattish wreckage and within wreck	22-30
Dogleg Reef	West Bay, Dorset	flattish rock	21.5

All but two of these sites are in South Devon and Cornwall and this is the prime location for dense sea fan forests.

- 4.28 On the basis of the information in this and our previous 2001-2 report the abundance of sea fans in broad geographic areas is shown below:

Eire – Donegal (one site surveyed)	occasional
Wales – North Pembrokeshire	few scattered individuals
Wales – South Pembrokeshire	few scattered individuals at most sites, occasional around Skomer
England – Lundy, North Devon	Occasional on both west and east sides of island
England – North Cornwall	Occasional, locally common
England – Isles of Scilly	Relatively few, common only on two wrecks
England – Lands End, SW Cornwall	Rare except on deep wrecks where abundant
England – Manacles, Cornwall	Common, abundant on deeper rocky sites
England – Whitsand Bay	Common on wrecks and reefs
England – Plymouth, South Devon	Common on most rocks, wrecks and breakwater, abundant on the Drop Off.
England – Bigbury Bay, South Devon	Common on rocky sites, abundant on wreck of Persier
England – Dartmouth, South Devon	occasional
England – Teignmouth, South Devon	common on offshore wrecks
England – Lyme Bay, Devon/Dorset	common on low lying flattish reefs
England – Purbeck, Dorset	occasional, common on small low lying reefs off Kimmeridge
England – Poole Bay, Dorset	few scattered individuals
Channel Islands – Sark & Guernsey	occasional, locally common
Channel Islands - Jersey	occasional on Minquiers Reef

#### f. Size

- 4.29 In the previous report we noted that there were significant differences in the maximum size attained by sea fans in different areas. At that time much the biggest sea fan was recorded from the Channel Islands and this record has been included in the Figure 3 below for comparison. As with the previous findings, the figure shows that dimensions of 50cm wide and 50cm high are the maximum in most areas. However two large fans were recorded on

Lundy. One was an unusual shape being 80cm wide but only 35cm tall (Figure 4). The other was 65cm tall but only 30cm wide. The latter was in poor condition and probably represents the remaining parts of an originally much bigger colony.

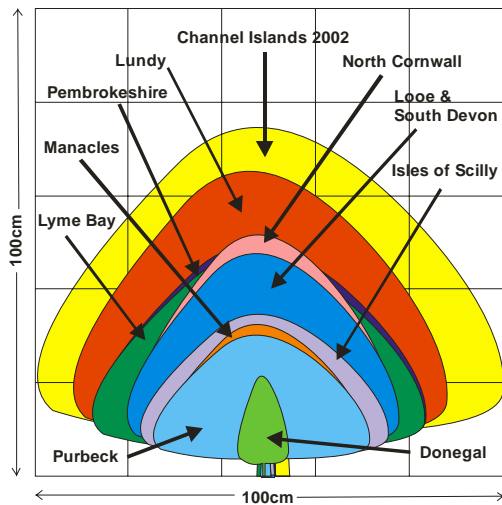


Figure 3: Maximum fan size by area



Figure 4: unusually shaped large fan, Dead Cow Point, Lundy

4.30 In the 2001-2002 the area with the smallest maximum size was Purbeck in Dorset, the most easterly extent of sea fans in the English Channel. Whilst the number sampled in this report is small none exceeded 30cm high though the most easterly specimen was 45cm wide (28cm high). However the maximum size of the fans at St Johns Point, Donegal (again a small sample), was only 22cm tall and 13cm wide. This is much the smallest maximum size of any area and is also close to the geographic limit of the species, in this case the northerly one.

4.31 The average size of fans recorded in each area is shown in Figure 5. The highest average sizes are from Pembrokeshire, North Cornwall and Lundy and is probably because there were few newly recruited colonies recorded in these areas, though the first record of small newly settled colonies at Skomer has reduced the average compared to our 2001-2002 report.

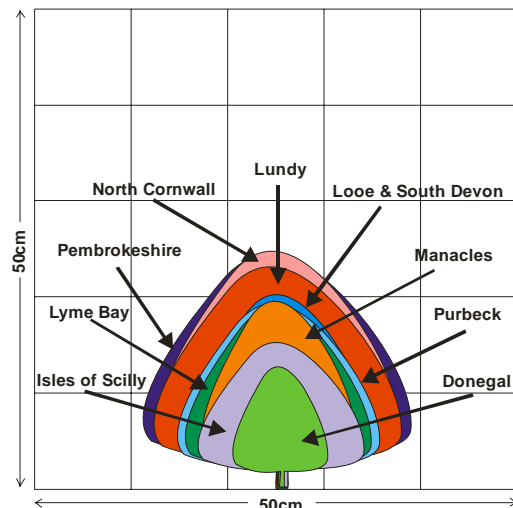


Figure 5: Average size of fans by area

4.32 The sea fans with the smallest average size are those from the Isles of Scilly and Donegal. In both cases this is a reflection of the overall population and does not result from recording a larger proportion of juvenile species. In the case of Donegal it may be because sea fans are at their northern limit in this area. The habitat may also be a factor, being rock with a thin covering of gravel which in storm conditions could lead to

mortalities. In the case of the Isles of Scilly the exposure of the islands to winter storms may also be the limiting factor to growth.

### g. Condition

4.33 The condition of each sea fan was recorded on a scale of 1-5 in which 1 reflected a colony in very poor condition with at least 80% dead or fouled and 5 a colony containing 100% living tissue. Standing wholly dead sea fans were recorded as D and have received a score of 0 in the following tables.

4.34 The average condition score for each broad geographical area during this study is shown in Figure 6 by the red columns and for the 2001-2002 report by the green columns. This report confirms our previous conclusions that the populations throughout the range are in good condition, except those at Lundy which remain in a poorer condition than at any other site.

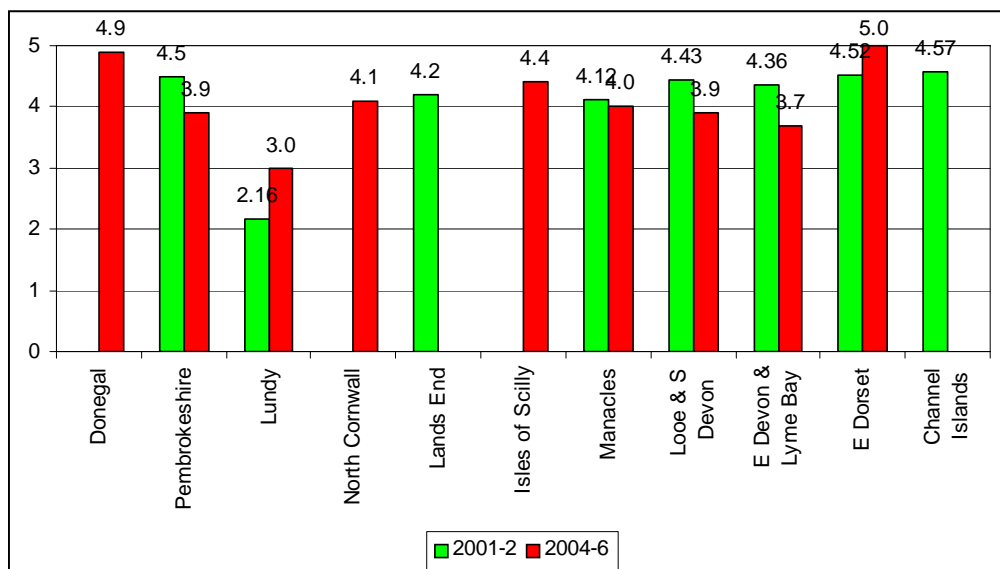


Figure 6: Average condition by area – both reports

4.35 There has been a considerable improvement in the average condition of sea fans at Lundy since 2001-2002., rising from 2.16 to 3.00. This is explored further in Chapter 5.

4.36 There have been falls in average condition between the two reports in three areas, Pembrokeshire, Looe and South Devon, and East Devon and Lyme Bay. The records from Pembrokeshire come from different sites to those recorded in the 2001-2002 report and include one site, West Hook which is popular with anglers and had a low condition score (2.0) and a second, Rye Rocks which is a popular diving site and also had a low condition score (3.8). Most of the sites recorded in both surveys are in the Skomer Marine Nature Reserve and are monitored photographically on a regular basis.

4.37 The area covered by the Looe and South Devon records includes the largest number of records (510 colonies) and also includes a number of

new sites which were not surveyed in 2001-2002. Within the area there is considerable variation from location to location as shown in Figure 7. This shows that the population at the Dartmouth Mewstone is in poorer condition than Lundy. Further breakdown of the Bigbury Bay average figure by site also shows large differences between sites which are close to each other and thus demonstrates that local variations in condition are as important as regional ones.

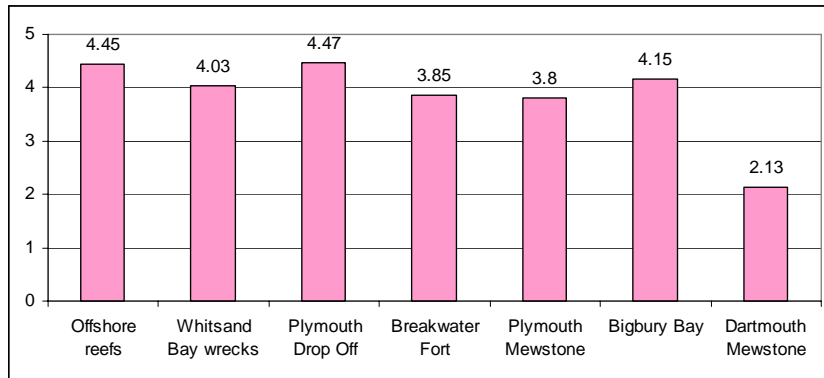


Figure 7: Variations in condition in Looe and South Devon region

- 4.38 In East Devon and Lyme Bay the deterioration between the two reports is greatest, falling from an average of 4.36 in 2001-2002 to 3.7 in 2004-2006. This is explored further in Chapter 5.
- 4.39 Figure 6 also shows an increase in condition score for east Dorset from 4.52 to 5.00. The latter figure is only based on observations of 5 colonies, 2 of which were newly settled single stems. The difference is not thought to be significant, though the small numbers of sea fans that occur in this area at the easterly extent of their range are undoubtedly in good condition.

## h. Colour

- 4.40 For the purposes of this study each sea fan was recorded as either pink or white. There are undoubtedly variations in the pink colouration and 'sickly' colonies may look more buff than pink. On the other hand the white colonies are very distinctive and have been recorded separately to see if there are any regional variations. A total of 20 white sea fans were recorded, which is 1.45% of the total population. White *Eunicella* can be easily distinguished from *Swiftis pallida*, which is also white, by colony form and there is no overlap in distribution in the UK. The records of white sea fans in this survey all relate to white *Eunicella*.
- 4.41 The only area where significant numbers of white sea fans are recorded is the Isles of Scilly. Here white colonies make up 18% of the population. Only 7 white colonies were recorded elsewhere from 7 geographically diverse sites with quite different habitats. There was only 1 white colony at each site:
- Bull Hole, Skomer MNR
  - Dead Cow Point, Lundy

- Pinnacle near Dean Quarry, Manacles
- Hatt Rock, south of Looe
- West Eddystone
- Breakwater Fort, Plymouth
- Plymouth Drop Off

No white colonies were recorded to the east of Plymouth.

### i. Associated Species

4.42 Species associated with sea fans fall into four headings:

- Drift organisms which become attached to sea fans (often algae),
- Opportunistic organisms which grow on dead branches (hydroids, bryozoans, sponges, soft corals, barnacles, sea squirts),
- Species which feed or live on sea fans (nudibranchs, sea fan anemones, false cowrie),
- Egg cases which are deliberately attached to sea fans (catsharks, cuttlefish and squid).

The number of different organisms found is shown in Figure 8.

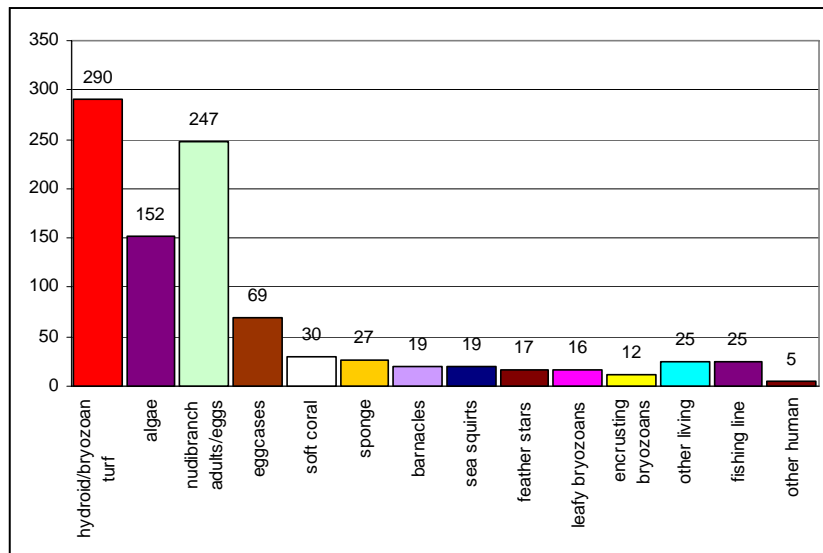


Figure 8: number of attached organisms

4.43 Algae were found on 152 sea fans (11%). In many cases this was drifting algae which had become entwined amongst the branches of the colony. This particularly affects colonies in shallow areas where there are algae present on surrounding surfaces. It can have an impact on the health of the colony but in most cases is likely to be a temporary feature and not of great concern. In some cases small algae were growing on the sea fan, normally as a part of a silty 'turf'. Other temporary associations are mobile animals which may use a sea fan as a perch for feeding but do not eat the polyps or do any lasting damage. This would include some starfish, feather stars and sea cucumbers.

4.44 The most common association is a silty 'turf' made up of hydroids and other invertebrates and plants and bound together with silt. 290 colonies



(21%) were affected in this way. This is believed to be the result of settlement on dead parts of the colony rather than something which can damage it in the first place. It may, however damage adjacent polyps and thus spread once it gains a hold on the fan. In cases where parts of a colony are dead they rarely remain unfouled for long and this the most common covering. In cases where completely dead sea fans remain attached and standing they may be completely covered in this silty turf as in Figure 9, an example from Lundy.

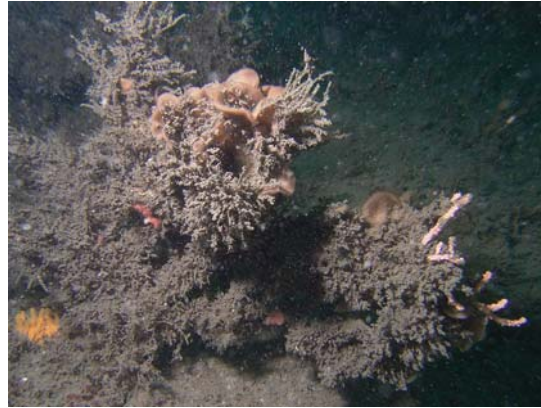


Figure 9: dead fouled sea fan, Lundy

- 4.45 Other larger animals that settle and grow on dead parts of sea fans are soft corals (usually *Alcyonium digitatum*) (2%), sponges (2%), sea squirts (1.4%), leafy bryozoans – usually *Pentapora foliacea* (1.2%), encrusting bryozoans (0.9%), and sea anemones – usually *Metridium senile*. In each case these are likely to be opportunistic growths and do not cause any further damage to the colony.
- 4.46 1.4% of sea fans had barnacles on part of the colony. It is not clear whether the original settlement was on dead parts of the colony but limited evidence from tagged samples at the Manacles suggests that the barnacles settle and expand rapidly. The species involved is believed to be *Solidobalanus fallax* (K. Hiscock pers. comm.).
- 4.47 **The sea fan nudibranch, *Tritonia nilsodhneri*** is a well-known associate of sea fans and is known to both feed and lay its eggs on sea fans. 17.9% of the sea fans studied in details had either eggs or adults. This is virtually identical to the figure in our previous 2001-2002 report (17%).
- 4.48 As in the previous report, there are wide differences in occurrence between different areas, as shown in Figure 10 which shows the percentage of fans with either eggs or adult nudibranchs present from both surveys. Where it is possible to compare areas, both the Manacles and Looe and South Devon have over 20% with nudibranchs present in both surveys. Equally high percentages are found in Donegal and North Cornwall, where there are no earlier figures to compare. At the other end of the scale no nudibranchs have been recorded in Pembrokeshire in either survey and the percentage in Lyme Bay (5% and 9.3%) and East Dorset (6% and 0%) is low.

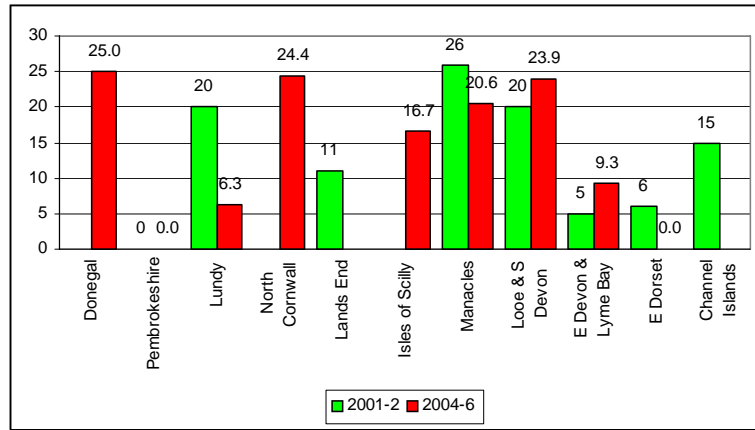


Figure 10: percentage of fans with nudibranch eggs or adults

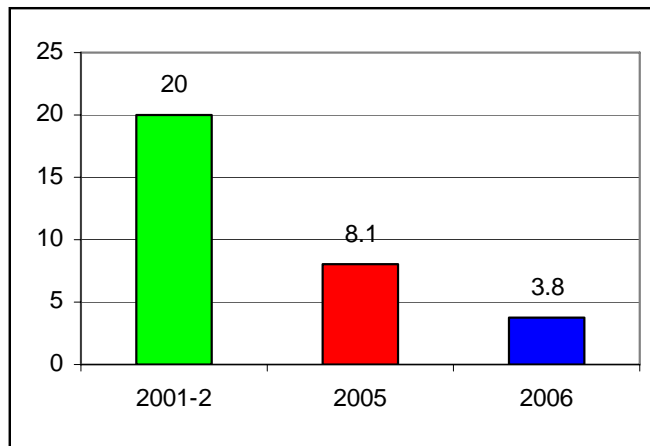


Figure 11. percentage of fans with nudibranch eggs or adults on Lundy

4.49 The main difference between the two surveys is at Lundy. In the 2001-2002 survey 20% of the sea fans had eggs or adult nudibranchs present, whereas in 2004-2006 this dropped to 6.3%. Figure 11 splits up the records from 2004-6 into separate years (there were no records in 2004) and shows that whilst there was a large drop in nudibranchs on sea fans at Lundy between 2001-2 and 2005 there was also a further drop between 2005 and 2006.

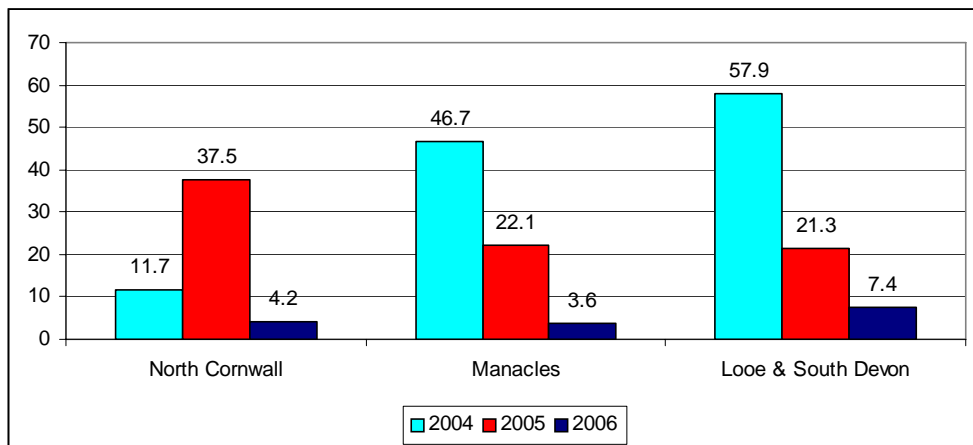


Figure 12: percentage of fans with nudibranch eggs or adults 2004-2006

- 4.50 A comparison of records from three areas with overall high percentage of nudibranchs split into the three years of this survey demonstrates how widely nudibranch numbers vary but also shows a significant fall in 2006 over previous years in each case. Figure 12 shows how low numbers of nudibranchs were in 2006. It is not clear why this should be the case but it is clearly a consistent fall throughout SW England.
- 4.51 **The sea fan anemone, *Amphianthus dohrnii*** is a much rarer animal. A total of 4,690 sea fans were checked for the presence of anemones, either using the full sea fan recording form or the simpler wreck recording form. Two other sightings have been included from general Seasearch recording during the period from other locations where pink sea fan forms were not completed. A total of 58 sea fans had anemones present, which represents 1.24% of the anemones observed.
- 4.52 No sea fan anemones at all were recorded from Donegal, Pembrokeshire, Lundy or East Dorset. This is consistent with the 2001-2002 survey. The areas and sites from which they were recorded are shown in the table below.

area	no. of fans counted	no. with anems	% with anems	sites present	number with anems	max anemones per sea fan
N Cornwall	180	1	0.6%	Bawden Rocks	1	1
Isles of Scilly	72	1	1.4%	Flat Ledge	1	9
Lands End	2125	15	0.7%	Wreck Slaatero	15	40
Manacles/S Cornwall	257	4	1.6%	Pencra Reef	4	20
Looe & S Devon	1567	36	2.3%	Udder Rock Looe	1	1
				Hatt Rock	1	1
				Wreck of Rosehill	30	35
				Eddystone	1	1
				Mewstone	1	2
				Fairylands	1	3
				Hilsea Point Rock	1	1
E Devon & Lyme Bay	232	1	0.4%	Sawtooth Ledges	1	1

- 4.53 The record for Bawden Rocks, North Cornwall is the first for this area and the most northerly record of *Amphianthus dohrnii* on the pink sea fan in the UK. The species does also occur in Scotland where it is found on the northern sea fan, *Swiftia pallida*. The record for Sawtooth Ledges, Lyme Bay is the most easterly record in the English Channel. In both cases only a single anemone was recorded.
- 4.54 These records confirm south Cornwall and Devon as the most likely areas for the occurrence of *Amphianthus*. Comparison with the 2001-2002 records shows little correlation between sites where they occurred in that of the 5 sites where they were recorded in 2001-2002 only one, Pencra Reef, had them recorded in 2004-2006 despite all sites being re-visited. The percentage of sea fans with anemones present increased from 0.7% in 2001-2002 to 1.24% in this survey. This increase is due to large numbers of fans with anemones being found in two locations, both on wrecks, the Slaatero off Penzance and the Rosehill in Whitsand Bay neither of which were visited in the 2001-2 surveys. Regular monitoring of the sea fans and

anemones on the Rosehill is taking place (see Chapter 5). The Slaatero is too deep for regular monitoring.

- 4.55 Sea fan anemones reproduce primarily by basal laceration (Wood, 2005) and thus there are often a number of individuals on a single fan. The largest numbers on an individual observed in this study were Pencra Reef (20), wreck of Slaatero (40) and wreck of Rosehill (35). The fans at Pencra and the Rosehill were both photographed and the Rosehill fan is a part of the monitoring programme (Figure 13).



Figure 13: part of a sea fan with numerous *Amphianthus dohrnii*, Rosehill, Whitsand Bay, Cornwall

- 4.56 The information from monitoring at the two sites as described in Chapter 5 suggests that the presence of sea fan anemones is a cause of damage to sea fans by destroying living tissue where they attach to the branch and encouraging subsequent growth of silty turf. This is direct contrast with the sea fan nudibranch, *Tritonia nilsodhneri* which does not appear to cause any lasting damage despite being found in much larger numbers. If *Amphianthus* occurred in similar numbers the impact on sea fan populations would be severe.
- 4.57 **The false cowrie *Simnia patula*** is a gastropod mollusc in the family Ovulidae, which is closely related to the cowries. Most species occur in the Indo-Pacific and many are known to live in close association with colonial animals such as soft corals, sea fans and sponges. *Simnia patula* is the only representative of the family in British waters and is commonly associated with dead men's fingers, *Alyconium digitatum* (a soft coral), in south-west England. The shells are predominantly white in colour with yellow lines on the mantle, and are very well disguised on the white bodies of Dead men's finger colonies. Like the sea fan nudibranch, the egg masses of *Simnia* are much more obvious than the adults, forming dark disks.
- 4.58 *Simnia* has previously been suggested as a possible cause of damage to sea fan colonies. However only two sea fans were found with *Simnia* present, in our 2001-2002 survey and 3 in this survey (one each on Lundy, Isles of Scilly and Hatt Rock). In each case they were adults, and no egg masses were observed. These records confirm our 2003 conclusion that the small numbers of *Simnia* which predate sea fans, like the nudibranchs, do not cause any significant damage to colonies.
- 4.59 **Egg cases** are found attached to 5% of sea fan colonies. In 95% of cases these were the mermaid's purse egg cases of the smallspotted catshark, *Scyliorhinus canicula* (Figure 10). Four of the fans had cephalopod eggs attached - in three cases the distinctive 'bunches of grapes' of cuttlefish,

*Sepia officinalis* and the other the 'white finger' egg masses of squid, *Loliogo sp.* attached to a largely dead colony on Lundy (Figure 14).



Figure 14: Largely dead sea fan with squid eggs, Lundy

- 4.60 Sea fan colonies with catshark egg cases attached are frequently distorted by the tightness of the tendrils wrapped around them and individual branches may become closely bunched together (Figure 15). Since the catshark young take from 5-11 months to hatch the presence of the egg cases is at least likely to inhibit growth during the period they are attached, and there may well be damage to individual polyps as a result of the lack of room to expand and feed. The presence of the egg cases and bunched branches of the sea fan may also encourage the settling of drift algae or the build up of silt and silty turf animals.



Figure 15: 'spindly' sea fan fouled by colonial sea squirt and catshark egg case, Bigbury Bay Devon

## j. Human Impacts

- 4.61 In assessing the impact of human activities on sea fans it is important to realise that this study only records the condition of sea fans which remain *in situ* and cannot assess the outcome of habitat destruction or any human activity that completely removes sea fans. This is of particular importance in assessing the impact of scallop dredging activities in Lyme Bay, which is considered in Chapter 5.
- 4.62 2% of sea fan colonies had fishing line wrapped around the colony but remained in place. Any sea fans broken off by fishermen trying to free their lines would not be recorded. The locations of the sea fans fouled by fishing line were widespread with no particular focus. However one fan was at the

Knoll Pins within the statutory no take zone within the Lundy Marine Nature Reserve. It is not known if the fishing line preceded the declaration of the no take zone or not. Images of fans fouled by fishing line and nets are shown below (Figure 16) and in Figure 1.

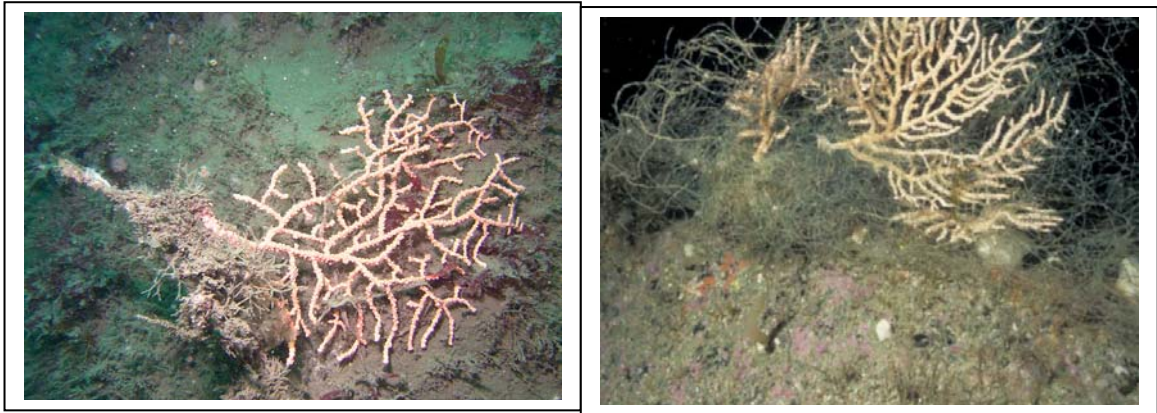


Figure 16: broken sea fan fouled by angling line, Dead Cow Point, Lundy (left), detached fans tangled in monofilament netting, Plymouth (right – photo: Keith Hiscock)

4.63 Other human debris reported fouling sea fans were plastic bags (3 colonies), a length of rope and a strip of fabric.



## 5.00 Specific studies

5.01 This chapter includes the results from specific studies carried out in different locations to research different issues.

### a. Populations at risk – Lundy and Bigbury Bay

5.02 The 2001-2002 surveys identified the poor condition of the sea fan population at Lundy, which at that time was worse than any other area. General Seasearch surveys in South Devon also identified a site in Bigbury Bay which had previously been identified for the high density of sea fans and which by 2003 had become rare and in poor condition.

5.03 In neither case was there any obvious physical reason for the population decline. In Lundy substantial numbers of sea fans remained but were largely dead, suggesting death in situ for much of the population. In Bigbury Bay the sea fans had largely disappear but those that remained appeared to have suffered a similar fate to Lundy.

### Lundy

5.04 Pink sea fan recording was one of a number of studies carried out by MCS divers on Lundy between 1997 and 2001. These studies showed a declining situation between 1999 and 2001 and comparison with sea fan populations elsewhere in 2001-2002 showed the Lundy population to be in the worst condition. The aim of the studies in 2005 and 2006 was to repeat the 2001 records to see if populations had continued to decline.

5.05 On the west coast sites at Battery Point and Dead Cow Point were surveyed. On the east coast records were made at Gull Rock and Brazen Ward/Knoll Pins. On the north coast records were made only in 2001 and 2006. The locations of these sites are shown in Figure 17. The results of the three sets of records are shown in Figure 18. There were improvements at all sites between 2001-2 and 2005 and the average condition improved from 2.2 to 3.1.

5.05 The 2006 records, however do not suggest a continuing improvement. At each site except one the condition score was lower in 2006 than in 2005, and in 3 of the 6 sites the condition in 2006 was poorer than in 2001-2. The average condition in the 2006 records was 2.7, half way between the lower figure in 2001-2 and higher figure in 2005.

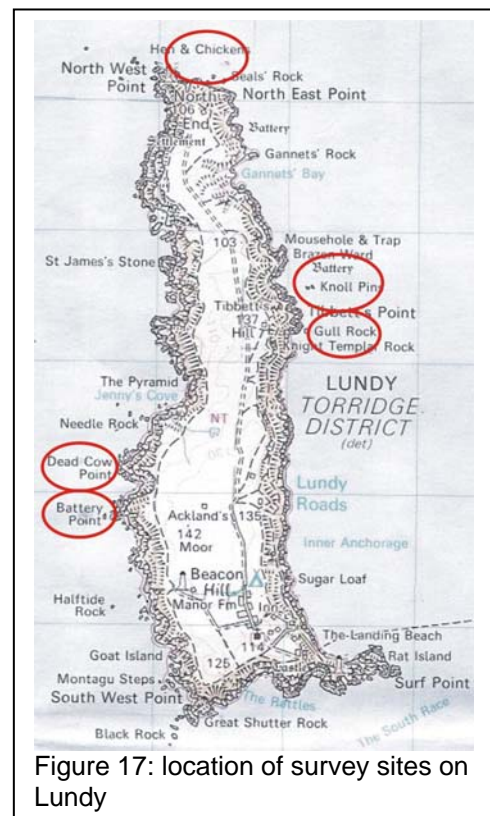


Figure 17: location of survey sites on Lundy



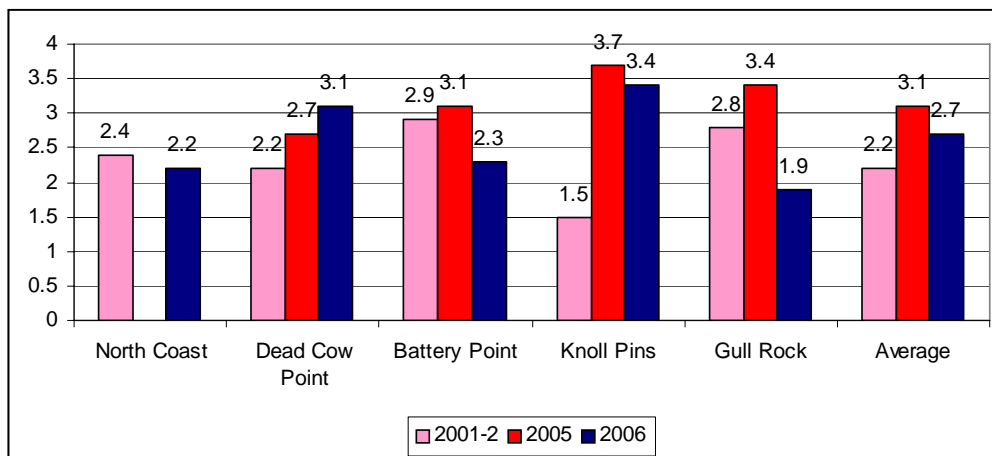


Figure 18. Condition of sea fans at Lundy 2001-2006

5.06 The main fouling organism on the fans was a slity hydroid/bryozoan turf which was found on 48% of the colonies surveyed. Other growth on fans included dead men's fingers, potato crisp bryozoan, sponges and Bugula sp. bryozoans. All of these are assumed to have settled and expanded on the colonies subsequent to polyp loss *in situ* at some time before 2001. Other studies have implicated a bacterial infection in causing necrosis in sea fans (Hall-Spencer *et.al.* 2007) and this is consistent with the number of completely dead sea fans which can be seen on Lundy, still attached to the sea bed but completely covered in silty turf and other organisms (Figures 9 & 15).

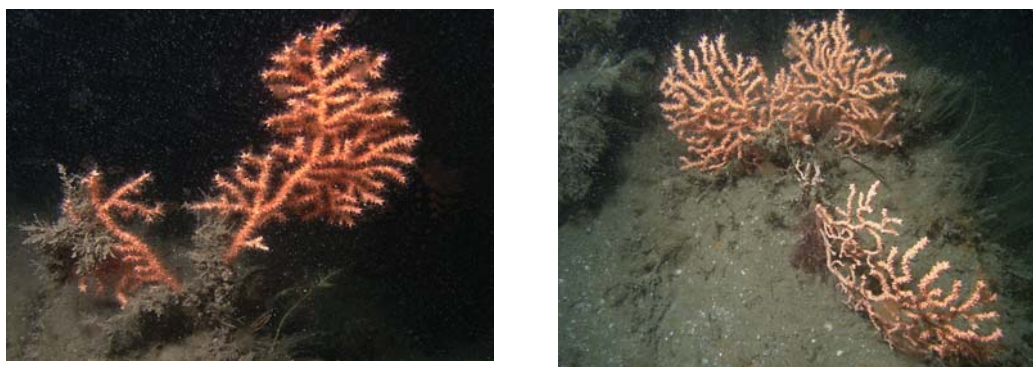


Figure 19: signs of re-growth on dying sea fans, Knoll Pins, Lundy, June 2006

5.07 In some cases there was a dead area in the centre of the colony and healthy growth at the extremities (Figure 19). It is possible that this represents new growth after a period of poor health some years ago. If so it is a healthy sign.

5.07 The condition of sea fans at Lundy should continue to be monitored on a regular basis. In the absence of regular photographic monitoring, such as that carried out in Skomer Marine Nature Reserve, spot surveys such as those reported here can provide a reliable picture of the population as a whole and, over time, whether there is any recovery. What it will not do is monitor changes in the condition of individual sea fans.

## Bigbury Bay

- 5.08 The Seasearch South Devon Reefs Survey (Wood 2003) surveyed a number of sites in Bigbury Bay, including some that had been last surveyed by Devon Wildlife Trust in 1996. The site which showed the greatest change in the 7 year period was South of Wells Rock. In 1996 it had been described as: “a rich site, important for the exceptional abundance of *Eunicella verrucosa*.” By 2003 sea fans were no longer abundant and those that remained were in poor condition (Wood, 2003). Accordingly Bigbury Bay was the focus for a number of sea fan surveys in 2005 and 2006 to put the situation at this one site in context.
- 5.09 Records were made from five different sites in Bigbury Bay which are shown in Figure 20. Other sites in the 2003 survey where sea fans were recorded are shown as open circles.

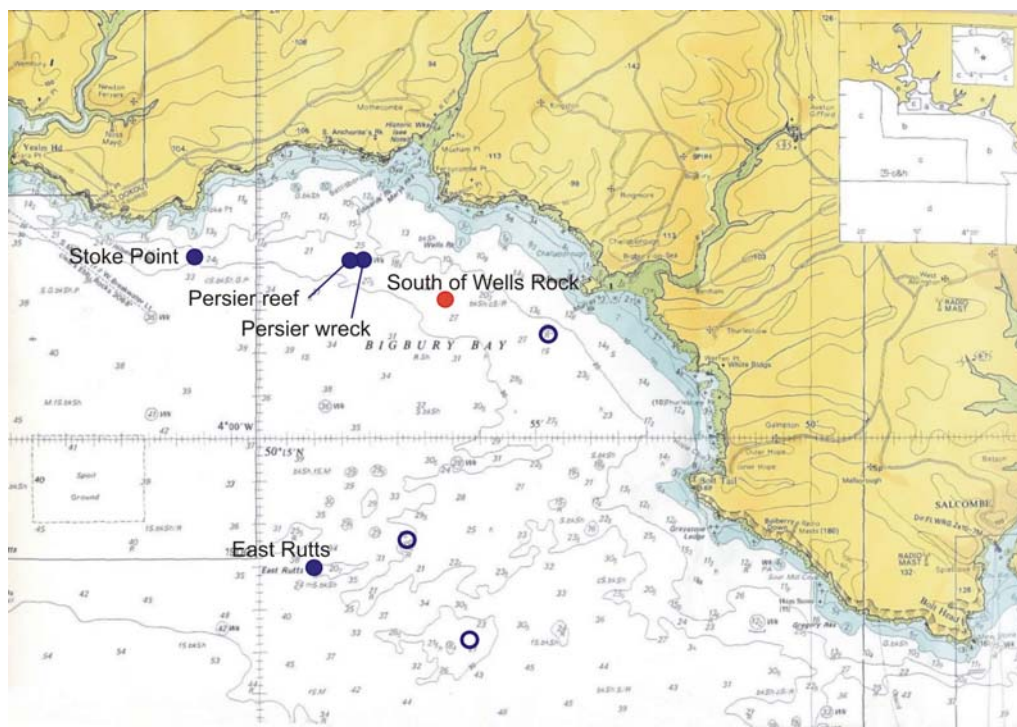


Figure 20: sea fan survey sites in Bigbury Bay, Devon

- 5.10 The South of Wells Rock site is an area of flattish rocky outcrops interspersed with areas of coarse sediment. The depth is 17-24m below chart datum. Approx 2km to the west lies the wreck of the Persier with a reef immediately adjacent to it. The sea fans on the wreck are found on flat or sloping metal plates at about 25-27m depth. The adjacent reef has tall rock faces and a depth of 20-25m. Further west Stoke Point has a similar topography of flat rock to the south of Wells Rock site and was surveyed at a similar depth (23.5-25.5m). East Rutts to the south is a tall rocky pinnacle and sea fans were found at its base in a depth of 20-26m. Figures 21 and 22 show the abundance and condition scores from these five sites.

5.11 It is clear that the South of Wells Rock site now has both fewer sea fans than the other sites and they are in poorer condition. In 2003 62 colonies were counted in an area of 250sq.m., but by 2005 only 14 sea fans could be found by 2 recorders during a dive. It is clear not only that there has been a huge loss in sea fans at this site since 1996 but also that the situation has deteriorated between 2003 and 2005. The reason for this deterioration is uncertain. The two alternatives are a viral infection such as that experienced in Lundy or physical damage by trawling. On the one hand there are no large numbers of standing dead fans as there are at Lundy which would suggest that the fans had been physically removed, on the other there are other large fragile animals, such as potato crisp bryozoans and sponges which remain and would be likely to have been equally damaged by trawling. The habitat of low reefs amongst sediment is similar to Lyme Bay and is clearly one which some fishermen target for scallops.

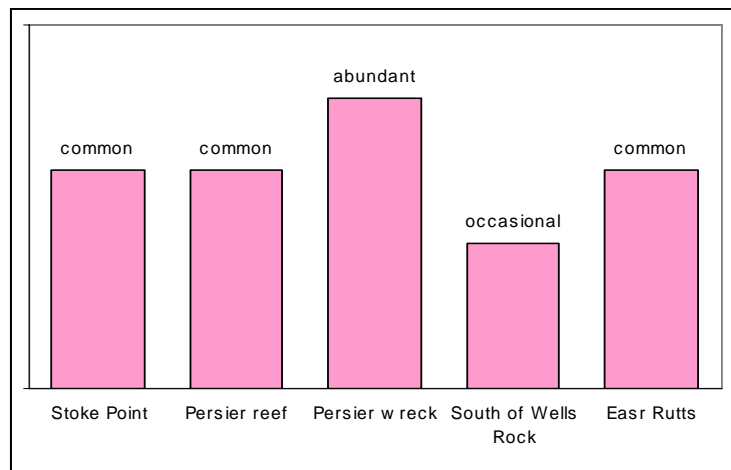


Figure 21: Abundance of sea fans in Bigbury Bay

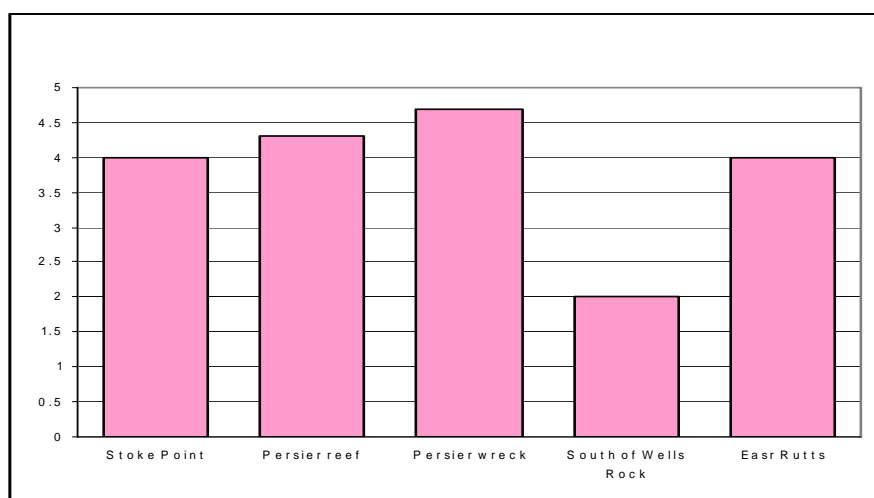


Figure 22: Condition of sea fans in Bigbury Bay

- 5.12 The other sites all appear to have healthy sea fan populations both in terms of abundance and condition. If the Wells Rock population has been affected by a viral disease it has not affected sites as close as 2km where the population on the Persier wreck is abundant and has a high condition score. This would suggest physical removal rather than disease. The Persier wreck and reef and East Rutts would not be suitable grounds for trawling having tall rocks or substantial metal plates. If trawling has damaged Wells Rock then the fact that the populations on these other sites are in better condition would be expected. On the other hand the habitat at Stoke Point is similar to Wells Rock and yet the population there is in good condition. This suggests that whatever physical damage has occurred at Wells Rock has not taken place at Stoke Point. Whatever the cause, there has been a dramatic loss in sea fan populations at the Wells Rock site. As there are other recruitment sites nearby the population would be likely to recover over a period of time, providing the damaging activity ceased.

### **Dartmouth Mewstone**

- 5.13 Sea fans at the Dartmouth Mewstone had not been surveyed prior to 2005. A total of 46 colonies were measured around the rock, ranging in depth from 8.5m to 25m. Abundance was occasional and the condition of the sea fans was very poor with an average condition score of 2.3, similar to that at both Lundy and Wells Rock. 61% of the sea fans were fouled with silty hydroid/bryozoan turf and 13 of them (28%) had catshark mermaid's purses wrapped around them. The size of fans was smaller than at other locations with none exceeding 30cm tall or 22cm wide. The average size was 10.4cm wide compared to a regional average of 18.5 and 15.0cm tall compared with a regional average of 20cm.
- 5.14 This population may be an unstable one. Many of the colonies are relatively shallow, rather small and heavily fouled. Further surveys would be advisable to see if any change is taking place.

### **b. Dense populations – Manacles and Plymouth Drop Off**

- 5.15 At a number of locations there are dense populations of sea fans with an estimated density of 10 or more colonies per m<sup>2</sup>. In most cases these are relatively small areas, such as portions of wrecks, or limited areas of low lying reef and the number of colonies can be measured in hundreds rather than thousands. However there are two areas where there are extensive dense sea fan forests that stand out, and where numbers of colonies are in the thousands.
- 5.16 The Manacles rocks off the east coast of the Lizard peninsula in Cornwall are isolated pinnacles standing up from a general rocky seabed of 25-30m depth. The pinnacles themselves have some sea fans present but it is the flattish seabed surrounding them where there numbers are especially high. Generally wherever there is flattish rocky sea bed below 20m over an extensive area there are dense populations of sea fans. Individual sites surveyed were Maen Garrick and Pencra reef, both to the north of the main

pinnacles, and sites on both the north-east and south-west sides of Maen Voes (The Voices), one of the ridges in the centre of the reef.

- 5.17 The reasons for the large numbers of sea fans in this area are likely to be a combination of clear waters, moderate current flows and, critically, a lack of deep water swells in winter storms, due to the easterly facing coastline which shelters the area from south-westerly gales.
- 5.18 The average condition of sea fans in the Manacles area (both those sites with dense populations and others) is 4.0 which is exactly the average for the survey as a whole. There are instances of damaged and diseased fans present and some standing dead colonies, but there is no sign of widespread mortality or physical damage to the population as a whole.
- 5.19 The second area of extensive sea fan forests is south of Plymouth in an area known as the Drop Off. This is a southward facing ledge which runs across much of Plymouth Sound with a depth of about 30m at the top and 35m at the base. The exposed flat rocky reef at the top of the ledge is densely covered in sea fans over much of its length in a band at least 50m wide and probably much wider. The length of the ledge is gradually being surveyed but to date all of the sites visited have abundant sea fans. Colonies are also found on the face of the ledge and on the boulders and rock at the base but the top is by far the most abundantly covered.
- 5.20 This is a more exposed site than the Manacles as it faces south and is outside the protection of Rame Head to the west. It must be assumed that the depth of 30m+ is sufficient in this location to prevent damage by south-westerly storms. It is notable that the depth here is about 10m deeper than the forests at the Manacles and this may well be critical.
- 5.21 The condition of the sea fans at the Drop Off is good with an average of 4.66, albeit from a limited sample.
- 5.22 Neither of these sites of extensive sea fan forests are within SACs or benefit from any form of statutory protection.

### **c. Deep wreck populations**

- 5.23 A separate survey form was devised to collect information from deep wrecks where the time available on the bottom would not be sufficient to collect details of individual colonies. The prime aim was to collect data on density, and the presence of sea fan anemones and sea fan nudibranchs from sites below 30m. The locations of the wrecks from which records were received are shown in Figure 23.



Figure 23: Location of wreck surveys 2004-6

- 5.24 The most westerly records are a group of six wrecks south of Penzance. Pink sea fans were abundant on four of the wrecks – the Slaatero (58-61m), Underwood (52-56m), Kilmaho (58-62m) and John R Park (52-56m). They were common on the Mulberry harbour (40-45m), rare on the Alice Marie (24m) and absent from the Jose de Aramburu (32-35m). On these wrecks there is a clear relationship between abundance and depth. Sea fans were abundant on the 4 deepest wrecks, all lying below 50m depth. They were rare or absent from the two shallowest wrecks.
- 5.25 The reason for the relationship between depth and abundance is likely to be related to exposure and the availability of nearby rocky areas to provide a source for recruitment of new colonies. The deeper wrecks are less likely to be affected by deep swells which could inhibit sea fan growth. The wreck from which they were absent, the Jose de Aramburu, lies near the Runnel Stone which is notoriously exposed to south-westerly wind and swells. However there are sites along the same coast much closer inshore when sea fans are found including Logan's Rock, and The Bucks (both included in the 2001-2 survey). The size of individuals in these inshore populations is small and they receive some protection from adjacent rocky pinnacles which may dissipate the effect of swells.
- 5.26 The four wrecks to the east of the Lizard Peninsula and south of Falmouth appear to have less sea fans than those off Penzance. On the Rinavia (50-56m) they were common and this is a similar depth to the wrecks recorded off Penzance. The other three wrecks were deeper – Liddy (70-75m), NK (70-80m) and Eskdale (65-70m) and in each case sea fans were only recorded as occasional. These wrecks lay close to one of the densest populations of sea fans around the Mandles and it may be that the depth of these wrecks is too great for optimum sea fan growth.
- 5.27 The wrecks in the Plymouth area range considerably in depth. The Claverley (63-66m) is similarly exposed and a similar depth to those off Penzance. It also has abundant pink sea fans. The Rosehill, James Eagan

Layne and Persier are much shallower (all less than 30m) and all well known for the abundance of sea fans. All three are exposed to south-west swells but not to the same extent as the sites off Penzance. The fourth wreck in this group, the Totnes Castle in Bigbury Bay (40-43m) does not appear to have any sea fans. This is surprising given its location close to other sea fan sites (Persier, East Rutts etc). Seasearch intends to look at other wrecks in this area during 2007 to see if there is any pattern emerging.

- 5.28 The wrecks recorded off east Devon are both shallower than most in this survey, Galacia (16-18m) and Bretagne (22-25m), and are both in relatively sheltered east facing locations. There are no coastal records of sea fans in this area, but many other offshore records further east in Lyme Bay.
- 5.29 The two records from Dorset were both of single sea fans on wrecks at a depth of about 30m. There are also scattered records of sea fans from rocky sites around the Isle of Portland (2001-2 survey).
- 5.30 Sea fan anemones were found on two wrecks, the Slaatero off Penzance and the Rosehill in Whitsand Bay. In both cases there were considerable numbers of fans with anemones present - 15 out of 370 colonies checked on the Slaatero and up to 25 fans out of 'hundreds' counted on the Rosehill. On the Slaatero most colonies had 3 or 4 individuals present but one fan had over 40. On the Rosehill the presence of anemones has led to a separate monitoring project which is described below.
- 5.31 Sea fan nudibranchs were recorded from 8 wrecks, including a number of the deeper ones. The greatest numbers were found on deeper wrecks, with over 20 adults/egg masses on fans on the John R Park (52-56m) and the Claverley (63-66m).

#### **d. Sea fan anemones – Manacles and Whitsand Bay**

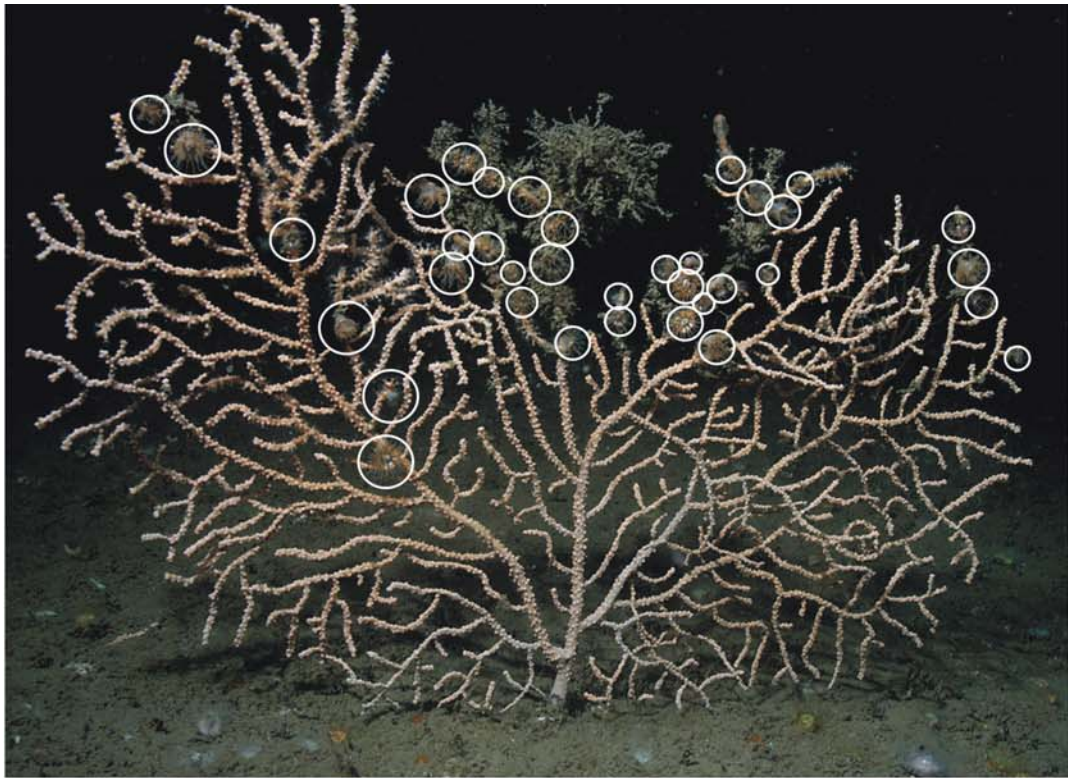
- 5.32 Two experiments have been made to monitor individual sea fans with anemones on them. In the first experiment 3 fans situated close together at Pen Win on the Manacles were photographed and tagged in July 2004. The fans were marked by cable ties loosely attached around the base of the sea fan with a plastic tag attached to the cable tie. The same anemones were re-located and re-photographed in August 2004.
- 5.34 The site was next visited in May 2005 but unfortunately the tagged fans could not be relocated. The site was visited again in May 2006 and the location where the fans had been was ascertained. However none of the 3 tagged fans were there. One loose tag was found. We concluded that the presence of the tags must have caused damage to the base of the sea fans over the 2004/5 winter period and unfortunately may have caused them to break off and thus be killed. For this reason the second study does not involve attaching any form of tag to the fan itself, however loosely.

- 5.35 In the second experiment sea fan anemones were located on fans on the wreck of the Rosehill in Whitsand Bay. There were several fans with anemones present but three fans in particular were chosen – one was heavily encrusted with anemones, an adjacent fan had just a few anemones and the third fan, a few metres distant, had just one anemone attached. All were in a position which was easy to find, even in poor visibility. Marker tags were attached to the adjacent wreckage.
- 5.36 An initial visit and photograph was taken 06/04/06, the fans were re-photographed with a wide angle lens and tagged on 28/07/06, re-visited on 11/11/06, 28/01/07 and 04/04/07 when they were photographed from the same position with the same lens. From these photos the number of anemones could be ascertained and their movement monitored. Comparison photographs taken on 27/06/06 and 04/04/07 are shown in Figure 24 (following page), which shows the position of the anemones in each case and the parts of the sea fan which were fouled in the earlier picture and have broken away in the second.
- 5.37 It is clear from these photographs, and others taken elsewhere, that the anemones are often associated with a certain amount of fouling on the sea fans. Whether this is because they attract detritus or silt is hard to say but seems very possible. However, the level of fouling together with the enveloping of the sea fan branch by the anemone certainly causes die back.
- 5.38 It is already apparent that the anemones are causing dieback and damage to the first sea fan. The centre has disappeared, leaving a v-shaped centre. The most recent photo shows less brown fouling growth attached which could be due to the main centre part (which was the most heavily fouled) falling away, or to the time of year. The second fan is less heavily encrusted but dieback is also occurring. The third fan had just one anemone which was still in situ on the last visit and appeared not to have moved, budded off or affected the sea fan adversely.
- 5.39 The fans will be monitored whenever possible for the foreseeable future to ascertain the longevity of the anemones, their spread over the host fan and to adjacent fans and their affect on the host fans.

#### **e. Lyme Bay and Chesil Beach**

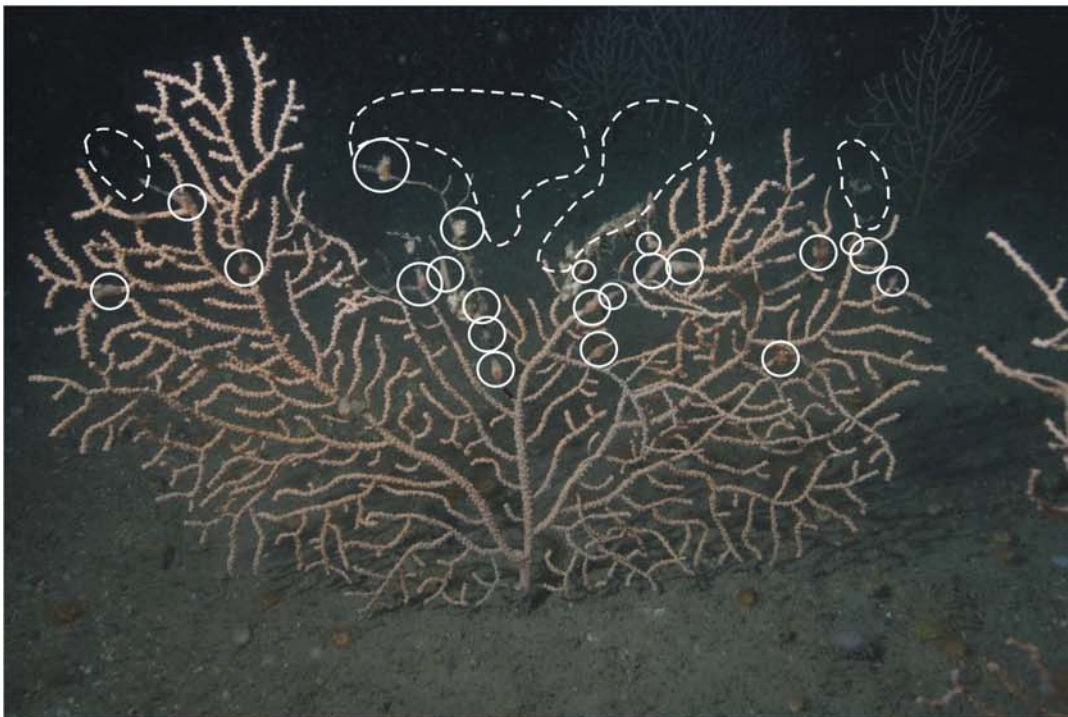
- 5.40 In paragraph 4.38 it was noted that the deterioration in condition between the 2001-2 report and this survey was the greatest in Lyme Bay. In 2001 40 colonies were measured at 3 sites giving an average condition score of 4.36, which exceeded the average for the whole survey of 4.12. In 2004 40 colonies were measured at 3 sites (two the same as in 2001 and one different). The average condition score was 4.32, very little changed from 2001. In 2006 110 colonies were measured from 6 sites, only one of which was the same as 2001. The average condition score was 3.53, which represents a significant decline from both 2001 and 2004 and is below the average for the 2004-6 survey of 4.0.





Above June 2006

Below April 2007




 anemones  
areas fouled in 2006 now missing

Figure 24: Rosehill sea fan 1 in June 2006 and April 2007

- 5.41 There is a significant difference between sites in the 2006 data which ranges from 4.4 at West Tennants (West) to 2.6 at East Tennants.
- 5.42 In addition to the sea fans counted in 2006 which go to make up the condition figures above there were a large number of additional comments made on the recording forms which put the records in a wider context by including information on other sea fans at the same site/time.

**West Tennants Reef** (average condition 3.48)

*“many sea fans lying flat on muddy rock, some bent over”*

*“about 20 dead fans and many parchment worm tubes” (these were not counted)*

*“several fans flat on sea bed”*

**West Tennants (West)** (average condition 4.4)

*“some detached and dying, others cracked about 2cm above seabed and lying over on the side”*

**Pinhay Settle** (condition 4.0)

*“only one colony found within 20m of shot. Massive boulders (landrover sized) obviously broken by fishing gear (towed scallop dredge)”*

**East Tennants** (average condition 2.6)

*“10 dead detached fans recorded” (included in condition assessment below)*

- 5.43 All of these comments relate to physical damage which is likely to have been caused by mobile fishing gear being dragged across the site. There may be some inconsistency amongst recorders as to whether detached dead or dying fans were included. In the case of East Tennants, where they specifically were, the average condition score is the lowest as a result.
- 5.44 At the other two sites recorded in 2006 there are no comments about physical damage. In the case of the Heroine, a wreck, the sea fans were found on stable cobbles and boulders around the wreck. Whilst there was no sign of physical damage, probably because wreckage would be avoided by fishermen towing gear, there were standing dead colonies present. In the case of Sunset Reef there was no reference to physical damage but “a large proportion of the sea fans on the southward sloping reef were either dead or severely ‘sick’ i.e. thin and white”.
- 5.45 In addition to the records above photographs were taken of the condition of the sea fans at a number of sites. These show overturned boulders, silted reefs and piles of detached and dying seafans and parchment worm tubes. They are included in a Seasearch summary report produced in July 2006 (Baldock 2006) which can be downloaded from the Seasearch website. The photograph of detached and dying colonies (Figure 25) is from West Tennants reef.



Figure 25: detached sea fans, West Tennants July 2006

5.46 In parallel with these studies a study of sea fans and other material washing up on parts of Chesil Beach (which forms the north-easterly side of Lyme Bay) was carried out (Trehella and Hatcher 2006). This recorded 1,368 whole colonies washed up on a 595m stretch of beach in four surveys from October 2005 to August 2006. In addition to sea fans there were 1,545 'mermaids purse' egg cases of catsharks, which are commonly attached to sea fans (see paras 4.59 – 4.60 above).

## **6. Summary of other related studies**

6.01 This chapter briefly summarises other studies carried out by Seasearch and Seasearch partners during the same period.

### **a. Worbarrow Bay, Dorset**

6.02 A study was carried out by Dorset Wildlife Trust using Seasearch recruited divers of a sea fan population on a single reef in Worbarrow Bay Dorset. This involved detailed studies of an area of reef measuring 15m x 200m which contained 22 sea fans. The work included mapping, temperature measurement and photographic monitoring of individual fans to demonstrate growth rates. Propagation of clippings was also undertaken successfully. The report (Tinsley, 2005) can be downloaded from the Seasearch website.

### **b. Cornwall**

6.03 A report has been produced of sea fan studies in Cornwall during 2004 and 2005 (Doyle, 2006). The data on which it is based is data included in this study for 2004 and 2005. The report provides more detailed analysis of the data for Cornwall during this period. The report can be downloaded from the Seasearch website.

### **c. Northern sea fans – Firth of Lorn and Skye**

6.04 The northern sea fan, *Swiftia pallida*, is found at a number of sites on the west coast of Scotland north of Mull. A survey was carried out by Seasearch in April 2005 in the Firth of Lorn, south of Oban. This surveyed three sites with northern sea fans present and enabled the pink sea fan methodology to be adapted to fit the different physical characteristics of the colonies. Additional sites were surveyed in the spring of 2007.

6.05 The survey recorded sea fan anemones at two of the three sites. Whilst the number of records is small it seems likely that sea fan anemones occur more frequently on northern sea fans than they do on pink sea fans.

6.06 Reports of both the 2005, and 2007 surveys (Duncan, 2005 & Paisley, 2007) can be downloaded from the Seasearch website.



## 7. Revised Recommendations

### a. Site protection

- 7.01 Pink sea fans are found in two Marine Nature Reserves, Lundy and Skomer, and in a number of other Special Areas of Conservation (SACs) – including Isles of Scilly and Plymouth estuaries. There have been no significant changes to the SAC boundaries since our previous report was published in 2003.
- 7.02 The greatest densities of sea fans occur at the Manacles, the Plymouth Drop Off and on a number of wrecks off south Devon and Cornwall. None of these sites receive any special protection to reflect their importance. Many other sites which are important for sea fans, such as the reefs south of Plymouth (Hatt Rock, The Eddystone, Hand Deeps) and notoriously Lyme Bay are equally unprotected.
- 7.03 At the time of our 2001-2 report there was little evidence of physical damage to sea fans that could be rectified by better protection. The area suffering the greatest decline in populations was Lundy which was already a Marine Nature Reserve and SAC and the decline was not due to physical impacts. However, in the intervening period there has been evidence of severe physical damage to pink sea fans in Lyme Bay and northern sea fans in the Firth of Lorn as a result of heavy mobile gear fishing over low lying reefs; for scallops in the case of Lyme Bay and Dublin Bay Prawns in the case of the Firth of Lorn. This report, and other work undertaken by the Devon Wildlife Trust has documented the damage both to sea fans and other long lived marine invertebrates in Lyme Bay, which has not been adequately addressed.
- 7.04 This report does not show any evidence that the two centres of population at the Manacles and the Plymouth Drop Off are currently threatened by mobile gear fishing in the same way as Lyme Bay. However, this is in no way the result of effective conservation measures. In the case of the Manacles the presence of rocky pinnacles makes bottom gear fishing impractical and the size of the Drop Off at Plymouth is also a deterrent to fishing nearby. However it is notable that the names given to two of the individual sections of the Plymouth Drop Off come from abandoned fishing gear (scallop dredge site and rope and trawl wheel site).
- 7.05 Figure 26 demonstrates the position of the Drop Off site in relation to the Plymouth Esuaries SAC. The Drop Off site is important not only for the abundance of pink sea fans but also for other long lived species including the nationally rare sunset cup-coral, *Leptopsammia pruvoti*. This being only one of four locations in the UK from which it is currently known. The others are Lundy (MNR and SAC), Isles of Scilly (SAC) and Lyme Bay (not protected). In this case some benefit could be achieved by an extension of the SAC boundary to the south to encompass the Drop off. Pink sea fans and reefs are already set out as reasons for designation of the SAC, and whilst there are reefs with pink sea fans within it, around the Mewstone, the

best examples are outside. The Plymouth reefs, which include this site, have been identified as one of the areas of greatest marine biodiversity in the UK (Hiscock & Breckels, 2007) and it must be an important area to consider for protective measures. In the meantime an extension of the existing Plymouth Estuaries SAC to include the Drop Off would afford a measure of protection.

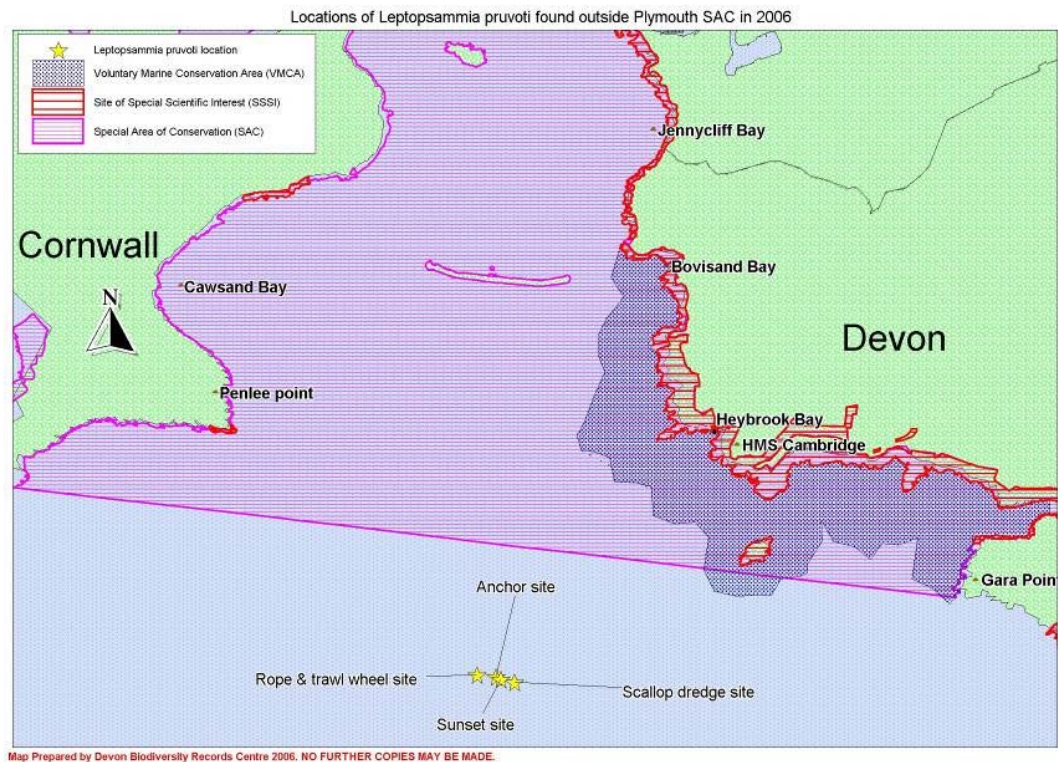


Figure 26: Plymouth Drop Off sites in relation to the SAC.

- 7.06 In the case of the Manacles a new designation is likely to be appropriate to reflect the rich rocky reefs and the presence of not only pink sea fans but also *Amphianthus dohrnii* and many other anemones, soft corals and other species.
- 7.07 Our recommendation for adequate protection of these two important reef areas is consistent with that made in the earlier report in 2003.
- 7.08 Many of the other hot spots for dense pink sea fan populations are wrecks. All of these are unprotected by legislation but partially protected by the fact that mobile gear fishing is not practicable adjacent to them. However wrecks are frequently encountered with large amounts of netting snagged on them and monofilament netting is also encountered with broken sea fans. We have no evidence of diver damage to sea fans on these sites, though some, such as the Persier in Bigbury Bay, are popular dive locations. In a comprehensive system of marine protected areas some wrecks with extensive sea fan populations would be included. At present there is no legislation in place which would allow the protection of individual sites of this nature. The current Marine Bill provides an opportunity to rectify this position.

- 7.09 An alternative approach to the creation of marine protected areas to protect major pink sea fan would be to prevent mobile benthic fishing taking place within them. This would require action by Defra, the relevant Sea Fisheries Committees and Natural England.
- 7.10 The sea fan populations at the northerly extent of their range in Wales (North Pembrokeshire), the northerly extent of their range in Britain and Ireland (Donegal), and the easterly extent of their range in England (Worbarrow Bay and Poole Bay Dorset) are all unprotected areas. In our previous report we recommended extensions of existing SACs in Pembrokeshire and Dorset to include the sea fan populations at the extreme of their range in the UK. These recommendations are still relevant.

#### **b. BAP status and monitoring**

- 7.11 The pink sea fan and sea fan anemone are both UK BAP species with action plans. Because of their importance, pink sea fans have been the subject of a good deal of recent research and publicity. However the BAP status and actions have not been sufficient to prevent physical damage to populations on a large scale in Lyme Bay. There has been rather less action in the case of the sea fan anemone and the studies reported here are the only action we are aware of currently taking place to understand or protect this species. Of course effective action to protect the pink sea fan, and in Scotland the northern sea fan, would have the added effect of protecting the sea fan anemone which is dependent on sea fans.
- 7.12 The UK BAP species and habitats have been recently reviewed (Biodiversity Reporting and Information Group, 2007). Both the pink sea fan and sea fan anemone remain on the list and the northern sea fan has been added. We will press for more effective monitoring of population status of all three species now that much more is known about distribution of and impacts on existing populations as a result of this and other studies.
- 7.13 The level of information now available provides a baseline on which a monitoring programme specifically addressing pink sea fan populations could be devised. SAC monitoring does include sea fans but is not, except at Skomer MNR, designed with this species in mind. In any event many of the important sea fan populations are outside any SAC or monitoring programme.
- 7.14 In some cases detailed monitoring of the sort already carried out at Skomer could be undertaken. Lundy is an obvious example. However, in most cases a good impression of the general health of a population in an area could be obtained by repeating recordings using the Seasearch methodology at regular intervals of not more than 2 years. This could be undertaken by volunteer divers providing support for survey costs and training was made available.
- 7.15 In order to achieve a geographic and habitat spread of records we suggest that a monitoring programme should include the following sites:



- Wales – Skomer MNR
- North Devon - Lundy
- Cornwall – Bawden Rocks (North Cornwall), Manacles (South-West Cornwall), Rosehill wreck (south-east Cornwall), Offshore reefs south west of Plymouth,
- Devon – Plymouth Drop Off, Plymouth Breakwater Fort, 2 sites in Bigbury Bay, 2 sites in Lyme Bay

7.16 Seasearch would be glad to assist with such a monitoring programme, subject to funding.

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**APPENDICES**

**Appendix 1: Pink Sea Fan Recording form**

**Pink Sea Fan Recording Form**

**About you**

Name

Address

Postcode

Email

**Additional notes on sea fans at this site**

**Return completed form to:**

Seasearch, Marine Conservation Society, Unit 3, Wolf Business Park, Alton Road, Ross on Wye, HR9 5NB or Cornwall Seasearch, Cornwall Wildlife Trust, Five Acres, Allet, Truro, TR4 9DJ (Cornwall & Scillies records only)



[www.seasearch.org.uk](http://www.seasearch.org.uk)

**About your dive**

Site Name  General Location

Position  
Lat  Long

or OS Grid Reference

Date  Start time

Depth range of sea fans  to

Habitat of sea fans  (tick all that apply)

Sloping rock	Flattish rock	Wreck	Sediment covered rock	Boulders	Other (specify in notes)
--------------	---------------	-------	-----------------------	----------	--------------------------

Density of sea fans

Forest	Common	Occasional	Rare
--------	--------	------------	------

**Details of individual sea fans**

	Width cm	Height cm	Feeding Y/N	Colour P/W	Condition D, 1-5	Fouling Species list	Fishing debris list	Sea fan anemone number	Sea fan sea slug eggs - number	Sea fan sea slug adults - number
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										



This Seasearch survey is organised by the Marine Conservation Society and Cornwall Wildlife Trust, with financial support from English Nature.



## Appendix 2: Pink Sea Fan Wreck Recording Form

### Pink Sea Fan Wreck Recording Form

#### About you

Name

Address

Postcode

Email

#### Sea fan anemones and sea slugs

Number of fans counted

Number with anemones  Sea slug adults  Sea slug eggs

#### Additional notes on sea fans at this site



www.seasearch.org.uk

#### About your dive

Site Name  General Location

Position

Lat  Long

or OS Grid Reference

Date  Start time

Depth range of sea fans  to

Habitat of sea fans  (tick all that apply)

Sloping or vertical wreckage	Flattish wreckage	Protected by wreckage	Rocks around wreck	Other (specify in notes)
------------------------------	-------------------	-----------------------	--------------------	--------------------------

Density of sea fans

Forest	Common	Occasional	Rare
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Return completed form to: Seasearch, Marine Conservation Society, Unit 3, Wolf Business Park, Alton Road, Ross on Wye, HR9 5NB or Cornwall Seasearch, Cornwall Wildlife Trust, Five Acres, Allet, Truro, TR4 9DJ (Cornwall & Scillies records only)

#### Why record sea fans?

The pink sea fan, *Eunicella verrucosa*, is one of the two sea fans that grow in British waters. It is found throughout SW Britain and is a slow growing and long lived species which is especially prone to damage by fishing gear or careless divers.

The sea fan is a protected species under the Wildlife and Countryside Act and has been included amongst the marine species for which a Biodiversity Action Plan (BAP) has been prepared. The aim of this recording project is to add to our knowledge of sea fan distribution, habitat and condition and to complement other research taking place to contribute to the action to protect them.

This form has been designed specifically for records made on deeper wrecks where bottom time is strictly limited. It is therefore more straightforward to complete than the normal pink sea fan recording form, but it does require you to make some simple notes underwater.

We are particularly interested in records of pink sea fans from deeper wrecks, or reefs, since this is a species which is known to occur as deep as 200m. The densest 'forests' of sea fans seem to occur below 30m and we want to know more about numbers and density in these depths.

Wrecks are known to provide hard surfaces for sea fans to attach.



Pink sea fan 'forest'



Sea fan anemones and sea slug



Sea fan sea slug and egg mass

#### Filling in this form

A new form should be completed for each dive.

**Site Name/Location:** Name the wreck and describe its general location - e.g 5miles south of the Eddystone

**Date and Time:** This will enable us to relate your depth information to chart datum.

**Position:** Use GPS to record Lat/ Long.

**Depth Range:** Record the shallowest and deepest depth you see sea fans on your dive.

**Habitat:** Record the habitats in which the sea fans are growing. Tick any of the five boxes that apply. If you use the other category explain in the additional notes box

**Density:** Tick the box that describes the maximum density of sea fans on the wreck. Forest is a thick covering of sea fans where they almost touch each other. Common is where there are a number of sea fans in different parts of the wreck and you see at least 20 over your dive. Occasional is from 5-20 seen. Rare is less than 5 seen during the dive.

**Sea fan anemones and sea slugs:** You'll need to look carefully at a number of fans to see these. Record the number of fans and the number that have one or more anemones, sea slug adults and sea slug egg masses on them. Don't count how many there are per fan - just the presence of one or more. For larger pictures of both species and the egg masses see the Seasearch website.



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### Appendix 3: Summary of Data Received

The following two tables are a summary of the data on which this report is based. Additional information is available in a fuller spreadsheet on request.

	Site	County	Lat	Long	Date	Observer	Depth Range BCD	Habitat	Abundance	no measured
240	St. John's Point, Donegal	Eire	54 33.56N	008 27.34W	13/05/2004	Chris Wood	13-21	rock with thin covering of gravel	O	8
	<b>Eire</b>									
241	Tri-Maen-trai, Strumble Head,	Pembs	52 00.30N	005 05.28W	03/08/2004	Bruce Jones	18.3	sloping rock	R	1
288	West Hook, Skomer MNR	Pembs	51.73271	-5.23952	? 2006	Kate Lock	-	current swept rock	-	3
286	Rye Rocks, Skomer MNR	Pembs	51.74039	-5.27609	? 2005	Kate Lock	-	current swept rock	-	15
287	Bull Hole, Skomer MNR	Pembs	51.74105	-5.31082	? 2005	Kate Lock	-	current swept rock	-	33
289	South Middleholm, Skomer MNR	Pembs	51.73170	-5.2639	? 2006	Kate Lock	-	current swept rock	-	6
257	East Gateholm Island	Pembs	51 42.859N	005 13.752W	23/07/2006	Kate Lock	-	low lying rocky reef		2
258	Little Bay Point, Skokholm	Pembs	51 42.249N	005 16.665W	19/08/2006	Kerry Lewis		steep rocky reef with gullies		1
259	Hog Bay, Skokholm	Pembs	51 41.826N	005 15.105W	19/08/2006	Steve Bound	7.5	rocky reef gully		1
	<b>Pembrokeshire</b>						<b>7.5-18.3</b>			<b>62</b>
260	Hen and Chickens, Lundy	Devon	51 12.211N	004 40.583W	03/06/2006	Chris Wood	14-19	flattish rock	R	5
242	Dead Cow Point, Lundy	Devon	51 10.52N	004 41.05W	10/07/2005	Chris Wood	17-20	flattish rocks/boulders	O	11
243	Dead Cow Point, Lundy	Devon	51 10.52N	004 41.05W	10/07/2005	Chris Webb	15-17	flattish rock	O	10
244	Dead Cow Point, Lundy	Devon	51 10.52N	004 41.05W	10/07/2005	Ellie Hardman	14-19	sloping, flattish rock, boulders with sediment	R	6
245	Dead Cow Point, Lundy	Devon	51 10.52N	004 41.05W	10/07/2005	Rachel Locklin	14-22	flattish rock	O	5
261	Dead Cow Point, Lundy	Devon	51 10.48N	004 41.07W	03/06/2006	Belinda Gadsby	15-19	sloping rock / sediment covered in rock	O	10
262	Dead Cow Point, Lundy	Devon	51 10.48N	004 41.07W	03/06/2006	Chris Wood	12-21	flattish rock	O	11
263	Dead Cow Point, Lundy	Devon	51 10.48N	004 41.07W	03/06/2006	Gavin Black	12-21	reef with gullies and short faunal turf	O	8
246	Battery Point, Lundy	Devon	51 10.35N	004 41.08W	09/07/2005	Ellie Hardman	17-20	boulders	O	8
247	Battery Point, Lundy	Devon	51 10.35N	004 41.08W	09/07/2005	Sally Sharrock	12-18	boulders	O	7
248	Battery Point, Lundy	Devon	51 10.35N	004 41.08W	09/07/2005	Chris Wood	15-19	flattish rock, boulders	O	15
249	Battery Point, Lundy	Devon	51 10.35N	004 41.08W	09/07/2005	Chris Webb	20-22	bedrock	O	9
290	Battery Point, Lundy	Devon	51 10.424N	004 41.027W	03/06/2006	Keith Denby	24.5-29.5	sediment covered rock & boulders	C	9

250	Knoll Pins, Lundy	Devon	51 11.28N	004 39.63W	09/07/2005	Sally Sharrock	10.5-22.5	sloping, flattish rock covered in sediment	O	11
291	Knoll Pins, Lundy	Devon	51 11.28N	004 39.63W	04/06/2006	Chris Wood	4.5-19.5	sloping rock	O	10
251	Gull Rock, Lundy	Devon	51 11.12N	004 39.59W	10/07/2005	Chris Wood	8.5-14	sloping rock; boulders	O	14
252	Gull Rock, Lundy	Devon	51 11.12N	004 39.59W	10/07/2005	Susan Howson	10-17	boulders covered in sediment	C	15
253	Gull Rock, Lundy	Devon	51 11.12N	004 39.59W	10/07/2005	Rachel Locklin	9-15	boulders covered in sediment	O	5
264	Gull Rock, Lundy	Devon	50 11.12N	004 39.59W	04/06/2006	Sally Sharrock	11.5-14.5	boulders	C	20
	<b>Lundy</b>						<b>4.5-29.5</b>			<b>189</b>
150	The Sphene, near Port Quin	Cornwall	50 36.165N	004 53.214W	04/07/2005	Joana Doyle	19.5	on top of wreck	C	3
151	Newland Island, Pentire Point, Polzeath	Cornwall	50 35.37N	004 56.53W	21/08/2005	Joana Doyle	16.5-22.5	sloping rock	C	12
152	Newland, 2km NW of Polzeath	Cornwall	50 35.37N	004 56.53W	21/08/2005	Steve Adams	-	sloping and flattish rock with boulders	C	19
303	Outer Gulland, Trevoze Head nr Padstow	Cornwall	50 35.190N	005 00.304W	24/08/2006	Keith Denby	21.5-25.5	sloping and flattish rock	A	10
153	Bedruthan Rock, Newquay	Cornwall	50 29.19N	005 03.03W	09/10/2004	Peter Hewitt	13-16.5	rock pinnacle	O	10
154	Pells Reef, Newquay	Cornwall	50 28.46N	005 04.89W	10/10/2004	Peter Hewitt	25.5-26.6	sloping to flattish rock	O	4
155	Poltexas Reef, Newquay	Cornwall	50 26.04N	005 04.64W	10/10/2004	Phil Reynolds	16-18	sloping rock, vertical faces	C	9
156	Poltexas Reef, Newquay	Cornwall	50 26.47N	005 04.56W	10/10/2004	Helen Spring	15.5-18.5	vertical rock reef	O	8
157	Poltexas Reef, Newquay	Cornwall	50 26.47N	005 04.56W	09/10/2004	Phil Reynolds	15-18.5	large fans on vertical, juveniles in fissures on horizontal areas	C	29
158	Bawden Rocks, St Agnes	Cornwall	50 20.03N	005 13.52W	19/05/2005	Chris Whitworth	-	sloping rocks and boulders	C	14
159	Bawden Rocks, St Agnes	Cornwall	50 20.03N	005 13.52W	07/06/2005	Joana Doyle	16-22	boulders	C	11
160	Bawden Rocks, St Agnes	Cornwall	50 20.03N	005 13.52W	07/06/2005	Chris Whitworth	-			12
161	Bawden Rocks, St Agnes	Cornwall	50 20.03N	005 13.52W	29/06/2005	Chris Whitworth	-			16
162	Bawden Rocks, St Agnes	Cornwall	50 20.03N	005 13.52W	09/07/2005	Joana Doyle	20-24	sloping rocks	C	9
304	Bawden Rocks, St Agnes	Cornwall	50 20.03N	005 13.52W	28/10/2006		15-21			14
	<b>North Cornwall</b>						<b>13-26.5</b>			<b>180</b>
163	Wreck of King Cadwallon, Hard Lewis Rocks, St Martins	Isles of Scilly	49 57.56N	006 14.32W	16/09/2004	Chris Wood	27-29	flattish rock; wreck	O	14
164	Wreck of Juno, Hard Lewis Rocks, St Martins	Isles of Scilly	49 57.55N	006 14.53W	16/09/2004	Chris Wood	18-23	flattish rock; wreck	R	5
165	Flat ledge, E. of St. Martins	Isles of Scilly	49 58.09N	006 15.20W	12/09/2004	Chris Wood	23-25	sloping rocks	O	6
166	East Withan Rock, N. of St. Martins	Isles of Scilly	49:58:47N	006 17.14W	12/09/2004	Chris Wood	23.5-24	sloping rocks	R	2
167	White Island	Isles of Scilly	49 59.03N	006 17.10W	17/09/2004	Sally Sharrock	25-26	flattish rock; sediment covered rock	R	2

168	Western wall of Men-a-Vaur	Isles of Scilly	49:58:37N	006 20.04W	13/05/2005	Christine Harling	19	sloping rocks	R	1
169	Mussel Rock, Shipman Head, Bryher	Isles of Scilly	49 57.858N	006 21.909W	12/05/2005	Chris Wood	23-26	flattish rock	R	5
170	Wreck of Plympton, Lethegus Rocks, St Agnes	Isles of Scilly	49 52.87N	006 20.848W	09/05/2005	Chris Wood	16-26	sloping rocks on wreck	C/R	10
171	Wreck of Plympton, Lethegus Rocks, St Agnes	Isles of Scilly	49 52.87N	006 20.848W	09/05/2005	Mike Flavell	25	wreck	C	6
299	Wreck of Plympton, Lethegus Rocks, St Agnes	Isles of Scilly	49 53.00N	006 20.40W	07/08/2006	Robin Smith	-		A	
298	Wreck of Maria	Isles of Scilly	49 52.52N	006 20.18W	06/08/2006	Robin Smith	23		R	
172	South Gilstone Reef, St. Marys	Isles of Scilly	49:54:17N	006 17.35W	15/09/2004	Chris Wood	-	flattish rocks	R	1
302	Gilstone Ledge, St Marys	Isles of Scilly	49 53.35N	006 17.30W	11/08/2006	Robin Smith	24.5		R	1
173	Cita wall to SW, St. Marys	Isles of Scilly	49 54.07N	006 16.75W	14/09/2004	Sally Sharrock	23.5	flattish rock covered in sediment	R	1
300	Wreck of Cita, St Marys	Isles of Scilly	49 54.43N	006 16.40W	09/08/2006	Robin Smith	18-23	flattish rock and wreckage	R	4
301	Wreck of Cita, St Marys	Isles of Scilly	49 54.43N	006 16.40W	10/08/2006	Robin Smith	-		R	1
174	Dry Ledge, St. Martins	Isles of Scilly	49 55.51N	006 16.431W	14/09/2004	Chris Wood	21.5-23.5	flattish rock	O	8
175	Dry Ledge, St. Martins	Isles of Scilly	49 55.51N	006 16.431W	14/09/2004	Sally Sharrock	18.5-23-5	sloping/flattish rock covered in sediment	O	4
176	Trinity Rocks, St. Marys	Isles of Scilly	49 56.097N	006 15.183W	08/05/2005	Fiona Crouch	21.5	sloping rock	R	1
	<b>Isles of Scilly</b>						<b>16-29</b>			<b>72</b>
W1	Jose de Arambura, nr. Runnel Stone	Cornwall	50 01.90N	005 41.60W	29/07/2004	Brod Mason	27.5-31.5	wreck	N	
W19	Bucks Reef, Lamorna Cove	Cornwall	50 03.053N	005 34.426W	11/06/2005	Richard Stodder	18	rocky reef/ mixed seaweeds		
W2	Slaatero, off Lamorna Bay	Cornwall	50 01.90N	005 36.25W	15/08/2005	Brod Mason	54-57	flattish wreckage	A	
W3	Underwood, Penzance Bay	Cornwall	49 59.915N	005 31.557W	27/07/2004	Brod Mason	48-52	sloping/vertical; protected by wreckage	A	
W30	Mulberry Harbour, Mounts Bay	Cornwall	50 02.571N	005 30.644W	Nov-05	Simon Angrove	-	concrete wreckage	C	
W4	Alice Marie, Mount Bay, Penzance	Cornwall	50 06.114N	005 29.498W	11/06/2005	Richard Stodder	22	flattish wreckage	R	
W5	Kilmaho, Penzance	Cornwall	49 57.74N	005 27.21W	17/08/2005	Brod Mason	54.5-58.5	sloping/vertical; protected by wreckage	A	
W6	John R. Park, Penzance Bay	Cornwall	49 59.982N	005 24.610W	26/07/2004	Brod Mason	48-52	flattish wreckage	A	
W7	John R. Park, Penzance Bay	Cornwall	49 59.94N	005 24.59W	28/07/2004	Brod Mason	50	sloping/vertical; protected by wreckage	A	
W8	John R. Park, Penzance Bay	Cornwall	49 59.883N	005 24.649W	30/07/2004	Brod Mason	-	flattish wreckage	A	



W9	John R. Park, Penzance Bay	Cornwall	49 59.883N	005 24.649W	16/08/2005	Brod Mason	36.5-52.5	flattish wreckage	A	
	<b>Lands End Peninsula</b>						<b>18-58.5</b>			
177	Pinnacle near Dean Quarry, Manacles	Cornwall	50 02.67N	005 03.365W	14/08/2005	Vicki Billings	9-21	sloping rock and boulders	C	13
178	Pinnacle near Dean Quarry, Manacles	Cornwall	50 02.670N	005 03.365W	14/08/2005	Susan Howson	17-21.5	sloping/flattish rock and boulders	C	13
255	Raglans, Manacles	Cornwall	50 02.65N	005 02.50W	27/05/2006	Chris Wood	23	flattish rock	O	11
256	Maen Voes (south side), Manacles	Cornwall	50 02.70N	005 02.70W	28/05/2006	Chris Wood	15-20	flattish rock; boulders	C	8
179	Wreck of Mohegan, Manacles, Lizard	Cornwall	50 02.75N	005 02.68W	30/05/2005	Chris Wood	19.5-21.5	wreck	C	10
180	Wreck of Mohegan, Manacles, Lizard	Cornwall	50 02.75N	005 02.68W	30/05/2005	Graham Bates	17.5-18.5	wreck	C	10
181	Wreck of Mohegan, Manacles, Lizard	Cornwall	50 02.75N	005 02.68W	30/05/2005	Sam Cook	17.5-20	wreck	O	8
182	Wreck of Spiridian Vagliano, The Voices, Manacles	Cornwall	50 02.79N	005 02.71W	25/07/2004	Chris Wood	19-20	flattish rock	C	9
183	Wreck of Spiridian Vagliano, The Voices, Manacles	Cornwall	50 02.79N	005 02.71W	25/07/2004	Darren Murray	14-16	wreck	R	7
184	Woodfords Wall, Manacles	Cornwall	50 02.87N	005 02.41W	29/05/2005	Darren Murray	14-19	sloping rock	C	12
266	Woodfords Wall, Manacles	Cornwall	50 02.85N	005 02.40W	29/05/2006	Chris Wood	15.5-22+	sloping rock	C	10
265	Pen-Win, Manacles	Cornwall	50 02.948N	005 02.37W	29/05/2006	Chris Wood	12-26+	sloping, flattish rock	C	13
267	Pen-win, Manacles	Cornwall	50 02.95N	005 02.37W	04/08/2006	Vicki Billings	-	rocky reef		3
185	Vase Rock, Manacles	Cornwall	50 03.00N	005 02.30W	14/07/2004	Ruth Williams	14.5-19.5	sloping rock	O	5
186	Maen Garrick, Manacles	Cornwall	50 03.128N	005 02.794W	25/07/2004	Chris Wood	14-19	flattish rocks; boulders	A	9
187	Pencra Reef, Porthoustock	Cornwall	50 03.680N	005 03.121W	28/05/2005	Darren Murray	17-20	sloping/flattish rock covered in sediment	A	17
188	Pencra Reef, Porthoustock	Cornwall	50 03.680N	005 03.121W	28/05/2005	Joana Doyle	14-19	sloping/flattish rock covered in sediment	C	9
189	Pencra Reef, Porthoustock	Cornwall	50 03.680N	005 03.121W	29/05/2005	Joana Doyle	14-22	sloping/flattish rock covered in sediment		6
254	Pencra Reef, Porthoustock	Cornwall	50 03.680N	005 03.121W	27/05/2006	Chris Wood	20-22	flattish rock	A	9
268	Pencra, Manacles	Cornwall	50 03.68N	005 03.12W	05/08/2006	Vicki Billings	-	rocky reef		3
190	Wreck of Volnay, Porthallow Bay	Cornwall	50 04.38N	005 04.00W	28/05/2005	Graham Bates	16-18	wreck	C	6
191	Wreck of Volnay, Porthallow Bay	Cornwall	50 04.38N	005 04.00W	28/05/2005	Sam Cook	15-17	wreck	C	9
192	Wreck of Volnay, Porthallow Bay	Cornwall	50 94.38N	005 04.00W	28/05/2005	Darren Murray	15-17	wreck	C	9
W10	Liddy wreck, 10km S of Falmouth	Cornwall	50 00.70N	005 01.80W	10/08/2004	John Abbott	65-70	sloping or vertical wreckage	O	
W11	NK, 10km S of Falmouth	Cornwall	50 00.10N	005 00.80W	12/08/2004	John Abbott	65-75	sloping or vertical wreckage	O	

W31	Rinavia, Falmouth	Cornwall	50.112494	-5.002904	27/06/2006	Mark Milburn	48.5-54.5	wreckage with fishing nets	C	
W12	HMS Eskdale, 8km SE of Falmouth	Cornwall	50 04.20N	004 54.50W	09/08/2004	John Abbott	61-66	flattish wreckage	O	
	<b>Lizard and South Cornwall</b>						<b>9-75</b>			<b>209</b>
NT6/092	Udder Rock, West of Looe	Cornwall	50 16.97N	004 33.71W	27/05/2006	Luke Cox		flattish rocky reef	C	
193	Hatt Rock, South of Looe	Cornwall	50 10.523N	004 29.088W	12/06/2005	Chris Wood	26.5+	sloping, flattish rock	C	10
194	Rosehill, Whitsand Bay, Looe	Cornwall	50 19.85N	004 18.4W	10/07/2004	Chris Wood	22-26	wreck	A	8
269	Rosehill, Whitsand Bay, Looe	Cornwall	50 19.795N	004 18.556W	05/07/2006	Sally Sharrock	26-28	flattish wreckage	A	2
W13	Rosehill, Whitsand Bay	Cornwall	50 19.795N	004 18.556W	18/09/2005	Sally Sharrock	24.5-25.5	flattish wreckage	A	
W26	Rosehill, Whitsand Bay	Cornwall	50 19.795N	004 18.556W	06/04/2006	Sally Sharrock	24.5-28.5	wreck	A	
W27	Rosehill, Whitsand Bay	Cornwall	50 19.795N	004 18.556W	11/11/2006	Sally Sharrock	25.5-27.5	flattish wreckage and protected by wreck	A	
W32	Rosehill, Whitsand Bay	Cornwall	50 19.792N	004 18.527W	06/07/2006	Allen Murray	24-26	flattish wreckage	A	
W33	Rosehill, Whitsand Bay	Cornwall	50 19.792N	004 18.527W	06/07/2006	Ruth Swarbrick	17-26	flattish wreckage	A	
W34	Rosehill, Whitsand Bay	Cornwall	50 19.792N	004 18.527W	06/07/2006	Rosemarie Longfield	17-26	flattish wreckage	A	
W35	Rosehill, Whitsand Bay	Cornwall	50 19.792N	004 18.527W	06/07/2006	Pete Holt	26	flattish wreckage	A	
W36	Rosehill, Whitsand Bay	Cornwall	50 19.792N	004 18.527W	06/07/2006	Kristina Leake	24-28	flattish wreckage	A	
195	James Egan Layne, Whitsand Bay	Cornwall	50 19.609N	004 14.720W	12/06/2005	Sally Sharrock	16.5	wreck	C	14
196	James Egan Layne, Whitsand Bay	Cornwall	50 19.609N	004 14.720W	12/06/2005	Chris Wood	14.5-16.5	wreck	C	10
197	James Egan Layne, Whitsand Bay	Cornwall	50 19.609N	004 14.720W	12/06/2005	Fiona Ravenscroft	16.5-18.5	wreck	C	13
198	James Egan Layne, Whitsand Bay	Cornwall	50 19.609N	004 14.720W	03/09/2005	Chris Wood	14-19	wreck	C	9
199	James Egan Layne, Whitsand Bay	Cornwall	50 19.609N	004 14.720W	03/09/2005	Sally Sharrock	17-18	wreck	C	10
W28	James Eagan Layne, Whitsand Bay	Cornwall	50 19.607N	004 14.702W	12/11/2006	Sally Sharrock	11.5-19.5	flattish wreckage and protected by wreck	A	
200	Hand Deeps	Cornwall	50 12.630N	004 20.360W	11/06/2005	Chris Wood	22.5-26.5	sloping, flattish rock	C	17
201	Hand Deeps	Cornwall	50 12.630N	004 20.360W	11/06/2005	Christine Harling	20.5-22.5	sloping, flattish rock	O	10
202	West of Eddystone, Plymouth	Devon	50 11.058N	004 16.299W	11/06/2005	Christine Harling	22.5-24.5	sloping, flattish rock	C	10
203	West of Eddystone, Plymouth	Devon	50 11.058N	004 16.299W	11/06/2005	Chris Wood	24.5	flattish rock	A	14
292	Eddystone Pinnacle	Devon	50 10.836N	004 16.177W	23/07/2006	Sally Sharrock	18.5-28+	sloping rock	C	17
W29	Eddystone Reef, East side	Devon	50 10.85N	004 15.8W	27/10/2006	Sally Sharrock	22-32+	rocks/boulders in gullies	C	0
273	Twin Peaks, Eddystone, Plymouth	Devon	50 10.889N	004 15.474W	23/07/2006	Sally Sharrock	17-25.5	sloping/flattish rock and boulders	C	13

W24	Claverly, East of Eddystone, Plymouth	Devon	50 08.37N	004 10.21W	24/07/2006	Marko Hranilovich	60-63	sloping or vertical wreckage	A	
296	Sunset Site, Plymouth Drop Off	Devon	50 17.628N	004 08.750W	03/07/2006	Sally Sharrock	28-35.5	flattish rock	A	5
272	Scallop dredge site, Drop Off, S.of Plymouth	Devon	50 17.614N	004 08.622W	04/07/2006	Chris Wood	28.5-34.5	flattish rock	A	10
204	Elk Reef, Plymouth	Devon	50 18.425N	004 10.315W	07/09/2005	Sally Sharrock	-	wreck	C	19
205	Anchor chain site no. 56, Plymouth	Devon	50 18.286N	004 07.957W	20/07/2005	Sally Sharrock	18-20	sloping rock	C	14
206	Firestone Bay, Plymouth Sound	Devon	50 21.39N	004 09.36W	20/02/2005	Sally Sharrock	13	silty cliff face	R	1
207	Breakwater Fort, Plymouth Sound	Devon	50 20.03N	004 08.83W	04/09/2005	Chris Wood	3-8			17
208	Breakwater Fort, Plymouth Sound	Devon	50 20.03N	004 08.87W	29/06/2005	Elizabeth Morris	3.5-7	fort wall	C	3
270	Breakwater Fort, Plymouth Sound	Devon	50 20.083N	004 08.889W	09/07/2006	Sally Sharrock	4.5-8	side of Fort	C	14
271	Breakwater Fort, Plymouth Sound	Devon	50 20.083N	004 08.889W	10/07/2006	Sally Sharrock	4.5-8.5	fort	C	3
W25	Breakwater Fort, 20m SW of fort, Plymouth	Devon	50 20.083N	004 08.899W	09/07/2006	Chris Webb	5.5-6.5	flattish wreckage with rocks	A	0
209	Mewstone, Plymouth	Devon	50 18.132N	004 06.637W	03/08/2005	Sally Sharrock	15.5-18.5	sloping rock	C	19
210	Mewstone Ledges, Plymouth	Devon	50 18.132N	004 06.645W	03/08/2005	Deb Bauckham	10.5-21.5	sloping rock	C	14
211	Mewstone Ledges, Plymouth	Devon	50 18.079N	004 06.645W	03/08/2005	Amy Bugg	20.5-22.5	sloping rock and boulders covered in sediment	C	8
212	Mewstone Ledges, Plymouth	Devon	50 18.132N	004 06.637W	03/08/2005	Dominic Flint	15.5-18.5+	sloping rock	C	11
213	Mewstone Ledges, Plymouth	Devon	50 18.132N	004 06.637W	03/08/2005	Gemma Brice	13.5-19.5	sloping rock	C	4
214	Mewstone Ledges, Plymouth	Devon	50 18.132N	004 06.637W	03/09/2005	Chris Wood	20-22	flattish rock	C	10
215	Mewstone Ledges, Plymouth	Devon	50 18.132N	004 06.637W	03/05/2005	Sally Sharrock	21-21.5		A	9
216	Fairyland, Hilsea Point	Devon	50 17.65N	004 03.78W	11/07/2004	Chris Wood	17.5-20.5	sloping, flattish rock	C	11
217A	Hilsea Point Rock	Devon	50 17.32N	004.02.65W	11/07/2004	Chris Wood	-		C	0
217	Hilsea Point Rock	Devon	50 17.32N	004.02.65W	10/12/2005	Chris Wood	18-23	sloping rock	C	8
274	Stoke Point, Bigbury Bay	Devon	50 17.19N	004 01.26W	20/08/2006	Chris Wood	23.5-25.5	flattish rock	C	12
218	Reef W of Persier Wreck, Bigbury Bay	Devon	50 17.151N	003 58.130W	01/06/2005	Chris Wood	20-23	sloping, flattish rock	C	12
219	Reef W of Persier Wreck, Bigbury Bay	Devon	50 17.151N	003 58.130W	01/06/2005	Chris Webb	20-23	sloping, flattish rock	C	14
220	Reef W of Persier Wreck, Bigbury Bay	Devon	50 17.151N	003 58.130W	01/06/2005	Sally Sharrock	21-25	sloping rock	C	8
221	Persier Wreck, Bigbury Bay	Devon	50 17.097N	003 58.123W	01/06/2005	Chris Wood	26-27	wreck	A	10

222	Persier Wreck, Bigbury Bay	Devon	50 17.097N	003 58.123W	31/05/2005	Sally Sharrock	29-30.5	wreck	A	13
223	Persier Wreck, Bigbury Bay	Devon	50 17.097N	003 58.123W	31/05/2005	Chris Webb	24.5-25.5	wreck	A	11
224	Persier Wreck, Bigbury Bay	Devon	50 17.093N	003 58.129W	11/07/2005	Sally Sharrock	26	wreck	A	12
W20	Persier, Bigbury Bay	Devon	50 17.103N	003 58.121W	08/07/2006	Carole Tudor	22-25	flattish wreckage	A	
W21	Persier, Bigbury Bay	Devon	50 17.103N	003 58.121W	08/07/2006	Paula Jones	23-25	flattish wreckage/protected by wreck/rocks	C	
W22	Persier, Bigbury Bay	Devon	50 17.103N	003 58.121W	08/07/2006	John Dunford	22-26	flattish wreckage/protected by wreck/rocks	C	
225	SW of Wells Rock, Bigbury Bay	Devon	50 16.720N	003 56.308W	31/05/2005	Chris Wood	17-24	flattish rock covered in sediment	O	7
226	SW of Wells Rock, Bigbury Bay	Devon	50 16.659N	003 56.228W	31/05/2005	Chris Webb	23-24	flattish rock	R	7
W23	Totnes Castle, Bigbury Bay	Devon	50 15.375N	003 58.841W	08/07/2006	Allen Murray	36.5-39.5		N	
275	East Rutts, Bigbury Bay	Devon	50 13.450N	003 58.974W	17/07/2006	Sally Sharrock	20-24.5	sloping rock and gully/sediment	C	13
297	East Rutts, Bigbury Bay	Devon	50 13.450N	003 58.974W	19/08/2006	Chris Wood	24-26	sloping rock and gullies	O	8
227	Mewstone, Dartmouth	Devon	50 20.008N	003 31.887W	18/06/2005	Chris Webb	13-20	rock wall	O	13
228	Mewstone, Dartmouth	Devon	50 20.008N	003 31.887W	18/06/2005	Brod Mason	11-25.5	rock reef	O	8
229	Mewstone, Dartmouth	Devon	50 20.212N	003 31.148W	19/06/2005	Brod Mason	12-18	rock	O	12
230	Mewstone, Dartmouth	Devon	50 20.212N	003 31.148W	19/06/2005	Chris Webb	8.5-18.5	sloping rock	O	13
	<b>Looe and South Devon</b>						<b>3-63</b>			<b>510</b>
W14	Bretagne, E of Babbacombe	Devon	50 29.30N	003 22.42W	05/02/2005	Teign Diving Center	19-22		O	
W15	Galicia wreck, 2m NE Teignmouth	Devon	50 33.28N	003 26.408W	17/07/2005	Simon Coe	13.5-14	flattish wreckage	O	
W16	Galicia wreck, 2m NE Teignmouth	Devon	50 33.28N	003 26.408W	05/09/2004	Robin Smith	-		A	
231	Beer Home Ground, Lyme Bay	Devon	50 38.27N	003 02.79W	14/08/2004	Chris Wood	21-23	sloping rock	O	13
294	West Tennants Reef, Lyme Bay	Dorset	50 38.80N	002 57.78W	29/07/2006	Lin Baldock	20.5-22.5	flat and sediment covered rock	C	8
281	West Tennants, Lyme Bay	Dorset	50 38.80N	002 57.78W	29/07/2006	Nick Reed	19.5-22.5	sediment covered rock	C	13
282	West Tennants, Lyme Bay	Dorset	50 38.80N	002 57.78W	29/07/2006	R. G. Plowman	19.5-21.5	flattish rock covered in sediment	C	3
285	West Tennants, Lyme Bay, W. end	Dorset	50 38.575N	002 56.465W	18/08/2006	Lin Baldock	24.5-26.5	flattish rock	C	24
284	E. end of Pinhay Settle, Lyme Bay	Dorset	50 42.107N	002 56.344W	18/08/2006	Charlie Sandercock	18	boulders	R	1
276	Wreck of the Heroine, Lyme Regis	Dorset	50 40.498N	002 56.045W	28/07/2006	Jenny Mallinson	22.5	stable cobbles in sand	O	5
277	Wreck of the Heroine, Lyme Regis	Dorset	50 40.498N	002 56.045W	28/07/2006	Lin Baldock	21.5-22.5	boulders and cobbles covered in sediment	O	13
278	Wreck of the Heroine, Lyme Regis	Dorset	50 40.498N	002 56.045W	28/07/2006	Chris Webb	22-22.5	cobbles	O	3

283	East Tennants, Lyme Bay	Dorset	50 39.18N	002 52.49W	30/07/2006	Lin Baldock	22.5-24.5	boulders covered in sediment	C	22
232	Dogleg Reef, West Bay, Bridport	Dorset	50 40.76N	002 50.14W	15/08/2004	Chris Wood	21.5	flattish rock	A	7
279	Sunset Reef, Lyme Bay - off West Bay	Dorset	50 41.08N	002 48.03W	28/07/2006	Katharine Brice	22	flattish rock	C	2
280	Sunset Reef, Lyme Bay - off West Bay	Dorset	50 41.08N	002 48.03W	28/07/2006	Lin Baldock	14.5-19.5	sloping rock	C	7
293	Sunset Reef, Lyme Bay - off West Bay	Dorset	50 41.08N	002 48.03W	28/07/2006	Jenny Mallinson & Ken Collins	19.5-21.5	flat and sloping rock	O	9
233	Sawtooth Ledge, Lyme Bay	Dorset	50 40.865N	002 48.150W	15/08/2004	Chris Wood	16.5-20.5	sloping, flattish rock	O	10
234	Sawtooth Ledge, Lyme Bay	Dorset	50 41.214N	002 47.032W	02/09/2004	James Pike	23.5	boulders	C	10
W17	St. Dunstan wreck, Portland	Dorset	50 38.291N	002 42.062W	06/11/2004	Sarah Lee	29	fine sand and gravel, mud	R	
235	Pulpit Rock, Portland Bill	Dorset	50 30.90N	002 27.70W	22/05/2004	Mary Restell	21.5	boulders on gravel	R	1
	<b>East Devon and Lyme Bay</b>						<b>13.5-29</b>			<b>151</b>
W18	Alex van Opstel, Weymouth	Dorset	50 32.43N	002 15.99W	26/08/2005	Brod Mason	27	sloping or vertical wreckage	R	
236	Kimmeridge Caves	Dorset	50 35.25N	002 05.36W	31/07/2005	William Hewitt	16.5	large rock slabs	R	1
237	Kimmeridge Ledges, Chapman's Pool	Dorset	50 35.035N	002 05.145W	16/05/2004	William Hewitt	16	rock ledges	R	1
295	Marks Reef, Poole Bay	Dorset	50 41.025N	001 51.334W	02/08/2006	Jenny Mallinson	12	sloping rock	R	1
239	Southbourne Rough	Dorset	50 40.87N	001 47.85W	09/08/2003	Lucy Kay	-	fissured bedrock	R	1
238	Southbourne Rough	Dorset	50 40.981N	001 47.831W	May-04	Jenny Mallinson	-	low, flat reef edge	R	1
	<b>East Dorset</b>						<b>12-27</b>			<b>5</b>
						<b>Depth Range</b>	<b>3-75</b>		<b>Total</b>	<b>1378</b>

	number measured	Width mean	Width max	Width min	Height mean	Height max	Height min	Feeding %	Contracted %	% pink	% white	mean condition	Hyd/Brz turf	algae	sponge	eggcases	soft coral	other living	fishing line	other human	fan with seaslug eggs	fans with seaslug adults	fans with either	extra fans counted	total counted	total with anemones	max anemones per fan
Pembrokeshire	62	28.0	70	1	24.1	50	3	70	30	98	2	3.9	18	12	1	12	1	1	2	0	0	0	0	0	62	0	0
Lundy	189	26.6	80	1	23.0	65	4	51	49	99.4	0.6	3	91	10	1	11	9	11	7	0	8	10	12	0	189	0	0
North Cornwall	180	24.1	56	5	24.8	52	5	54	46	100	0	4.1	24	45	2	9	0	6	4	3	25	43	44	0	180	1	1
Isles of Scilly	72	17.6	53	4	16.1	34	3	76	24	82	18	4.4	11	14	2	7	1	1	0	0	3	10	12	0	72	1	9
Lands End Peninsula																					44	12	2125	2125	15	40	
Lizard and South Cornwall	209	16.4	42	1	19.1	33	5	65	35	99.5	0.5	4	21	22	7	0	2	28	0	1	36	32	43	48	257	4	20
Looe and South Devon	510	18.5	58	0.5	20.0	50	2	49	51	99.2	0.8	3.9	116	46	14	18	12	28	7	0	41	117	122	1057	1567	36	35
East Devon and Lyme Bay	151	19.0	70	0.5	18.5	50	3	81	19	100	0	3.7	12	3	0	8	4	14	3	1	10	11	14	80	231	0	0
East Dorset	5	21.4	45	5	19.2	30	5	100	0	100	0	5	0	2	0	3	1	1	1	0	0	0	0	1	6	0	0
	1378	21.5	42.0	0.5	20.6	65.0	2.0					4.0	293	154	27	68	30	90	24	5	167	235	247	3311	4689	57	40