



Cornwall

Pink Sea Fan Survey Report 2005-2008



Supported and funded by:



1. INTRODUCTION

This report presents the findings of a study (carried out between 2005-2008) aimed at extending the knowledge base of distribution and health of the pink sea fan, *Eunicella verrucosa*, around the Cornish coast.

The Pink Sea Fan (PSF) is one of only two gorgonian corals found in UK waters, and as such is a Biodiversity Action Plan (BAP) species and is also one of the very few marine species which is protected under the Wildlife and Countryside Act 1981. Although nationally rare, PSFs are widely distributed in south-west Britain and are associated with rocky seabed habitats in depths down to 60m, usually on reef structures or stable boulders, and therefore ideally suited to dive surveys.

Cornwall Wildlife Trust, with funding from the SITA Trust, has completed its monitoring and mapping project recording over 1400 pink sea fans. Two additional BAP species associated with PSFs were included in surveys, the sea fan anemone (*Amphianthus dohrnii*) and the PSF nudibranch (*T. nilsohderni*).

Identifying the threats posed to PSFs was a major part of this project, both due to anthropogenic activity and changes in natural environmental conditions. However the majority identified during the project were physical, due to the brittle upright nature of PSF colonies.

2. Aims:

This project set out to identify and survey sites with PSFs populations in areas previously un-explored to determine the distribution and condition of PSF populations around the Cornish coast.

Four areas were identified as priorities for carrying out surveys: The Manacles, off the east coast of the Lizard Peninsula, Dodman Point to Gorran Haven, St Agnes and Newquay Bay. A Map showing the location of these survey sites is included in this report (p14).

The project aims to map PSF distribution and use that data to:

1. Measure the need for conservation by identifying and measuring activities/conditions causing threat to PSF populations.
2. Identifying sites of specific importance/interest in need of protection.
3. Utilising GIS software to highlight sites of importance and share this data with relevant conservation bodies.
4. Creating a photo ID catalogue

3. Methodology

All data were collected by volunteer divers using the Marine Conservation Society (MCS)/ Seasearch recording methodology which has been used to survey PSF populations at numerous sites around the UK. Training events were conducted for volunteers and data were checked against records collected by instructors.

This methodology asked and trained survey divers to collect a range of measurements including:

- Height
- Width
- Condition as a rating from 1-5
- Presence of and abundance of nudibranchs, nudibranch eggs and sea fan anemones.
- Evidence of any anthropogenic damage, such as monofilament fishing line, or litter.

Sea fan recording forms (which includes all the data above) were used for all shallower dive sites (<30m) and a new form was introduced for wreck diving. This wreck diving form allowed divers to record the presence of PSFs without having to go to the length of measuring individual fans, allowing us to receive data from sites as deep as 70m. Wrecks are an ideal solid substrate for PSFs and this proven a valuable recording system (see table 1).

Photographs were taken of as many PSFs as possible, depending on equipment and conditions, to create a photo catalogue of PSFs at sites of interest, so that individual fans can be revisited and recorded over time.

Identification of damage to PSFs was purely visual and as such there is very limited information of indirect threats such as fluctuations in water quality and temperature.

3.1 Survey Sites

In total 878 individual PSFs were recorded using the detailed PSF recording form, and a further 204 (approximately) were recorded using wreck forms, totalling 1081 during the 3 year project.

Within the four broad survey areas, 24 sites around Cornwall and the Isles of Scilly were surveyed; including nine sites on the north coast, 14 on the south coast. An additional site on the Isles of Scilly was also surveyed (Plates 1 and 2). Numbers of sea fans recorded increase incrementally as the project went on with 113 records in 2005, 200 in 2007 and 286 in 2008.

Legend

- Dive sites visited during this project
- ▲ Existing PSF records

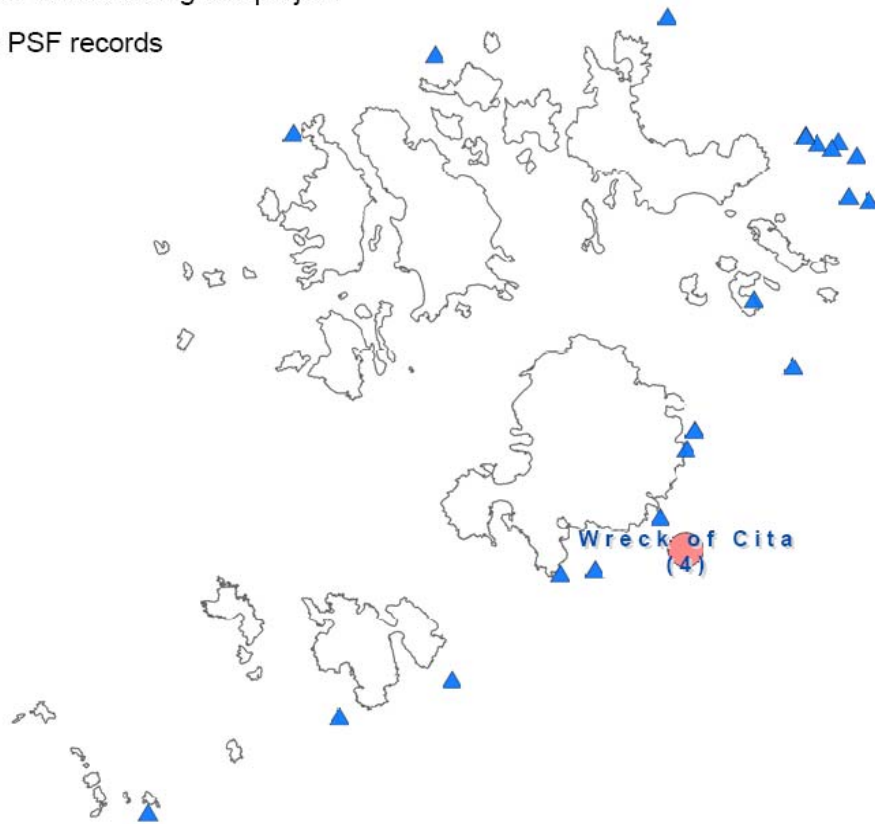


Plate 1: Distribution of PSF recorded in the Isles of Scilly

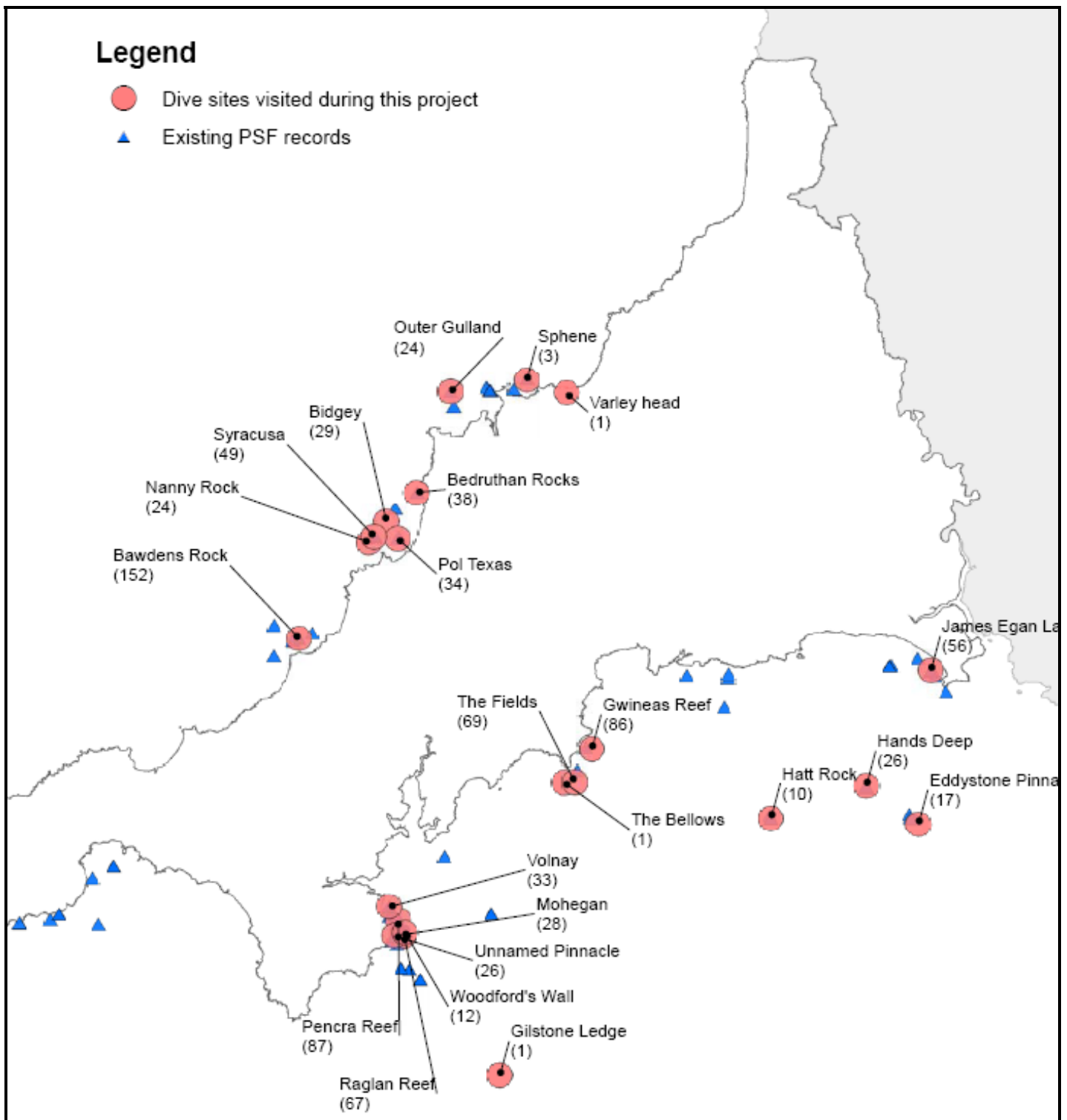


Plate 2: Map of dive sites visited in Cornwall

Pink sea fans (as shown in plate 2) tend to occur in exposed locations and are generally not found within sheltered and enclosed bays, but rather on more exposed rocky outcrops. As shown PSFs have been recorded on both coasts but there are obvious areas lacking data, mostly in the far west of the county. This lack of data is due to the difficulty in accessing this area and efforts must be made to identify and survey sites in this region to gain a better overall view of distribution.

4 Results

Figure 1 shows very clear variation between sites, with some such as Bawdens Rock having extremely large populations and others like The Bellows or Varley Head with very small populations.

The number of fans recorded at any one site is relative to several factors including the number of dives completed at each site, the number of divers and the accessibility of the site. However the data collected still give a clear indication of the importance of sites for conservation, as very small numbers mean even though the site was visited by a dive group very few PSFs were encountered.

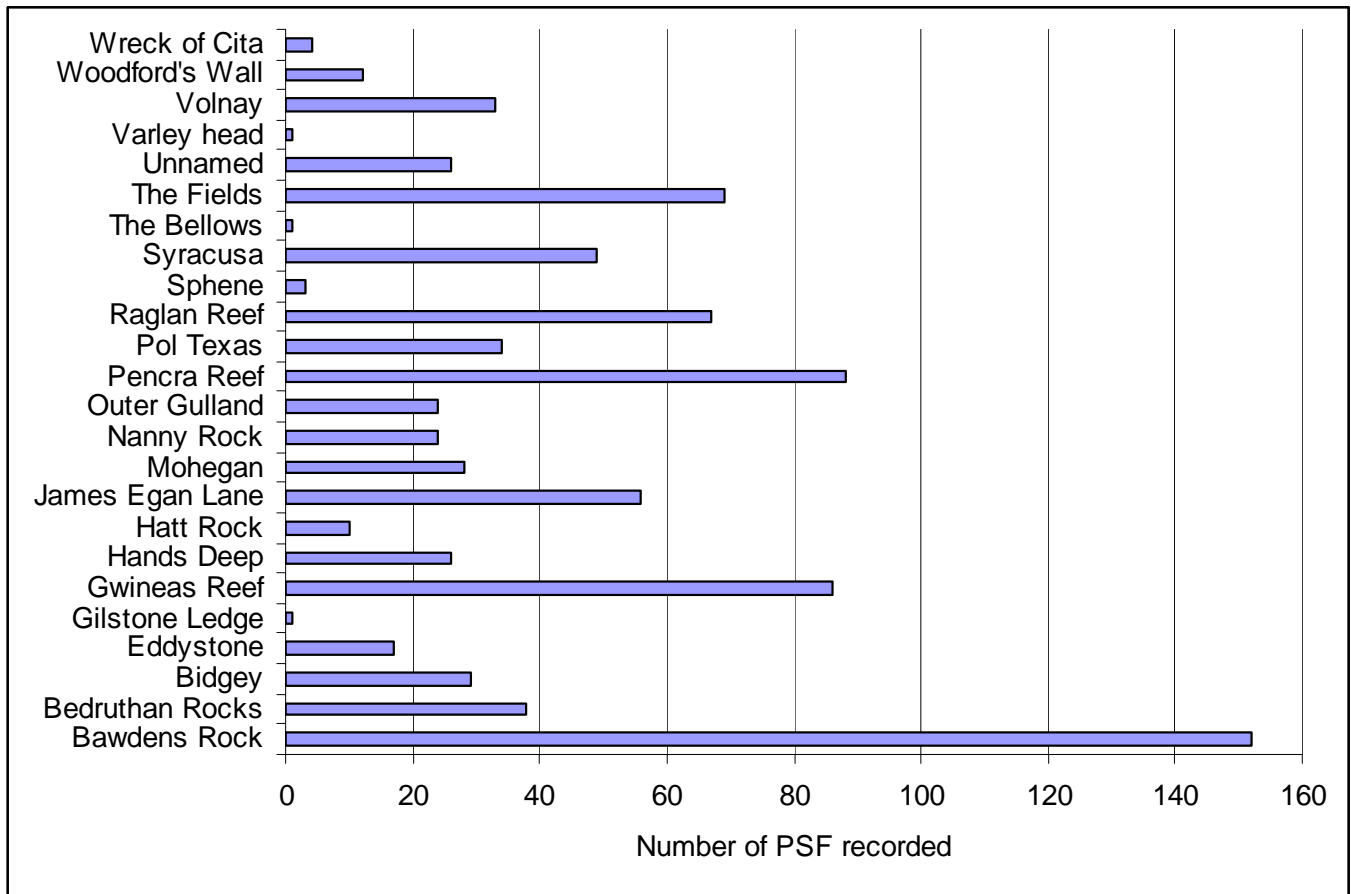


Figure 1: Number of PSFs at each site

4.1 Depth

The depth at which fans were recorded (Figure 2) showed one unexpected sites result, Varley Head where PSFs were recorded at 8m depth, whereas all the other sites were in more than 15m of water. Data presented in Figure 2 is limited to the recreational dive limit of 30m, the wreck forms (Table 1) on the other hand are not subject to this limit and (Table 1) show PSFs recorded at depths up to 75m on Liddy Wreck.

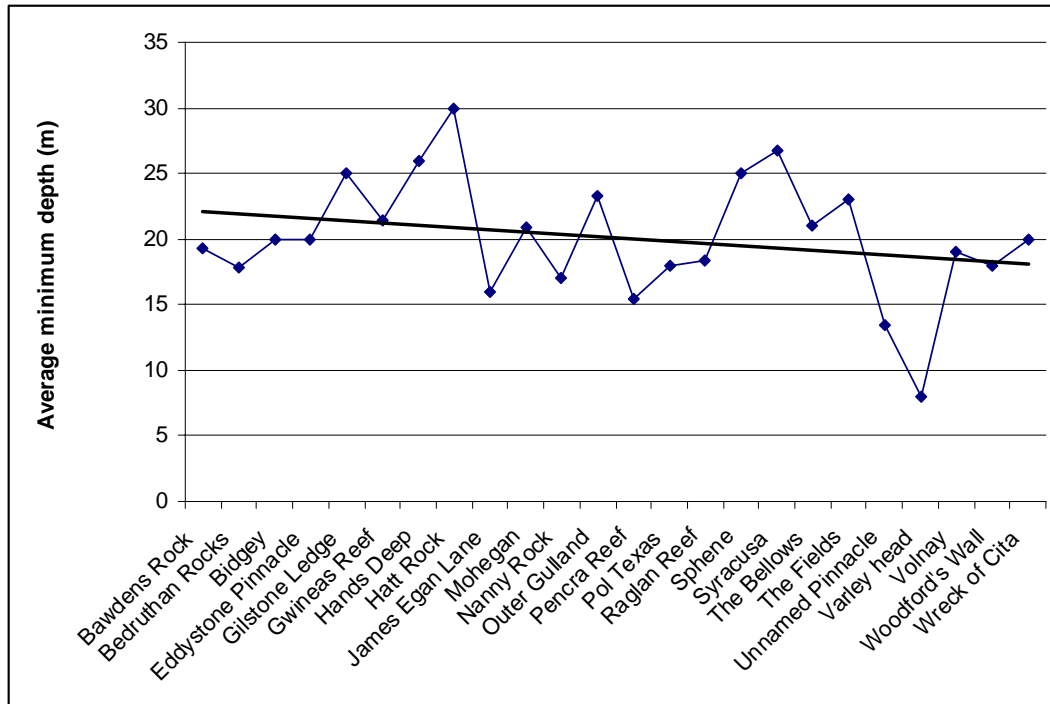


Figure 2: minimum depth (m)

4.2 Size

The size of individual fans is indicative of two things; one the physical energy of a site which is believed to be a controlling factor to the size of PSFs as they are brittle upright structures. Secondly, as filter feeding organisms, size relates to the availability of food and therefore flow rates of water and water quality. The largest fans were found at Bedruthan rock and Nanny Rock with an area of 750cm². One explanation of this is that smaller fans are likely to be found in areas with less food availability and therefore slower growth rates. The only way to confirm this is to sample the fans and check the age using the growth rings present in PSF branches.

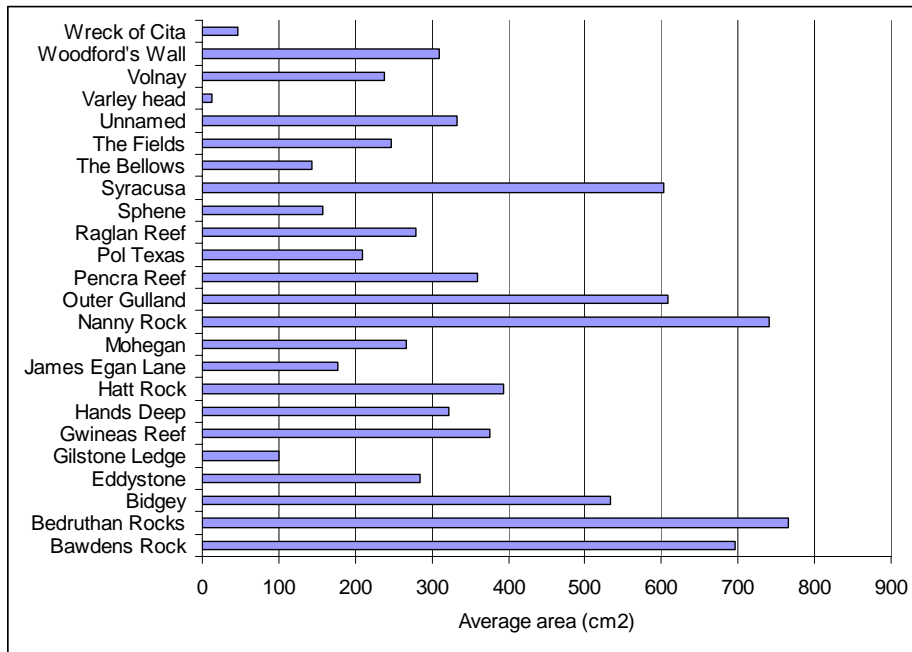


Figure 3: Average size of PSF area cm²

4.3 Condition rating

Conditions of the PSFs seen were recorded on a scale of 1-5, 1 being completely fouled and broken and 5 being un-fouled and intact. The average condition (Fig. 4) at each site shows that the lowest value recorded was 3 at Gilstone Ledge. All other sites had higher values, with The Bellows and Wreck of the Cita showing an average condition rating of 5. This shows the PSFs recorded during this survey were in good condition and showed little evidence of anthropogenic impacts.

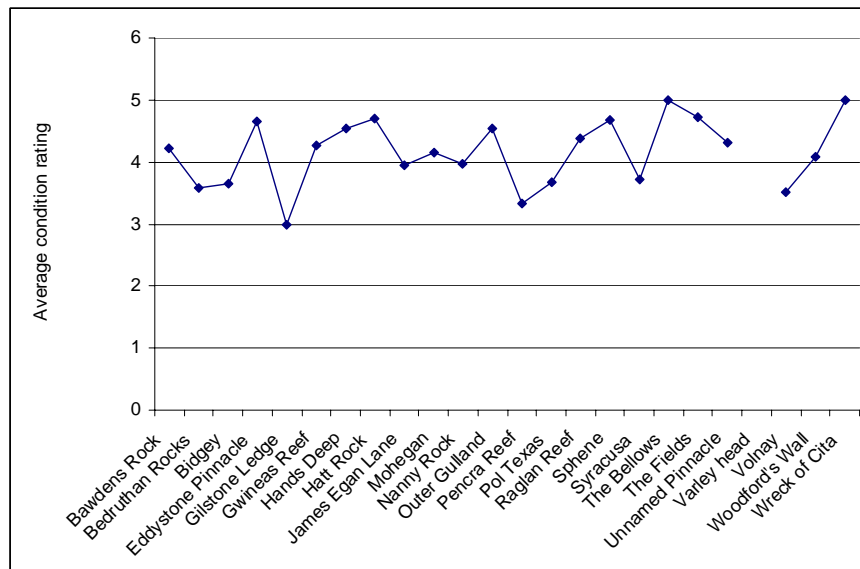


Figure 4: Average condition rating of PSF recorded.

The relationship between condition and size of fans is shown below in Figure 5, and surprisingly shows no clear correlation. Therefore purely rating a site by the size and number of fans recorded would not give a clear indication of the quality of the site.

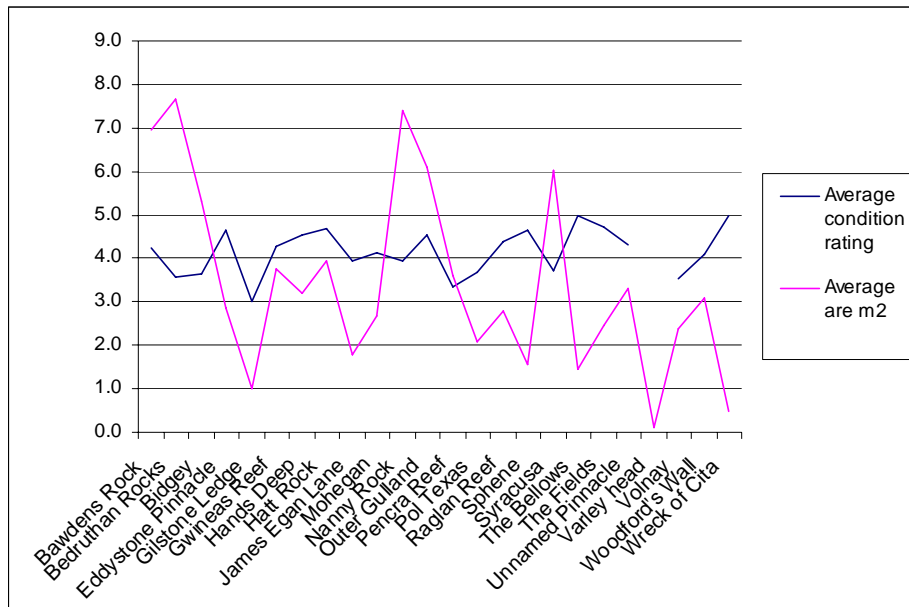


Figure 5: Average condition ratings plotted against average area m²

4.4 Wreck recording forms data

The data from the wreck recording forms (Table 1) show that PSFs were recorded at depths up to 75m, and that some wrecks have very large populations with the Rosehill wreck having 100+ fans recorded. This data gives a clear indication that wrecks are ideal structures for PSF colonisation; providing a hard substrate to colonise where there would otherwise be no suitable substrate. Wrecks also offer some protection from fishing activities as in general the only fishing activity around wrecks is potting due to mobile gear running the risk of entanglement in the wreck. In preventing such activities these wrecks often become a haven for vulnerable species such as the PSF.

| Site Name | Location | Numbers of Fans | Depth | Habitat | Density | Date |
|------------------|---------------------------|-----------------|---------|---|-------------|------------|
| Alice Marie | Mounts Bay, Penzance | 1 | 24m | Flattish Wreck | Rare | 06/11/2005 |
| Bucks Reef | | 1 | 22m | Rocky reef, mixed seaweeds | Rare | 06/11/2005 |
| Unnamed wreck | 10 km south of Falmouth | 25 | 70-80m | Sloping/vertical wreckage | Occasional | 08/12/2004 |
| Liddy Wreck | 10 km south of Falmouth | 15 | 70-75m | Sloping/vertical wreckage | Occasional | 08/10/2004 |
| HMS Eksdale | 8 km SE of Falmouth | 8 | 65-70m | Flattish Wreck | Occasional | 08/09/2004 |
| Low Lee Ledges | Mounts Bay, Penzance | 1 | 17m | Sloping rock | Rare | |
| Rosehill | Whitsand Bay | present | 27-29.1 | Flattish wreckage | Forest | 18/09/2005 |
| The Sphene | Port Quin, North Cornwall | present | 13-27m | Flattish Wreckage/ sloping/ protected by wreckage | Occasaional | 14/07/2005 |
| Rosehill | Whitsand Bay | 100+ | 26-30m | Flattish Wreck | Forest | 06/07/2006 |
| Udder Rock | Near Looe | 35-40 | 24m | rocky reef | Common | 27/05/2006 |
| Mulberry Harbour | Mounts Bay, Penzance | present | 40-45m | | common | 00/11/2006 |
| Wreck of | Scilly | 2 | 15-25m | | rare | 06/08/2006 |

| | | | | | | |
|-------------------|------------------------------|---------|--------|------------------------------|--------|------------|
| Maria | | | | | | |
| Wreck of Plumpton | Scilly | 100+ | | | forest | 07/08/2006 |
| Wreck of Cita | Scilly | 1 | | | rare | 10/08/2006 |
| Rinovia wreck | Falmouth nr St Anthony Light | present | 50-56m | | common | 27/06/2006 |
| Wreck of Cita | Scilly | 4 | 20-25m | flattish wreck/flattish rock | rare | 09/08/2006 |
| Hatt Rock | | present | 35-40m | | | |
| Newland Island | Polzeath Bay | 6 | 30m | Rocky Reef | Rare | 02/09/2007 |
| SS Germaine | Port Gaverne | present | 43m | Flattish wreck | Common | 15/06/2008 |

Table 1: Wreck recording form data

4.5 Nudibranchs (*T. nilsohdneri*) and nudibranch egg records:

Nudibranchs and their eggs were recorded as present or absent on each fan, however they were extremely rare on most sites. Figure 6 below shows some sites stand out as being of specific importance to Nudibranch populations such as Bawdens Rock, Pencra Reef and Raglan Reef.

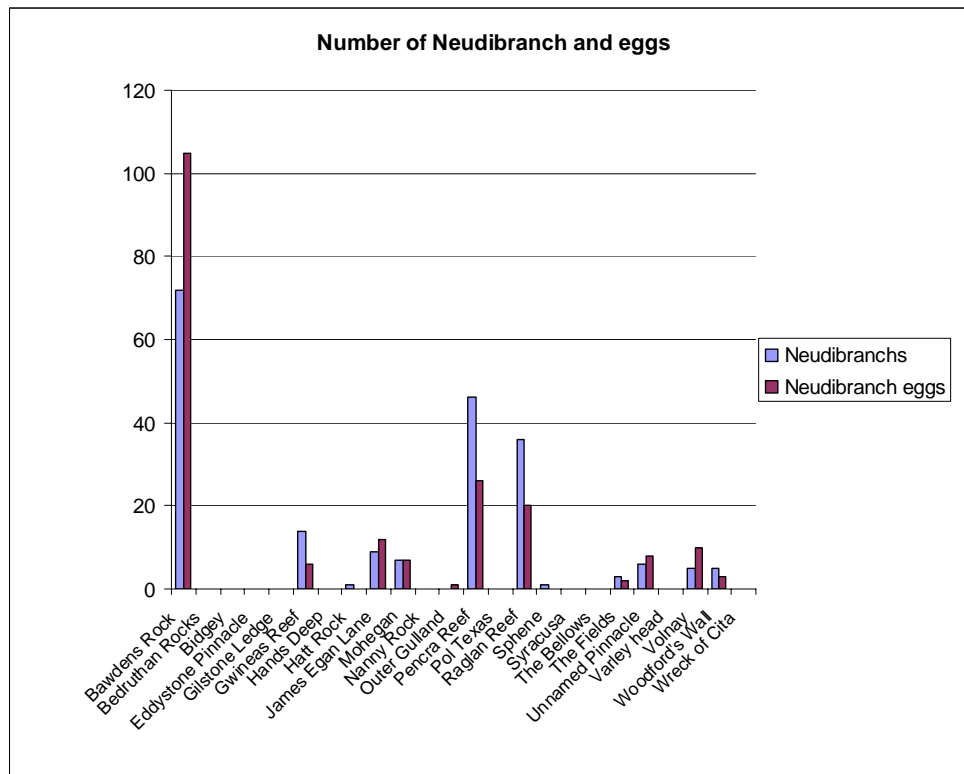


Figure 5: Number of Nudibranchs and Nudibranch eggs recorded

Due to the rarity of nudibranchs in this survey it is difficult to infer any detailed conclusions except that they are a rare species and three sites have been highlighted as important for this species group.

4.6 Pink Seafan Anemones (*Amphianthus dohrnii*)

Data collected for seafan anemones were so varied that it is very difficult to infer any conclusions from the results. Anemones were recorded at six of the sites surveyed and as such these six sites are of importance to this BAP species. However, with only nine anemones recorded in a total of 878 PSF records, it is very difficult to draw any conclusions from this data except that they are an extremely rare species.

4.7 Comparison of North and South coast data

When looking at the difference between the north and south coast results, there are surprisingly few variations. The major differences shown below in Figure 6 are the condition rating and the average size. Figure 6 shows that the North coast PSFs are almost twice the size on average than those found on the South coast. This is a surprising result as the North coast is subject to much more wave energy which would be a potential controlling factor for size of fans. However in general on the North coast, these large fans were recorded in relatively sheltered areas of reef such as in cracks and crevices in the rock. This suggests that growth rates are higher on the north coast, probably due to the higher concentrations of plankton in the water. Condition ratings were very similar with only an average difference of 0.3 between the two coasts, again showing condition is not relative to size and therefore dispelling the idea that size of a fan is indicative of health.

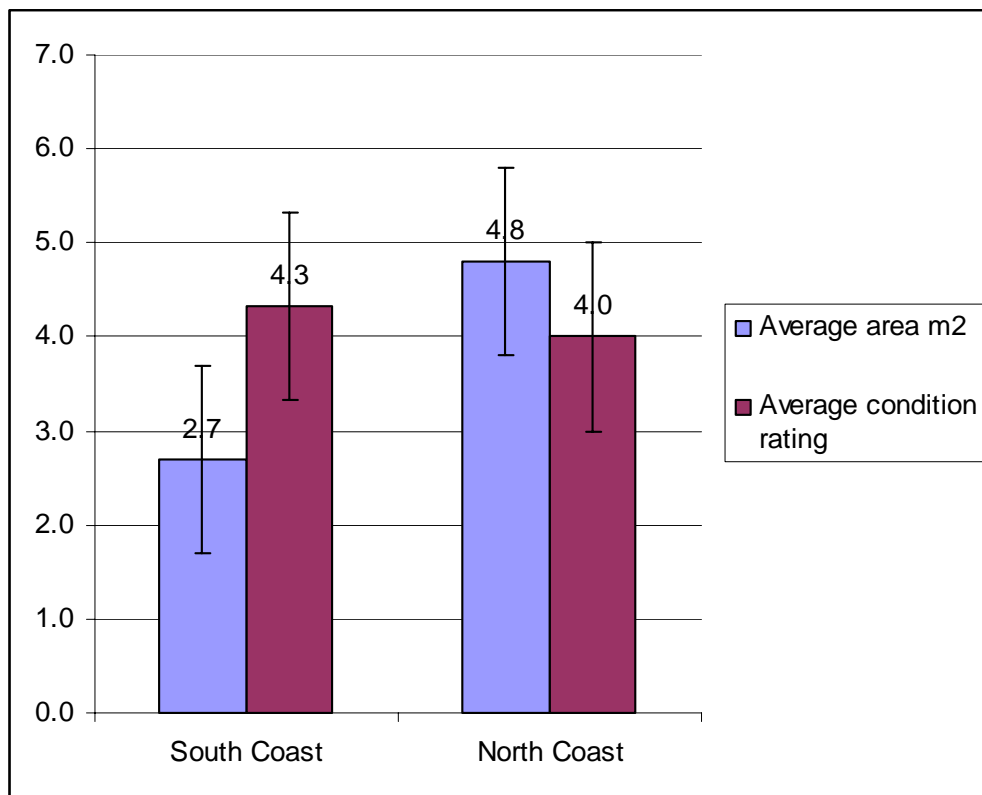


Figure 6: Comparison of average condition and average size of PSF between the north and south coast records.

5 Discussion

Data collected show the importance of the Cornish coast for PSFs and represents encouraging figures for the health and density of populations in the county. The fact that some of the largest and most numerous fans were found at Bawdens Rock, coupled with the obvious population of Nudibranchs, makes this a very significant site in Cornwall.

This project has succeeded in furthering the known distribution of PSFs around our coast but has also highlighted gaps in our knowledge and some limitations of the project, such as the fact the majority of the sites were in well known dive sites due to the difficulty of accessing new sites. This could be overcome by taking more exploratory dives however surveys will still be limited to the conditions and accessibility of sites. The difficulty in diver survey techniques are highlighted by the limited number of days that most sites on the North coast are accessible, and the inaccessibility of the far western part of the coast. Therefore it is very likely that there are many more PSF populations around the coast yet to be identified and surveyed.

This study resulted in PSFs being recorded in sites that would not have been predicted, and in conclusion to this it would seem that we still have further work to fully understand PSF populations around Cornwall. Condition ratings of PSFs show very little evidence of anthropogenic damage. However this should be treated cautiously as although the sites surveyed may suggest this, in reality the anthropogenic impact in other areas may be significant and simply not reported. As a diver survey the majority of the sites visited were rocky reefs which are not subject to mobile gear fishing and dredging activities. It may simply be that we have visited areas not affected by anthropogenic activity due to their rocky reef nature. This puts the sites we have recorded into perspective as of great importance to PSF conservation and every effort should be made to maintain and protect these sites.

Data collected on nudibranch and anemones numbers were useful in highlighting the sites that are of importance to these species, however due to their rarity this tells us very little of their life cycle. Further work is needed on the sites these species were found at to analyse the state of their population and the threats faced by them.

6. Conclusions

1. A healthy and larger than expected population of PSFs was recorded around the coast
2. There is little evidence of anthropogenic impacts, though this is a major problem in other regions. This, however, is purely indicative of the sites visited and not those which may be affected by more physical damage such as dredging or intensive potting.
3. Fans surprisingly considering the higher wave energy, grow larger on the North coast.
4. Distribution is more wide spread and in shallower depths than expected.
5. Several key physical threats were identified early on in the project:
 - Fin strike from divers
 - Potting and fishing activities (entanglement)
 - Anchoring and net setting
 - Dredging (direct damage and smothering)

7. Recommendations

1. Bawdens Rock should be recognised and protected as a significant PSF population. This would not necessarily entail an MPA or any formal protection rather continued monitoring to maintain evidence of PSF health and an action plan if there is a change in population size and health.
2. Further work to identify damage to PSF populations and their recovery rate from that damage should be undertaken. We aim to undertake a survey project in the Fal SAC to measure the recovery of PSF populations since the ban on mobile gear in the SAC.
3. Awareness should be raised about the importance of the Cornish coast for the PSF, and the general public should be made aware of the importance of their coastline.
4. Informed decisions on placing MPAs should include the data in this report to make sure that the PSF is protected when the MPAs are decided upon.

8. Acknowledgments

Our thanks go to every diver who sent in a PSF form and all our Seasearch divers in Cornwall. We would also like to thank and acknowledge the SITA Trust for funding this project, as well as Seasearch for all its support.