Benthic Habitat Mapping along St Mawes Bank

Group 3
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Date/time: 25/06/2013 08:42 – 10:52 UTC
Weather: Overcast, dry

Background

The Fal estuary is the third largest natural harbour in the world and has been economically fundamental to many industries throughout history (Pirrie *et al.* 1997). In recent years, primarily due to the cessation of mining within Cornwall, there has been a major shift towards tourism as a driver of further economic development.

The benthic environment within the estuary is ecologically rich, containing nationally important Maerl beds comprised of two individual species, *Phymatolithon calcareum* and *Lithothamnion corallioides* (Hall-Spencer *et al.* 2010). In addition, the Fal supports extensive seagrass (*Zostera*) meadows. These species provide specific niches which support a high biodiversity. The Fal estuary is therefore of high ecological importance within the United Kingdom and is a designated Special Area of Conservation (SAC) (Wilson *et al.* 2004). As such, activities in the area are highly restricted and this has resulted in conflicting views between those looking to develop the harbour and those with conservation interests.

Aim

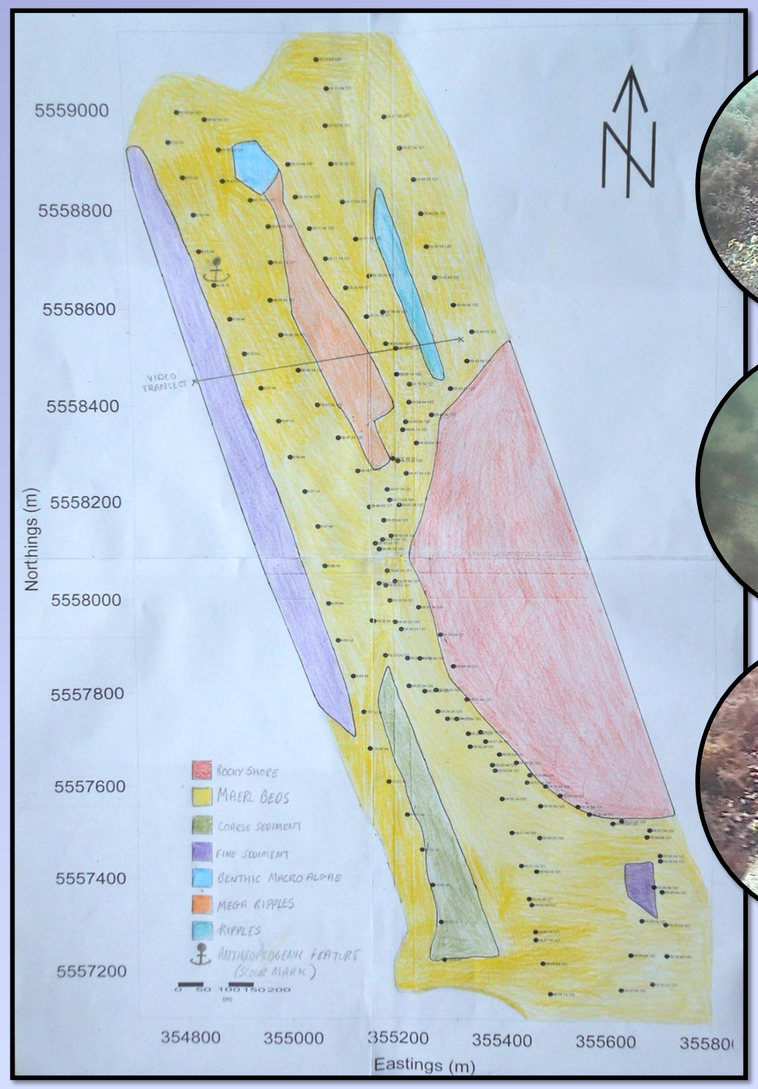
To carry out a prospecting survey at St Mawes Bank, in order to provide an indication of the physical and biological parameters of the benthic habitats in this area.

Methodology

The study area covers an area within the eastern Carrick Roads along St Mawes Bank (Fig. 1) and consists of 5 adjacent transects at approximately 100m intervals.

•A tow-fish mounted side-scan sonar provided bathymetric imaging of the study area. A high resolution print out of this data was interpreted to allow key zones and features to be defined. These were then superimposed onto the track-lines of the boat.

•Drop down video camera towed on a sledge, provided ground-truthing to the data obtained from the side-scan sonar. This was carried out on a separate transect running perpendicular to the side scan transects, in order to obtain a better representation of the entire data set.



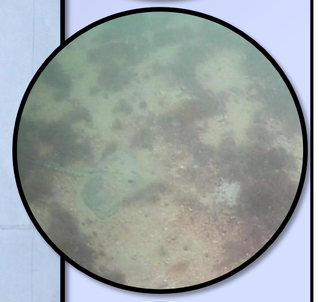


Fig. 1 (above) Habitat map of the survey area, showing distinct zones, features and video track path

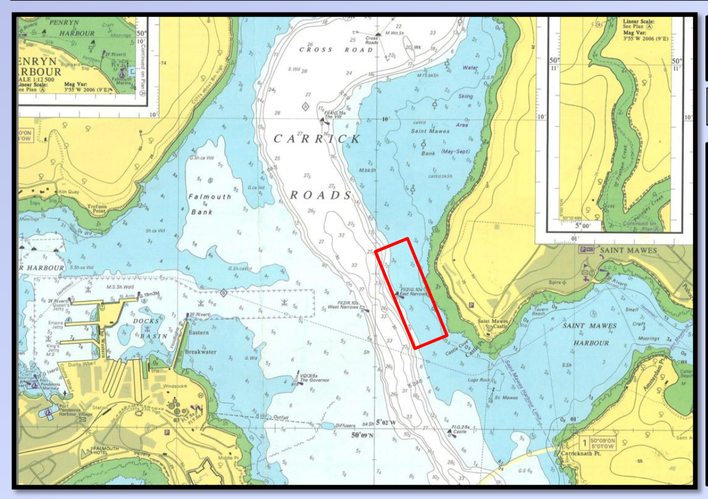


Fig. 2 (left) Map of Carrick Roads. The study site is located within the red box.

Features

Several features were observed across the study area, comprising ripples and signs of anthropogenic impact. Ripples at 50º09.678'N 005º01.921' W were found to have a mean height of 0.067m whilst at 50º09.776'N 005º01.695'W the mean height was found to be 0.036m.

Mega ripples were observed at 50º09.930'N 005º02.072'W – these had a mean height and depth of 0.1226m and 0.72m respectively. Another interesting feature observed during the benthic habitat mapping was an anchor scour mark. This was observed at 50º09.798'N 005º02.0800'W and had a depth of 1.56m and height of 0.265m.

Video Track

The majority of video track is through a Maerl bed, a mixture of live and dead calcareous algae. Blunden *et al.* (1981) states that *Lithothamnion corraloides* dominates in waters shallower than 6m, with *Phymatolithon calcareum* dominating deeper than 6m. Due to the water depth within the sampled area (<6m), it is therefore likely that *L. corraloides* would exclude *P. calcareum*. The Maerl is interlaced with various species of macroalgae - the most prominent being the rhodophyte (*Ceramium rubrum)*. Other species such as *Palmaria fascia*, *Palmaria palmata* and *Dilsea carnosa* are also present, but to a lesser extent. Two species of fan worm were identified (*Serpula vermicularis* and *Myxicola infundibulu)*.There were also roaming echinoderm predators such as Spiny Sea Star (*Marthasterias glacialis*) and Common Sea Star (*Asterias rubens*). Two crab species were also observed; a large Spiny Spider Crab (*Maja squinado*) and a Harbor Crab (*Liocarcinus depurator*). A Thornback Ray (*Raja clavata*) was also identified near the edge of the maerl bed. The screenshots to the left show various images from the video obtained during this process.

Limitations

As the sampling site is located within an SAC, we were unable to ground truth using grab sampling. Interpretation of the video transect is limited to that immediate area, and is therefore not representative of the entire survey area. This transect did not cover all the different features so not all can be confirmed. Some points were also not covered by the sidescan and thus are inferred if covered on both sides.

Sidescan interpretation

The sidescan data allowed us to determine different regions by observing variation in colour shades and recognising features characteristic of specific bedforms. The majority of the transect area was fairly uniform, and this area was identified as a Maerl bed upon cross reference with the video transect. Another significant feature is the rocky headland shown in red on Figure 2. Coarse and fine sediment types were identified according to the degree of backscatter on the sidescan data, with coarser sediment leading to greater backscatter. Benthic macroalgae was identified from the delineated sidescan and confirmed by the video. Finally, we carried out calculations allowing us to class bedforms according to their heights and depths.

References:

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