

Group 11 – Habitat Mapping of the Fal Estuary

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Aim: To analyse the seabed and biodiversity outside the Special Area of Conservation at Zone Point in the Fal estuary.

Introduction

Habitat mapping is important in order to determine and maintain the biodiversity of the sea floor, which in turn is vital for stability within the complex food web of the coastal waters in the south west.

Site Background

There is exposed and moderately exposed bedrock with seaweeds around Carricknath Point¹. We are therefore expecting to find a similar seabed around Zone Point. There may also be some sublittoral muddy gravel.

Meta Data

Date: 27.06.15
Time: 08:15 AST – 09:05 AST
Weather: cloud cover 0/8.
South westerly wind at 9mph.
Vessel: MTS Xplorer.

Air temperature: 15.8°C
Tide: Low water - 08:17 UTC (1.7 m)
High water – 14:17 UTC (4.2 m)
Neap tides.
Sea state: Calm

Side Scan Method

To understand the formation of the estuary bed we used side scan sonar apparatus which measured the rate of back scatter returning from the seabed, from this we can see any interesting seabed formations and infer geological and sedimentary characteristics of the sampled area.

Four 1 kilometre transects each 100 metres apart were set. The location of the first transect was deduced from waypoint 177 (50° 08.582 N, 004° 59.990 W) and waypoint 175 (50° 08.141 N, 005° 00.806). The subsurface dual frequency analogue side scan sonar was towed a few metres behind the vessel so that it was clear of the immediate wash created (the difference between the location of the sonar and the vessel has been corrected). The sonar was operating at a frequency of 100 kHz and was pinged at the seabed at set intervals, the returning back scatter was detected by the instrument. The rate of the backscatter is controlled by the sedimentology and the geomorphology of the estuary bed. The data was then recorded on a paper trace which was printed out allowing analysis.

Fig. 2. Paper trace of the four side scan transects, L_001 – L_004

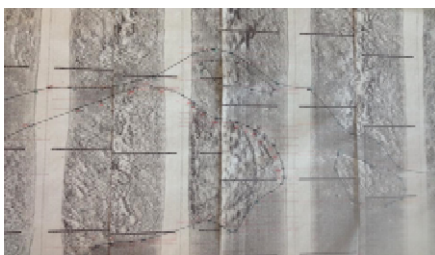


Fig. 3. Habitat map of the surveyed seabed



Conclusion

The use of high resolution side-scan sonar technology allows us to accurately image the seabed in the survey area. The use of ground truthing camera techniques allows us to confirm what the sonar trace infers and allows for a holistic insight into the biology of the area. The prevalent hard substratum prevented the use of grabs and dredges as alternative ground truthing methods and the limited field of view could have been supplemented by the use of alternative techniques like diver surveys.

The seabed type in this area is dominated by exposed/moderately exposed bedrock dominated by a *L. digitata* forest interspersed with small patches of mixed soft sediments. As such this area is expected to support a highly diverse community and represents an important nursery area for juvenile fish as confirmed in the video surveys.

References

¹ Mclod CR, Yao *et al.*, *The Habitats Directive: Selection of Special Areas of Conservation in the UK*, 2nd Edition, jncc.gov.uk/sacselection

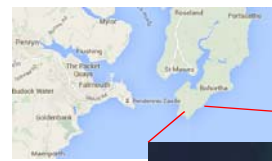
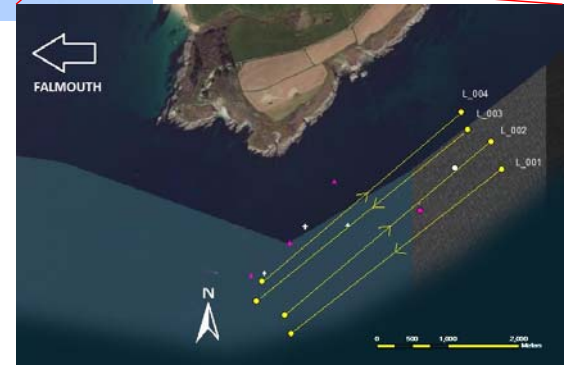


Fig. 1. Map showing the location of the four transect lines (yellow). The start (pink) and end (white) location of the four videos are represented by a circle, triangle, cross and diamond respectively.



Ground Truthing

From studying the backscatter received by the side scan sonar, on each transect we located an area of special interest, for example; a rock formation, a kelp forest or the point of transition from rocky reef to soft sediment. The location of the feature was put into the navigation system of the vessel, once there the camera was lowered into the water until it was approximately one metre above the sea bed. The vessel was left to drift, producing a video stream of the benthic habitat allowing further analysis of the flora and fauna present.

We were unable to take grab samples due to the rocky substrata.

Video Findings

Within all four videos the dominant habitat type was **kelp forest on rocky substrata**.

Dominant macroalgae: *Laminaria digitata*, rhodophyte species present between kelp fronds and on the stripes of the kelps.

Dominant fauna: Bryozoa on kelp fronds, little *aurita*.

Notable species: *Electra pilosa* and *Membranipora membranacea*

Macrofauna: Low density, *Pollachius pollachius* and *Labrus mixtus*.

Numerous juvenile fish

Gelatinous zooplankton including *Rhizostoma pulmo* and *Aurelia*

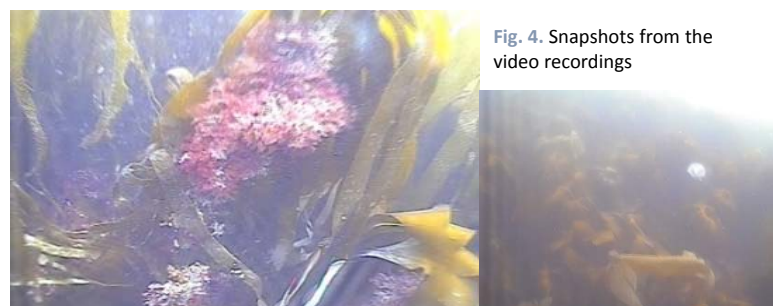


Fig. 4. Snapshots from the video recordings