Geophysical Benthic Habitat Mapping of the Helford River

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Introduction

The Helford Estuary is a ria in South East Cornwall, UK that is fed by seven creeks (Ponsontuel Creek, Mawgan Creek, Polpenwith Creek, Polwheveral Creek, Frenchman's Creek, Port Navas Creek, and Gillan Creek). Approximately 50km of coastline is situated inside the Fal and Helford Special Area of Conservation (SAC) and the estuary has multiple benthic habitat types that support a variety of benthic organisms. The Helford River has long been recognised as an area of outstanding marine biological significance and international importance (Covey and Hocking, 1987). Consequently, the ten year time series of benthic habitat mapping completed by the students of the University of Southampton contributes vital information to the changing patterns within the Fal and the Helford.

On the 24th of June 2016 a habitat mapping survey was conducted in the Helford River between 8:29 UTC and 10:18 UTC using the HTS Valonia. The survey began with 8/8 cloud cover with light precipitation but cleared to sun with 3/8 cloud cover as the survey progressed. High tide was at 7:34 UTC (4.70m), and low tide at 13:59 UTC (0.90m).

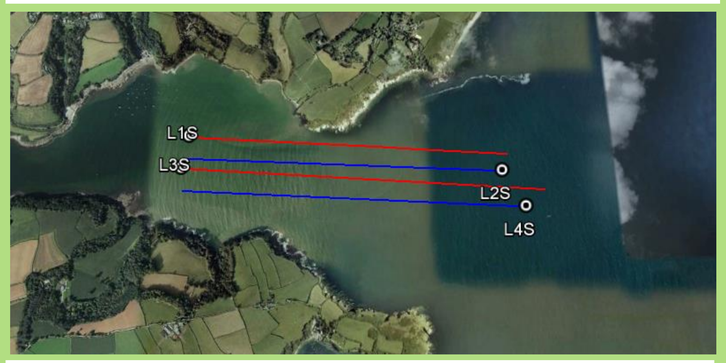

Fig. 1 Transect routes within the Helford River. Red lines indicate ship movement from left to right and blue lines indicate ship movement from right to left.

Methods

A geoacoustics 159 digital side scan sonar towfish was used to assess the bathymetric characteristics along four parallel transects that were 2km long and 100m apart (Fig. 1). The geological characteristics were translated on to paper for later analysis. A bowtech camera was deployed to observe and identify the benthic megafauna present. Surfer 8 software was used to create a transect map of the area.

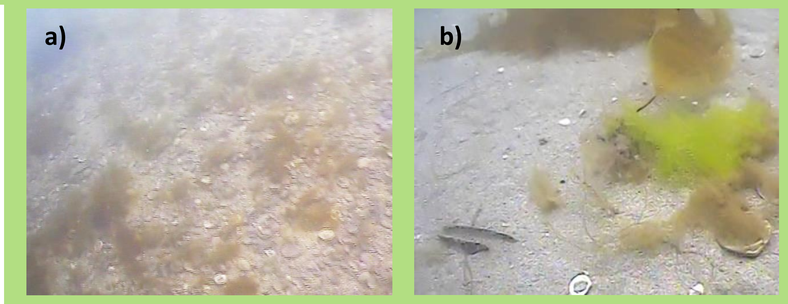

Fig. 2 Representation of the benthic habitat observed during a) drift 1 (start: 005°10' 641" W, 50°09' 611" N, finish: 005°10' 018" W, 50°09' 600" N), b) drift 2 (start: 005°11' 177" W, 50°09' 880" N, finish: 005°10' 522" W, 50°09' 897" N) along the Helford River

Habitat type

Along the two video transects, there were noticeable differences in the substrate, species abundance and species diversity. Along drift 1 (005°10' 641" W, 50°09' 611" N to 005°10' 018" W, 50°09' 600" N) the substrate consisted of coarse sand with a high density of bivalve shells and a patchy distribution of *Derbesia marina*. There was a high abundance of the common starfish (*Asterias rubens) in addition to* other species of *Asteroidea. Sepia officinalis, Pecten maximus, Cancer pagurus, Aequipecten operculceris, Maja squinado, Callionymus lyra* and *Laminaria saccharina* were also identified within the benthic video trawl. Along drift 2, (005°11' 177" W, 50°09' 880" N to 005°10' 522" W, 50°09' 897" N), the substrate was fine sand with patchy distribution of bivalve shells, the chlorophyta, *D. marina,* and phaeophyta, *L. saccharina*. In contrast, few megafaunal species were sampled along drift 2 with the exception of *Raja clavata, Aequipecten operculceris* and *A. rubens*. These two habitats were vastly different and the species presence reflected this.

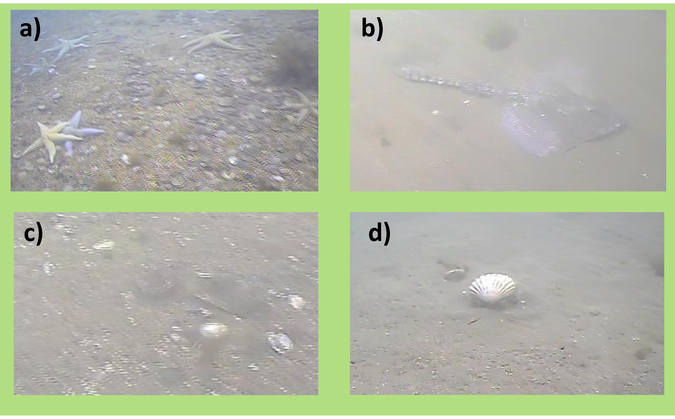

Fig. 3 Photographs of a) a cluster of common starfish (*Asterias rubens)*, b) Thornback Ray (*Raja clavata),* c) Common cuttlefish (*Sepia officinalis)*, d) Queen scallop (*Aequipecten opercularis)* taken using videophotography along a transect from 005°10' 641" W, 50°09' 611" N to 005°10' 018" W, 50°09' 600" N in the Helford River

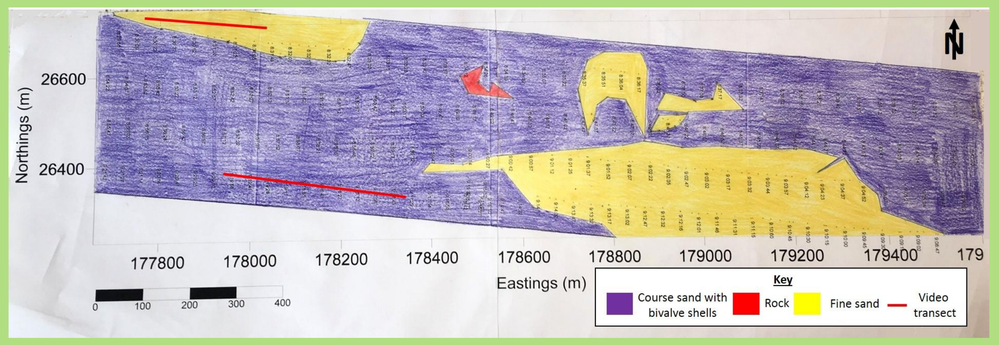

Fig. 4 Sidescan sonar track plot of the Helford River on 24/06/2016 with overlayed video transect location

Discussion

Historic data on benthic habitat types in the area showed that the sites we sampled once contained live Maerl beds, sand and sandy mud beds and Eelgrass Beds. However, when we sampled the area, there were 2 dominant sediment types; coarse sand with broken shells and finer sandy plains. The fauna associated with the course sand with broken shells was primarily *Asteroidea* with 185 *Asterias rubens* counted along drift 1. In contrast, along drift 2, only two *A. rubens* were observed on the finer sand plains.

Flat lower plane bedforms were present on the sidescan track plot for drift 1 and drift 2, this could be due to low flow velocities within the Helford.

References

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