

Fal Estuary Habitat Mapping

Background

The Fal Estuary is located on the south coast of Cornwall in the UK. It is a drowned river valley or ria which is composed of many tidal creeks which flow into an area of deep water known as Carrick Roads (Somerfield, Gee & Warwick, 1994). The area of Fal and Helford is designated as a Special Area of Conservation (SAC) due to the range of important habitats found in the area including; sandbanks, mudflats, mearl beds, Atlantic salt meadows and sea grasses, covering 6387.8 hectares in total (JNCC, No Date A).

The Aim - To create a comprehensive benthic habitat map for seabed between Carricknath Point and Shag Rock, showing the range of benthic habitats in the area.

Method

A sidescan sonar system was used to form four transects spaced 100m apart numbered Lines 4-7 (Figure 1.). The system included a tow fish (Figure 2.) that employed geo-acoustics to produce imagery and texture of the seabed. The sidescan swath was 150m (75m either side of the tow fish) allowing for each transect to overlap.



Figure 2. Tow fish used during survey

Three camera transects were taken by selecting a position within the sidescan transects and allowing the boat to drift. This gave an erratic transect which can be seen on the benthic habitat map. No grab samples were taken as we were located in the SAC.

Benthic Habitat Map—(Figure 3.)

Sandy Substrate – Patchy Seagrass - Around the features outlined, the majority of the substrate is sandy with very patchy seagrass, as seen in camera transect 1 (Figure 4.), which is representative of the area. While no grab sample was taken the grain size and sorting can be approximated from the video footage, it appears to be medium/coarse with moderately well sorting.

Sandy Substrate – Denser Seagrass - Boundary 7 contained a muddy substrate with varying densities of seagrass as can be seen on camera transect 2. Spotty areas on the sidescan readout were interpreted as seagrass outcrops (Figure 5.).

Rock – Kelp Forest - Boundaries 8 and 9 contain kelp, other marine flora, and rocky substrate. This assumption is based on similarities in side scan texture and footage from camera transect 3 (Figure 6,7.).

Rock – Unknown Flora - Includes boundaries 5, 6 and 10. We have no ground-truthing for these areas, so this conclusion is from similarity in sidescan trace texture to these areas and boundaries 8 and 9.

Muddy Substrate - Boundaries 1,2 and 3 enclose sections of finer substrate. We are unable to verify this as we have no camera footage or ground-truthing. We have covered a similar area on camera transect 1.

Depression - Boundary 4 encloses depression and shadow. Again this is an educated guess due to having no ground-truthing but the shadow is very clear.

Camera Transects

Camera transect 1 — Revealed fine sand and muddy sediments with sparse algae and seagrass (*Zostera marina*) (Figure 4.). No fauna are seen at the surface, but burrows and pits indicate the presence of infauna, such as burrowing polychaete worms.

Camera transect 2 — Revealed sand and muddy substrate with more abundant tufts of seagrass (*Zostera marina*) and other algae (Figure 5.). Small sized fish can also be seen, which may include Couch's Goby (*Gobius couchi*), a protected species only found in south Cornwall and Ireland (JNCC, No Date B).

Camera transect 3 — Displayed ripple marks in the areas of sandy sediment covered by an algal carpet (Figure 6.). These are characteristically formed in areas of constant high current, however these ripples are not big enough to be picked up by the sidescan sonar. Indications of infaunal organisms were also present. The transect also showed a shallow (4m depth) rocky habitat colonised by mixed vegetation including kelp (*Laminaria* species) and seaweed species, such as *Saccorhiza polyschides* and *Heterosiphonia plumosa* (Figure 7.). *H. pulmosa* is a red seaweed which grows as an epiphyte on kelp species (Rowley, 2008a). Juvenile pollack (*Pollachius pollachius*) use estuarine algae as a nursery ground during their first year of life (Rowley, 2008b).

Survey date: 23/06/2015

Sea state: 1-2

Cloud cover: 5/8

Speed of vessel: 4 knots

Sidescan model: Kongsberg dual-frequency

Operating frequency (kHz): 100 and 410

Co-ordinate system: OSGB36

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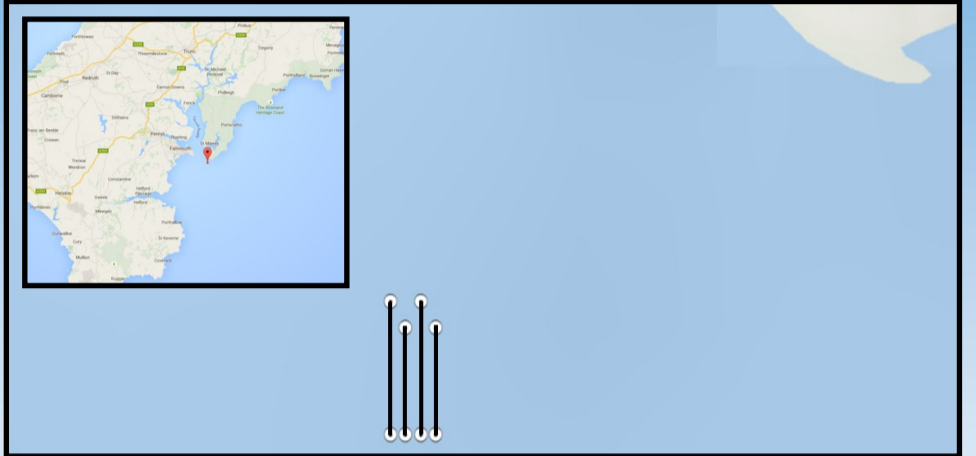


Figure 1. Map of transect locations .

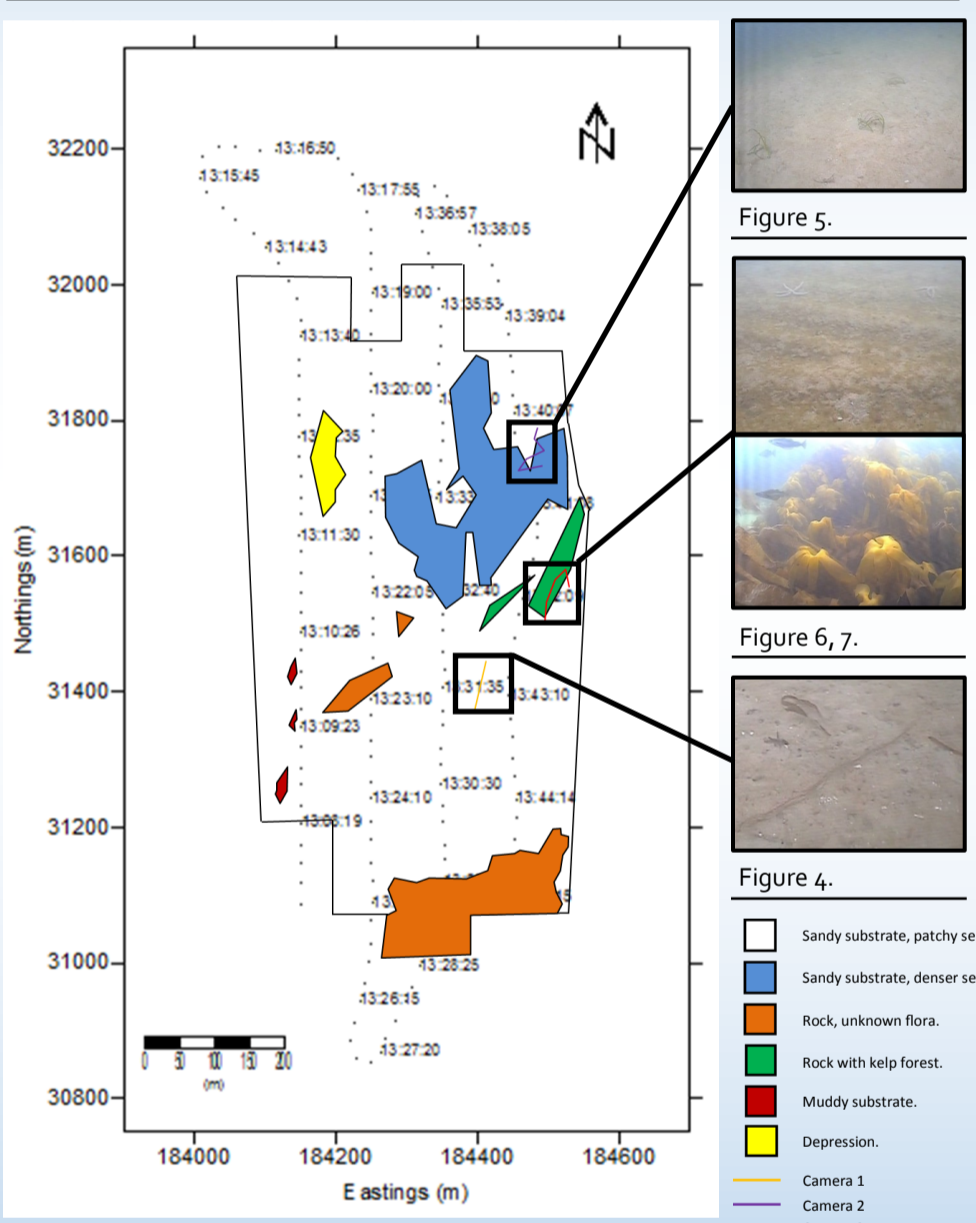


Figure 3. Habitat map including location of camera transects

Discussion

5 separate benthic habitats were identified from the track plot each providing their own biological niches with significant evidence for a vast and varied infaunal community across the surveyed area (Figures 4 & 5.). Certain characteristics about the water column can be inferred from the visible fauna and flora for instance the presence kelp (Figure 6 & 7) indicates a colder nutrient rich water column (Jackson, 1977). We are limited to inferences due to the site being SAC and the associated sampling restrictions of the habitats

References

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