

Geophysical and Benthic Habitat mapping of the Fal Estuary

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Background

The Fal estuary is a classic Ria, also known as a drowned river valley, in Cornwall, England. (Estuaries, A Physical Introduction 2nd edition (Keith R. Dyer) 1997). It plays host to a number of industrial and recreational activities, as well as containing a variety of habitats as well as species including *Lithothamnion corallioides* and *Zostera marina*.

The estuary is classified as a Special Area of Conservation under the Fal and Helford Marine Special Area of Conservation Management Scheme (REFERENCE) because it contains a number of interesting features such as saltmarshes, intertidal mudflats, and subtidal sandbanks.

Methods and materials

The survey was conducted on the 22/06/2016.

Three methods were used to produce the final habitat map.

The chosen survey site was selected from the map provided (fig 1) according to recommendations from the skipper and Mr Davies.

A subsurface dual frequency side scan sonar running at 100kHz and 410kHz produced a backscatter plot along three chosen transects from 1m depth. Each transect was 75m wide on each side of the towfish, with each tract parallel and 100m apart. The 100kHz frequency was used to generate the habitat map.

A video recorder was used to generate two videos of the seafloor to provide a more complete understanding of the fauna, flora and sediment type at each location.

Finally a Van Veen grab was used to sample the substrate, so as to quantify the local fauna. As well as this, a sieve was employed to study the sediment size and composition.

Aims and objectives

The aim of this survey was to provide a habitat map of the area between Pendennis Head and Swanpool Bay, with a focus on the fauna and flora as well as the substrate type

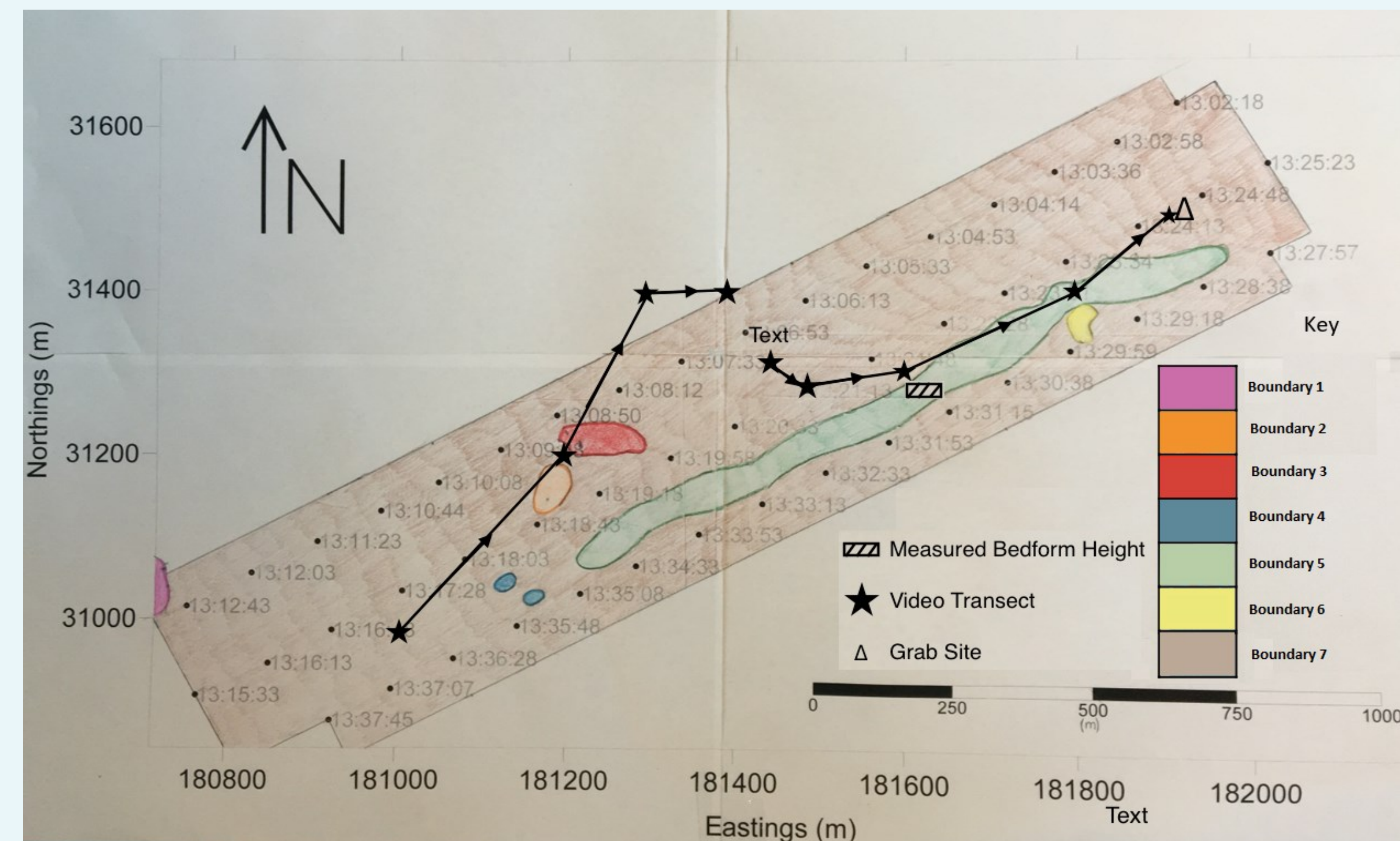


Figure 1: Habitat map showing the different boundary layers, measured bedform height, video transect and grab site

Results and Discussion

The area we surveyed was mainly sand with a scattering of rocks.

Boundary layer 1: backscatter here was the most reflective out of all the boundary layers found on the track plots. The dark backscatter suggests the presence of rock. Due to the difference in reflectivity of the object there could be a presence of macro algae.

Boundary layer 2: backscatter here was also reflective again suggesting the presence of rock lying on the substrate due to the orientation of the shadow relative to the towfish

Boundary layer 3: backscatter here was very similar to that of boundary layer 2 proposing a comparable composition

Boundary layer 4: backscatter shows high reflectivity signifying the existence of a hard object lying on the substrate

Boundary layer 5: backscatter here shows an area of larger scale dunes compared to the majority of the area (boundary layer 7)

Boundary layer 6: backscatter here is a lot lighter than seen in the other boundaries. The lighter backscatter shows scour mark

Boundary layer 7: backscatter here indicates a large area of sandy sediment with small scale symmetrical ripple marks indicating low persistent flow

From the two video surveys and the sample grab the most abundant species was the *Asteras rubens* with 17 seen across the surveys.

Key Species found

Asteria rubens-Common starfish

Has five appendages, that are often curled at the tips, typically has a orange-yellow colouration, but becomes pale at depth. Has an average diameter of 25-30cm. Predates on molluscs, and is typically found on muscle and oyster beds. Located on most British & Irish coasts



Ensis siliqua—Pod Razor shell

This mollusc has elongated dorsal and ventral margins. It is typically white with reddish streaks. The majority of the species are buried in sand, and has an average length of 200mm. It is a suspension feeder and breathes through syphons at sediment surface. Located on all British coasts.



Laminaria digitata - Oarweed

It is a large brown macro algae with a claw like holdfast. Can grow up to 2m in length and is found attached to bedrock and hard substrate. Found across all western British coasts. Note: species observed has hydrozoa species attached to the fronds.



Marthasterias glacialis - Spiny starfish

Inhabits hard substrata as well as occasional muds across all British coasts except the east coast of England and the eastern half of the Channel. This starfish can grow to an approximate size of 80cm in diameter and has five tapering arms, a very small central disc and distinctive rows of heavy spines along its arms. It has a brown-yellow base colouring with grey-green markings on its dorsal surface. *M. glacialis* diet consists of fishes, crustaceans, echinoderms

Conclusion

The 100kHz sidescan paper traces showed an overview of the seabed. The three video surveys and grab sample enabled the seabed to be seen in more detail and confirms the results from the sidescan survey.

In hindsight, another grab sample to determine if other species were present and to confirm the interpretation of the backscatter paper trace. The video surveys should also fully remain within the transect area.

References

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