Geophysical Benthic Habitat Mapping of the Fal Estuary

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Aims and Objectives

Aim: To study the benthic habitat in the Saint Mawes Harbour.

Objectives:

1. Use the side scan sonar to map the seafloor along 4 transects in Saint Mawes Harbour to map benthic habitats.
2. Deploy a video camera to determine species present in the habitat.

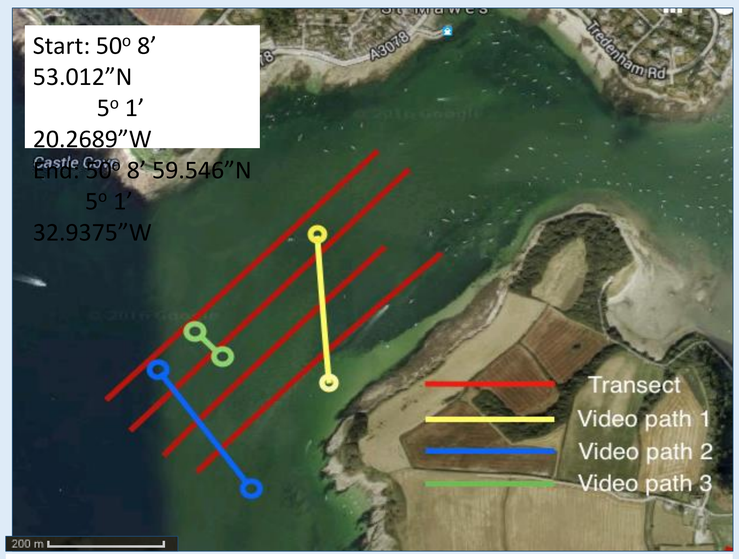

Figure 1: Map of Saint Mawes Habour showing sidescan transects and video paths.

Introduction

- The Fal Estuary, South-west Cornwall, is home to a range of habitats and rich biodiversity.
- Consequently, it has been designated as a Special Area of Conservation (SAC) by DEFRA[1].
- St Mawes harbour has a range of habitats, including maerl and eelgrass beds.
- The ecological importance of maerl has been lead the inclusion of two species (*Phymatolithon calcareum* and *Lithothamnion* corallioides) in Annex V of the EC Habitats Directive[2].
- Production of recent data on the habitat of Saint Mawes will allow more informative decisions to be made, and therefore aid the control of anthropogenic effects.
- Small scale habitat mapping is important on a local level for conservation priority setting[3].

Materials and Methods

- A subsurface Dual Frequency side scan was run at 410 kHz and 100 kHz, with a swath of 75m.
- The side scan was towed behind the MTS Xplorer along the 4 transects at Saint Mawes Habour.
- Data was collected from the 100 kHz survey and printed onto a paper trace.
- Surfer 8 software was used to produce a map of the boat track transects.
- Video imaging of the benthic habitat was carried out along 3 transects.
- Video was used for species identification, supplementing the side scan data by ground-truthing the bedforms and habitats.
- Findings were quantified by calculating the approximate percentage cover of each species.

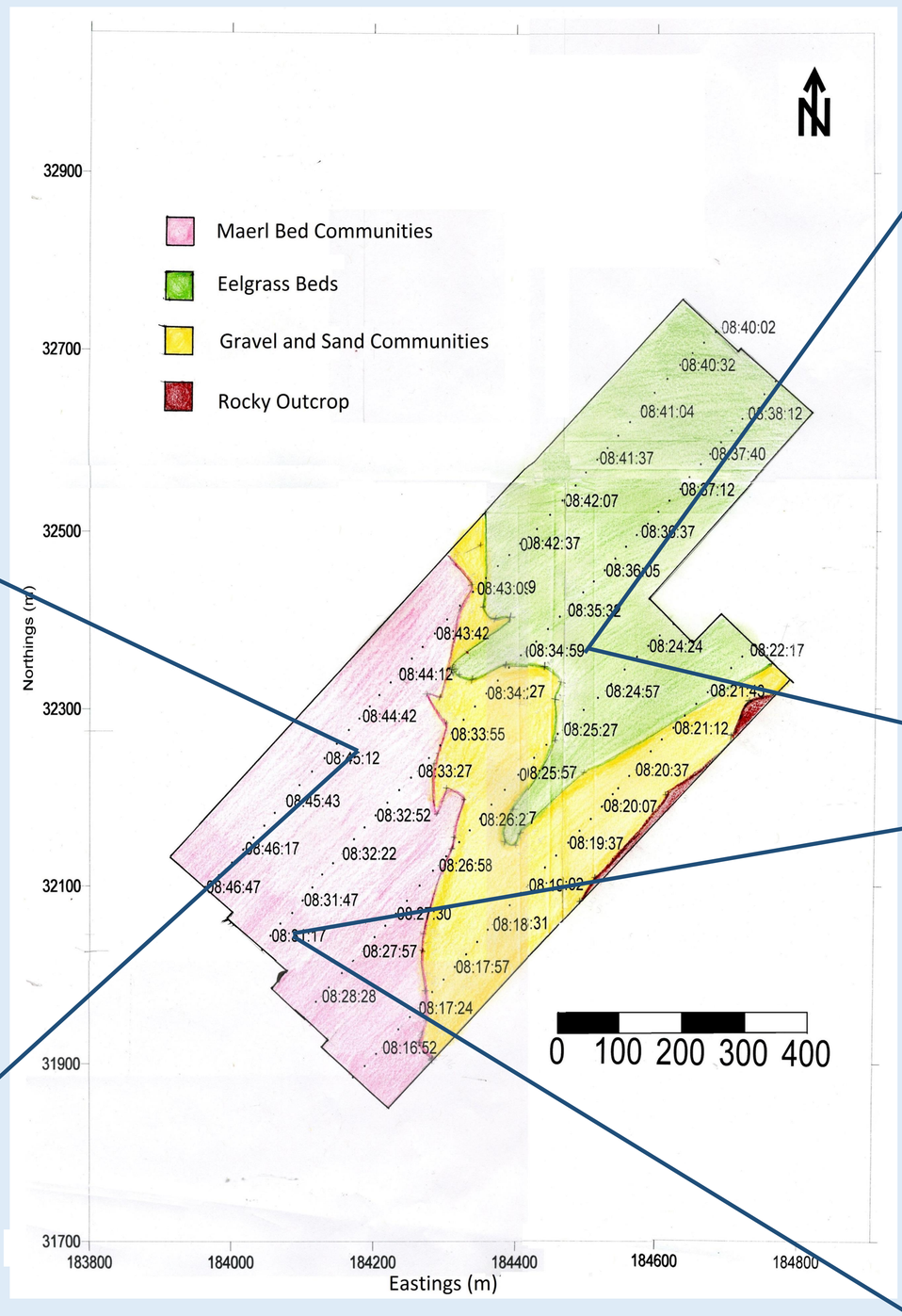

Figure 3: Section of bed dominated by Maerl, *Phymatolithon calcareum*, covering ~ 70-75% approximate seabed cover. Maerl bed communities in St Mawes Bay have Irish moss, *Chondrus crispus*, and Sea Lace, *Chorda filum* are present.

Figure 2: Eelgrass, *Zostera marina*, covering ~ 40-70%. Irish moss, *Chondrus crispus*, present in large quantities, ~ 30-40% approximate seabed cover. Sea lettuce, *Ulva lactuca*, and *Crypotpleura ramosa*, grow in lower concentrations, < 20% approximate cover. Sand occurs in the Eelgrass beds in concentrations up to 100% cover.

Figure 4: Section of bed dominated by both Maerl, *Phymatolithon calcareum*, and Irish moss, *Chondrus crispus*, which is a dominant species in Seagrass beds. Showing the area to be a Maerl community.

Meta Data

Date: 23/06/2016
Sampling Time: 08:07 to 10:09UTC
Location: St Mawes Harbour, Falmouth
Vessel: Xplorer,Wind: 9 knots, northerly
Sea state: ripples, no white caps

Discussion

- Results highlight the diversity and richness of the flora and fauna in the St Mawes Harbour, Falmouth.
- Video imaging evidence shows that the maerl bed communities were either high in maerl coverage, or patchy and less dense.
- Coarseness of the sidescan sonar allowed speculation of a maerl bed community composed of a mixture of both high, and low density, patchy maerl beds.
- Scanning at a higher frequency, using grab samples or more video imaging transects are all approaches that could be used to confirm the detailed structure of the maerl bed communities.
- Gravel and sand communities were assumed only on sidescan sonar evidence, not physical evidence that would have confirmed the structure of the habitat.
- Video imaging and sonar evidence suggested that eelgrass bed coverage was very extensive.
- Overall, our study reinforces how imperative the decision was to make the Fal a Special Area of Conservation (SAC), particularly with maerl beds, whose complex structure supports high levels of biodiversity[3].
- More time and a wider variety of benthic habitat mapping techniques will be needed for a more detailed map of this section of the Saint Mawes Harbour to be built.

References

1. 1. Bricket, D., Dring, M., Maggs, C. (1998) *Maerl Volume 5 – An overview of dynamic and sensitivity characteristics for conservation management of SACs.* Belfast: Scottish Association of Marine Science
2. Wilson, S., Blake, C., Berges, J. A. and Maggs, C. A. (2004) *Environmental tolerances of free-living coralline algae (maerl): implications for European marine conservation*. Science Direct, 120, 279-289.
3. Lourie, S. A. and Vincent, A. C. J. (2004) *Using Biogeography to Help Set Priorities in Marine Conservation*, Conservation Biology, 18, 1004-1020
4. Barbera, C., Bordehore, C., Borg, J. A., Glemarec, M., Grall, J., Hall-Spencer, M., De La Huz, C., Lanfranco, E., Lastra, M., Moore, P.G., Mora, J., Pita, M. E., Ramos-Espla, A. A., Rizzo, M., Sanchez-Mata, A., Seva, A., Schembri, P. J. and Valle, C. (2003), *Conservation and management of northeast Atlantic and Mediterranean maerl beds*, Aquatic Conservation: Marine and Freshwater Ecosystems, 13, S65-S76.