

Habitat Mapping in the Fal Estuary

Group 1

26/06/2015 Vessel: MTS Xplorer Sea state: Calm
 High tide: 11:05 UTC – 4.1m
 23:25 UTC – 4.2m
 Low tide: 05:11 UTC – 1.7m
 17:35 UTC – 1.8m
 Conditions: Sunny, cloud cover- 6/8th
 Winds: 5kn, southerly 157 °
 Sampling Time: 0859-0946 UTC
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Intro and site background:

The Falmouth harbour is estimated to be the third largest natural harbour in the world and is the deepest in Western Europe (falmouthport.co.uk).

Based on studies carried out during previous field trips and scientific work done in the area^{1,2,3}, it would be expected that the area would contain live Maerl beds, a coral-like seaweed, and eelgrass beds (only 3 species found in the UK), of which the latter is known to be a favoured nursery habitat for a number of species of fish and shellfish as well as providing shelter for seahorses and pipefish⁴. Maerl is very slow growing and can form beds thousands of years old providing a unique and rare habitat⁵. This combination has been one of the main driving factors in the area being designated as a Special Area of Conservation and one of the main reasons it is regularly returned to by the University of Southampton to be studied.

Aim: To investigate the area just outside the main harbour (50°9.31.71N, 005°2'56.98W) with the aim of producing a detailed habitat map via side scan sonar and video transects.
 Four transects were completed using the side scan sonar and two video transects, in areas of particular interest following a review of the side scan data.

Methodology:

Hydropro navigation software was used to locate our 4 transects, each 1km long with 100m between each transect. Our sidescan sonar towfish was deployed behind the MTS Xplorer to map the bathymetry. The sidescan sonar was towed at 1m depth and had a swath of 75m. A print out of the bathymetry was processed for later analysis of bedforms and sediments. Video footage was used to ground-truth the underlying bed forms and sediment at two interesting locations. The video camera was deployed on the starboard side of the MTS Explorer 0.5m above the seabed and we drifted across the location. This view enabled us to view bedform features and the species in this area.

References:

- 1, A.C. Birchenough, S.M. Evans, C. Moss and R. Welsh (2002): Re-colonisation and recovery of populations of dogwhelks *Nucella lapillus* (L.) on shores formerly subject to severe TBT contamination. Marine Pollution Bulletin. Vol. 44 Iss. 7 pp652-659.
- 2, L. Dupont, F. Viard, M.J. Dowell, C. Wood and J.D.D. Bishop (2009): Fine- and regional-scale genetic structure of the exotic ascidian *Styela clava* (Tunicata) in southwest England, 50 years after its introduction. Molecular Ecology. Vo.1 18 Iss. 3 pp442-453.
- 3, R.M. Crawford, A.E. Dorey, C. Little and R.S.K. Barnes (1979): Ecology of Swanpool, Falmouth: V. Phytoplankton and nutrients. Estuarine and Coastal Marine Science. Vo.1 9 Iss. 2 pp135-154.
- 4, <http://jncc.defra.gov.uk/page-5540>: Accessed 26th June 2015
- 5, <http://www.cornwallwildlifetrust.org.uk/conservation/position-statements/fal-docks-dredge-and-the-reference-area-for-maerl>. Accessed 26th June 2015
- 6, Will Rayment and Paolo Pizzola 2008. *Chondrus crispus*. Carrageen. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme. <http://www.marlin.ac.uk/speciesfullreview.php?speciesID=2971> Accessed 26th June 2015
<http://www.falmouthport.co.uk/commercial/html/history.php> . Falmouth Harbour Commission (2007) - Accessed 26th June 2015
- 7, UKHO, Falmouth admiralty chart, 2007, Taunton



Summary of Findings:

Zone 1—Backscatter here was much weaker than zone 6, shown by the lighter colour. Assuming towfish height is constant, the water column depth clearly increases by 20m. Looking at the admiralty chart (32) of Falmouth Harbour you can see that this corresponds to our survey track entering the Carrick roads channel area.

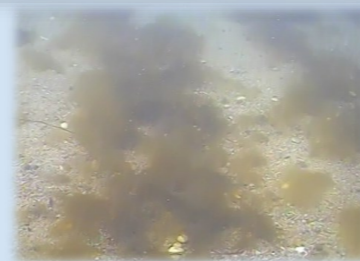
Zone 2—Zone 2 is characterised by crescent shaped distortions of the sea bed. These ridges have a spacing of 3.4m with each distortion having a length of around 11m and height of 1.1m. Their shape suggests possible anchor scarring given the area has unrestricted anchorage.

Zone 3—A lighter patch on the sonograph representing an area approximately 100m long and 30m wide suggests a softer substrate with less reflectance, likely to be a large patch of sandy, fine substrate.

Zone 4—A relatively small zone, found on the border of two transects. The light backscatter relative to the surrounding area and similar to that of zone 3 suggests a possible separated extension of this zone or another area of finer/sandy substrate.

Zone 5—Being found directly beneath the towfish track means the zone was not 100% observed. Again backscatter is weaker and shows a marked difference texturally and relative to the surrounding strong backscatter of zone 6.

Zone 6—This zone represent the dominant bed type with fairly uniform backscatter and ripple patterns across its area. Admiralty charts indicate that we should expect to see shells and calcareous weed. On transect 1 the distance between bedforms was measured to be 1.1m. We know that these bedforms are likely to be stable for more than a year due to our video footage showing *Chondrus crispus* which have a long lifespan reaching up to 6 years. Bifurcation in the bedforms suggests they were formed by oscillatory flow.



Video screenshot (left) shows calcareous seabed and presence of nebula-like algal clouds. Vegetation at station 1 was orientated in regular lines, with ~1m width, which corresponds to the ripple wavelength calculated from sonograph.



Vegetation at station 2 differed in that its distribution was in random patches which varied in size & density. As in station 1, seashells were seen present along the entire seabed.



A widely distributed rhodophyta, *Chondrus crispus* is found in the sublittoral zone of rocky shores around the British coasts and in estuaries such as the Fal where dense purple bushes are present. (The presence of *Chondrus crispus* in the troughs of the ripple bed formations gives some indication as to the lifespan of the ripples. *Chondrus crispus* is a species with a long life span, reaching up to 6 years in sheltered locations⁶ such as the survey area, suggesting the ripples are slow forming.



Aplysia punctata (Opisthobranch), observed only at station 2.

