Habitat mapping in The Helford Estuary

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Date: 26/6/15
Time: 07:00 to 11:20 (UTC)
Location: Helford Estuary Mouth
Wind: 8 knots 170°
Cloud Cover 7/8 okta
Tides: Low = 06:09 (1.80m)
High = 12:06 (4.20m)
Sea State: Force 2

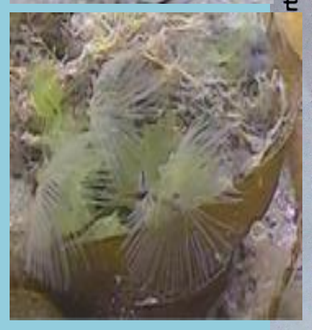
Introduction
The Helford estuary is 9.2km long with many creeks leading off it, with a tidal area of 568 ha. Tidal mixing is generally good with little fresh water input relative to river volume. The estuary is west of the Fal and within the Special Area of Conservation. In 1987 the Helford Voluntary Marine Conservation Area was designated to help protect this area of outstanding marine richness. Eelgrass beds can be found just off Durgan and Grebe. Due to the importance of the habitat this is where we chose to begin out transect area.

Aim:
To conduct a benthic habitat survey in the mouth of the Helford Estuary, which is located within the Falmouth Special Area of Conservation (SAC). This will provide an updated data set of the Helford Estuary.

Objectives:
- Using a side-scan sonar and tow camera to produce a benthic habitat map.
- Video benthic habitat using tow camera to identify species and influences within the area.

Methodology:
On board the M.T.S Xplorer four transect lines where surveyed within the mouth of the Helford Estuary. These were plotted using hydropro navigation equipment. A side-scan sonar tow fish was towed along 4 chosen lines; but unfortunately due to obstacles such a moored boats only the 4th line was able to be completed without any deviation. During the side-scan surveying, observations of the surrounding area were observed and noted into the log book.
Two co-ordinates of interest were noted during the side scan (26698m N, 177153m E and 26744.1m N, 176816.8m E). We then returned to these points and lowered the tow camera to approximately 10m below the surface. The video was then used to identify species on estuary bed.





Photos from tow camera

Observations from video

- Lots of dead mollusc shells present in **video 1**, with a variety of species such as *Mytilus edulis* (blue mussel), *Crepidula fornicata* (slipper limpet) and *Ensis ensis* (razor clam). This suggests and abundance of predators that feed on molluscs, such as *Asterias ruebens* (common starfish, which was seen on many occasions in both video surveys,) and crustaceans such as *Carcinus maenas* (common shore crab) or *Hommarus gammarus* (common lobster.) These were not seen during either video survey, as they are highly motile and likely to have fled any disturbance. **Video 1** surveyed the site of an old oyster bed, providing another explanation for the large volume of broken shell.
- **Video 2** surveyed closer to the shoreline, in a habitat that was dominated by sandy substrate. The substrate type was far less diverse than that of **video 1** and consequently species were less diverse and biomass was lower. However, the sandy substrate provides a better habitat for fish. *Psetta maxima* (Turbot) was spotted during **video 2**. The habitat here is much more suited to its camouflage than at **Site 1**.
- Algae is dominant, with huge diversity of species, forms and colours. Algae colonise all present substrates: coarse, gravelly sand and rock. Diversity and biomass of species was significantly higher at **site 1** due to the diversity of substrates (as previously mentioned.) Many of the present species of seaweed were long and fingered, such as Sugar Kelp, *Laminaria sacchirina.* Maiden's Hair, *Caulerpa spp* was very abundant and also long, but feathery. Both of these forms are well suited to living in gentle currents.
- Large presence of seaweeds also results frequent hydrozoan colonies. The densely packed nature of these show that the water quality of the Helford River is very high.

Boundary Descriptions
Green: Area made up mainly of rock. This is shown in the side scan as it is dark which is due to a high acoustic return.
Yellow: This area is mainly fine sand, but there are boulders and seaweed present shown by a small amounts of localized backscatter.
Blue: This area is most likely made up of gravel and course sand. There is also lots of broken shells present which can be seen in the video.
Red: This area is made up of seagrass shown on the side scan. Also previous surveys show this is an area of seagrass.
Purple: This area is made up of rock as the side scan was dark, meaning a high acoustic return.

Conclusion
The Helford River has a diverse array of bed forms and substrate types resulting in a high biodiversity. It is the site of two rare habitats found in inshore UK waters, Mearl Beds and Eelgrass. They are essential for biodiversity, by producing nursery grounds for juvenile fish and settlement protection for larvae. Our video surveys did well to support the habitats explored by the sidescan sonar. The survey moved from rocky substrates at the mouth of the river, to areas of coarse sand and broken shells as the ship moved up the river. In the north of our sample area, a small patch of eelgrass was detected. The video transects showed a wealth of marine life and a range of macro algae that are adapted to life in moving currents as well as a plethora of invertebrate species such as peacock worms, sea spiders and snails. Both habitats also supported an extensive macro fauna community. The video showed several large common starfish as well as turbot suggesting that the Helford River is a hotspot for biodiversity.

Line	Coordinates	N/E (m)	System AST	GPS	Observations
Start line 1	50°05.9' N 5°06.1' W	26657.5 N 178204.5 E	08:55:36	08:55:37	0855- Motor Boat, Port side, 26285.6m N, 178769.8m E.
End Line 1	50°06.0' N 5°06.6' W	26821.3 N 177655.5 E	08:59:41	08:59:42	0900- break from line 1 due to buoys on transect line.
Start Line 2	50°06.0' N 5°07.1' W	26890.2 N 177052.4 E	09:07:15	09:07:17	0910 – 5m deviation to avoid buoys on transect.
Mid Line 2	50°05.9' N 5°06.5' W	26690.4 N 127727.7 E	09:12:09	09:12:11	0912 – 30m deviation to avoid dive vessel on port side.
Return following deviation	50°05.8' N 5°06.1' W	26441.5 N 178197.1 E	09:15:29	09:15:59	
End Line 2	50°05.8'N 5°06.0' W	26538.7 N 178262.9 E	09:16:29	09:16:31	
Start line 3	50°05.8' N 5°06.1' W	26441.5 N 178197.1 E	09:19:57	09:19:58	0922 – sailing boat, port side, 26533.6m N, 17900.1m E.
Mid Line 3	50°05.8' N 5°06.8' W	26629.7 N 177585.7 E	09:24:25	09:24:27	0923 – visability drop, brief rain shower.
End Line 3	50°05.9' N 5°07.1' W	268110.9 N 176982.5 E	09:28:53	09:28:53	0924 – two sailing boats, port side, 26624.7 N, 177594 E.
Start Line 4	50°05.9' N 5°07.1' W	26708.6 N 176974.5 E	09:32:52	09:32:54	0937 – sailing boat, Tiger Lily, port side.
Mid Line 4	50°05.8' N 5°07.1' W	26533.8 N 177566.1 E	09:37:20	09:37:20	
End Line 4	50°05.7' N 5°06.1' W	26336.8 N 178241.3 E	09:42:17	09:42:19	

Table 1: Transect line coordinate data and observations for each transect.

References:
Helfordmarineconservation.co.uk, (2015). Helford Voluntary Marine Conservation Area. [online] Available at: http://helfordmarineconservation.co.uk [Accessed 27 Jun. 2015].
Jncc.defra.gov.uk, (2012). Fal and Helford - Special Area of Conservation - SAC - Habitats Directive. [online] Available at: http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0013112 [Accessed 27 Jun. 2015].
Google Earth, Helford Estuary, 50°05.9' N 5°06.1' W, accessed 27 Jun 2015

GROUP 5

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