Habitat Mapping in Plymouth Sound - Group 1

Introduction and Aims

Plymouth Sound is a bay approximately 6km across and surrounded by rocky cliffs It opens into the English Channel and is fed by the River Tamar and Plymm estuaries. The sound has a range of marine habitats such as sea grass beds, which are home to seahorses. The aim of this survey was to build up a picture of the habitats present on the seabed and map them. A well mapped seabed is useful for impact assessments for marine engineering projects as well as recording changes in quality and creating protected areas. Mapping techniques may look at seabed substrate as well as identification and quantifying of organisms present.

Vessel: Echo Sounder

(Sonadyme)

Location: Plymouth Sound

Date: 6th July 2019

Weather: Sunny

Sea State: 1-2

Tide: HW 0823 UCT

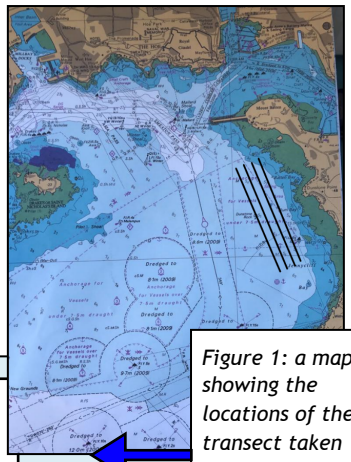


Figure 1: a map showing the locations of the transect taken on our survey

Biodiversity

With human impacts causing biodiversity to be lost, it is becoming even more important to understand our environment. Habitats with a greater biodiversity are more resilient to changes meaning they could have a better chance of surviving and adapting to future conditions (Tillman & Downing, 1994, Tillman *et al.*,1996).

Video Recorder

The video recorder allows flora and fauna to be identified. It also gives visual information about the substrate. Video recording can cover large areas quickly and can be reviewed later however turbidity and plankton blooms can hinder visibility making species identification difficult. Both sites were found to be made up of fine sand with shell fragments and intermittent small rocky outcrops. At site 1, there was a greater covering of macro algae compared to site 2. Limited visibility due to a high abundance of plankton made identification difficult.

Grabs

A Van Veen Grab was used to take seabed samples to ground truth the sonograph. A Van Veen Grab is made up of two clamshell buckets that close on the seabed, capturing the sediment. They allow samples to be brought to the surface for analysis. Two grabs were carried out during the survey.

Method

This survey focused on the eastern side of Plymouth Sound, in the area adjacent to Batten Bay and Dunstone Rock. Coordinates of the start and end point were selected to best cover the area. Four transect lines were drawn up using Hydroprobe, each approximately 1km in length and 100m apart. The side scan sonar was then towed behind the vessel along these lines to produce a continuous image of the sea floor. From this we identified areas of interest which we then went over with the towed video recorder and took seabed samples. The video and seabed samples can be used to ground truth the side scan image.

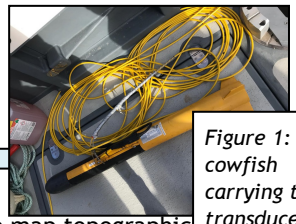


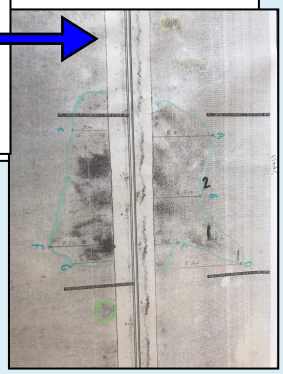
Figure 1: the cowfish carrying the transducers

Side-Scan Sonar

Side Scan Sonar uses acoustics to map topographic sediment texture and composition. The physical properties of a material effect the reflection of sound. This backscatter is then picked up and converted into an image called a sonograph. The instruments are towed behind the vessel on a towfish and transmit the sound pulse from transducers. The sonograph produced from this survey was analysed visually which allows dirty data or electrical noise to be identified. Sonographs required ground truthing as on their own they do not identify habitat types, only differences between substrates.

Transect:
Start: 50°21.338 N
004°07.768 W
End: 50°20.848 N
004°07.520 W

Figure 2: an example of our sidescan print out, showing the marked area of a wreck.



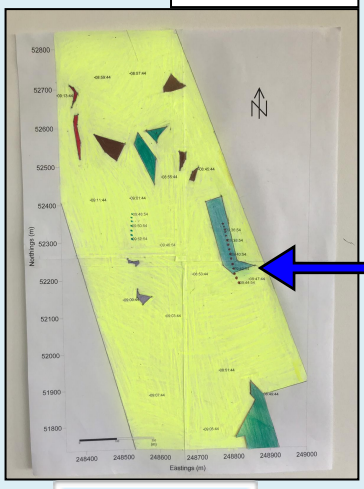
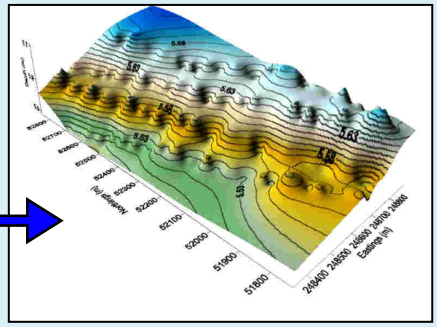


Figure 3: Map showing the position trace of the sonar side scan system between 0845 UTC and 0913 UTC in Plymouth Sound with notable seabed features and zones marked.

Figure 4: A surface plot of the seabed of Plymouth Sound. Data was collected from a side-scan sonar performed over four transects on 06/07/19. Notable seabed topography and zones are highlighted.



References

Tillman, D and Downing, J, 1994. Biodiversity and stability in grasslands. Nature 367, pp. 363-365.

Tillman, D, Wedin, D and Knops, J, 1996. Productivity and sustainability influenced by biodiversity in grassland ecosystems. Nature 379, pp. 718-720.

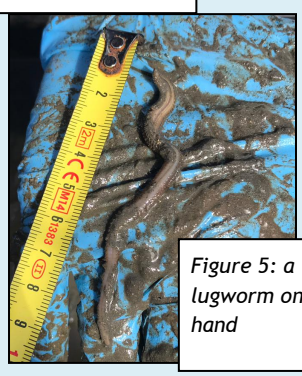


Figure 5: a lugworm on a hand

Site/ Technique	Location	Time (UTC)	Biological observations	Sediment characteristics
1 Video	50° 21.095'N, 004° 07.625' W	0935	*Ulva species, Marthasterias glacialis, Saccharina latissimi, Apoglossum ruscifolium, Schmitzia hiscockiana,* Burrow mounds	Fine sand, shell fragments
2 Video	50° 21.106'N, 004° 07.830' W	0948	*Marthasterias glacialis, Saccharina latissimi,* Bivalve - family *Pectinidae* scallop Burrow mounds	Fine sand, shell fragments
1 Grab	50° 21.095'N, 004° 07.833' W	1015	Tube dwelling worms, *Turritellidae* Razor clam, Ragworm	Mud/silt
2 Grab	50° 21.095'N, 004° 07.833' W	1009	Polychaete worms, *Turritellidae,*	Mud/silt