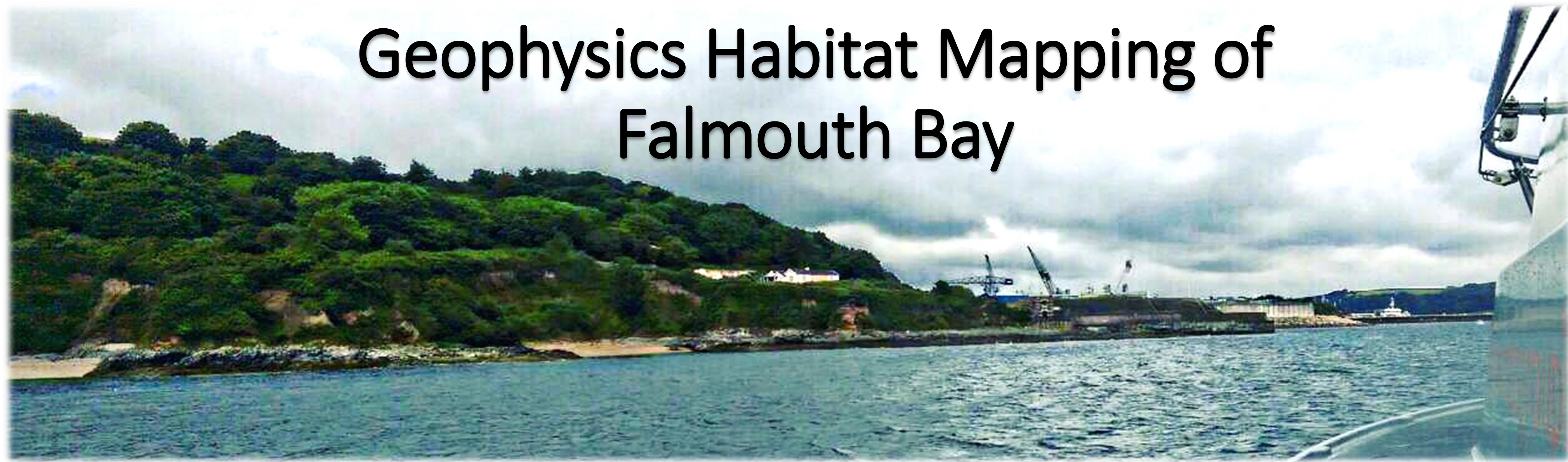


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Geophysics Habitat Mapping of Falmouth Bay



Metadata
 Date: 25/6/16
 Location: Falmouth Bay
 Time: 08:00 – 11:00 GMT
 Vessel: MTS Valonia
 Cloud cover: 6/8
 Sea state: Flat
 HW: 08:14, 20:31 GMT
 LW: 02:23, 14:40 GMT

Background

Falmouth Bay has been designated as a Special Area of Conservation (SAC) by the Marine Management Organisation (MMO) and provides a valuable refuge for a variety of benthic flora and fauna. In particular, supporting mearl and seagrass beds by minimising anthropogenic impacts, restricting dredging activities, and developing regulations acting to protect a range of habitats.

Methods

Three techniques were used to investigate and map the area:

- A subsurface dual analogue Side Scan Sonar was used to remotely map the seafloor along 4 transects. This provided a high resolution image (410kHz) with a swath range of 75m, layback of 15m and tow fish depth between 2 and 3m.
- A Van Veen Grab attached to a stainless steel hydrographic line was used for ground truthing. The grab was deployed at a single site and the sample was sieved and analysed. Photos were taken and the species found later analysed.
- A drop-down video system was deployed over the side of the vessel to the seafloor. This allowed verification of ground truthing, including identification of seafloor structure and a further insight into the flora and fauna in the coastal area around Falmouth.

Boundary 1 (brown)

This dark region of the map indicates a stronger return, possibly a rocky outcrop or a patch of macro algae.

Boundary 2 (orange)

This region contains dune bedforms, which extend across most of the sonar trace. The dunes follow a catenary transverse shape predominantly out-of-phase. The bedforms analysed have a height of 0.21m classifying them as small dunes. The length of ripples was 0.58m. These values were calculated using the side scan correction equations. The predominant grain is coarse sand.

Video transect 1

Boundary 3 (yellow)

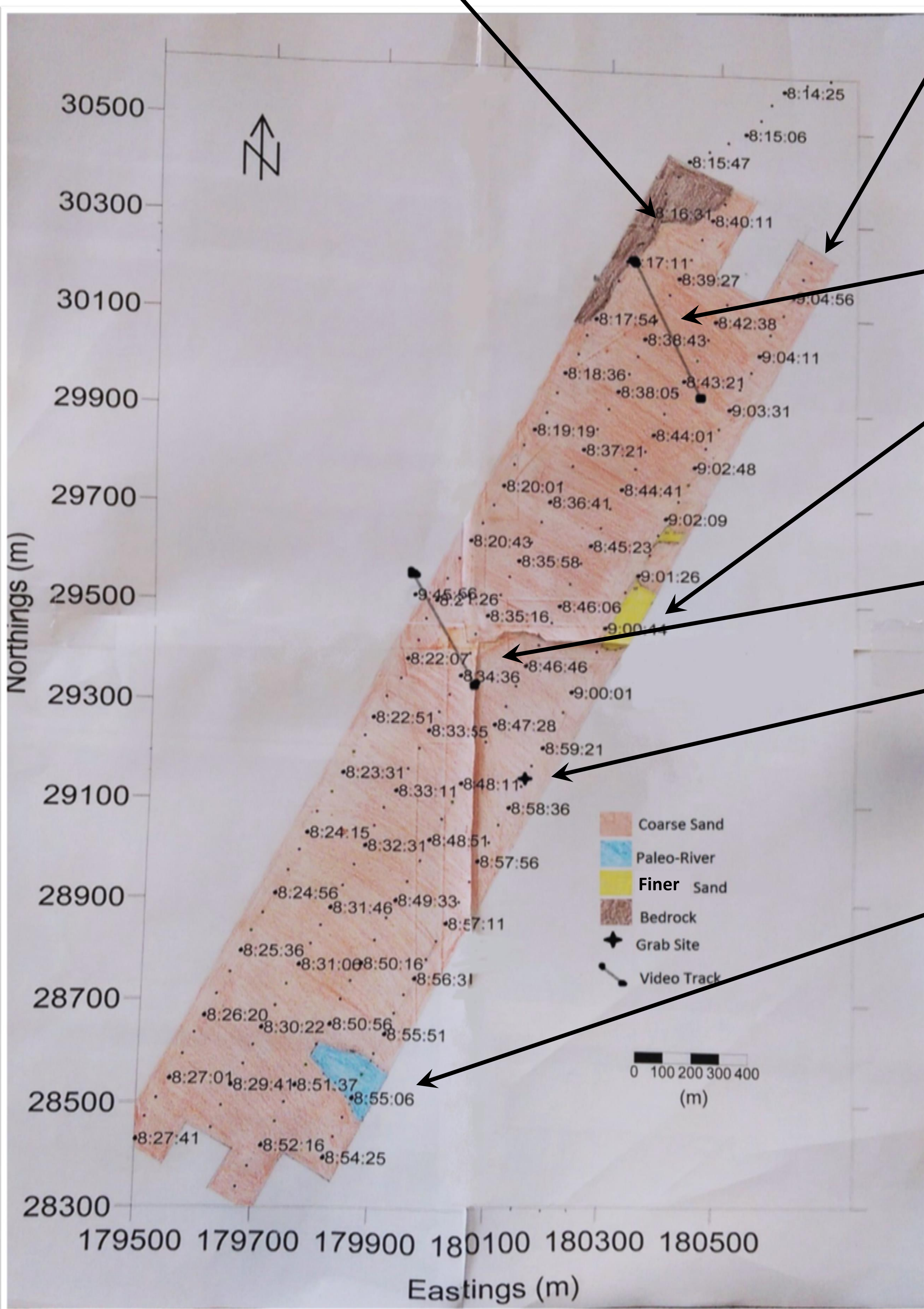
Boundary 3 represents an area of fine sediments indicated by the lighter return on the sonar trace. This area shows no evidence of bedforms in comparison to the neighbouring boundary 2.

Video transect 2

Location of grab

Boundary 4 (blue)

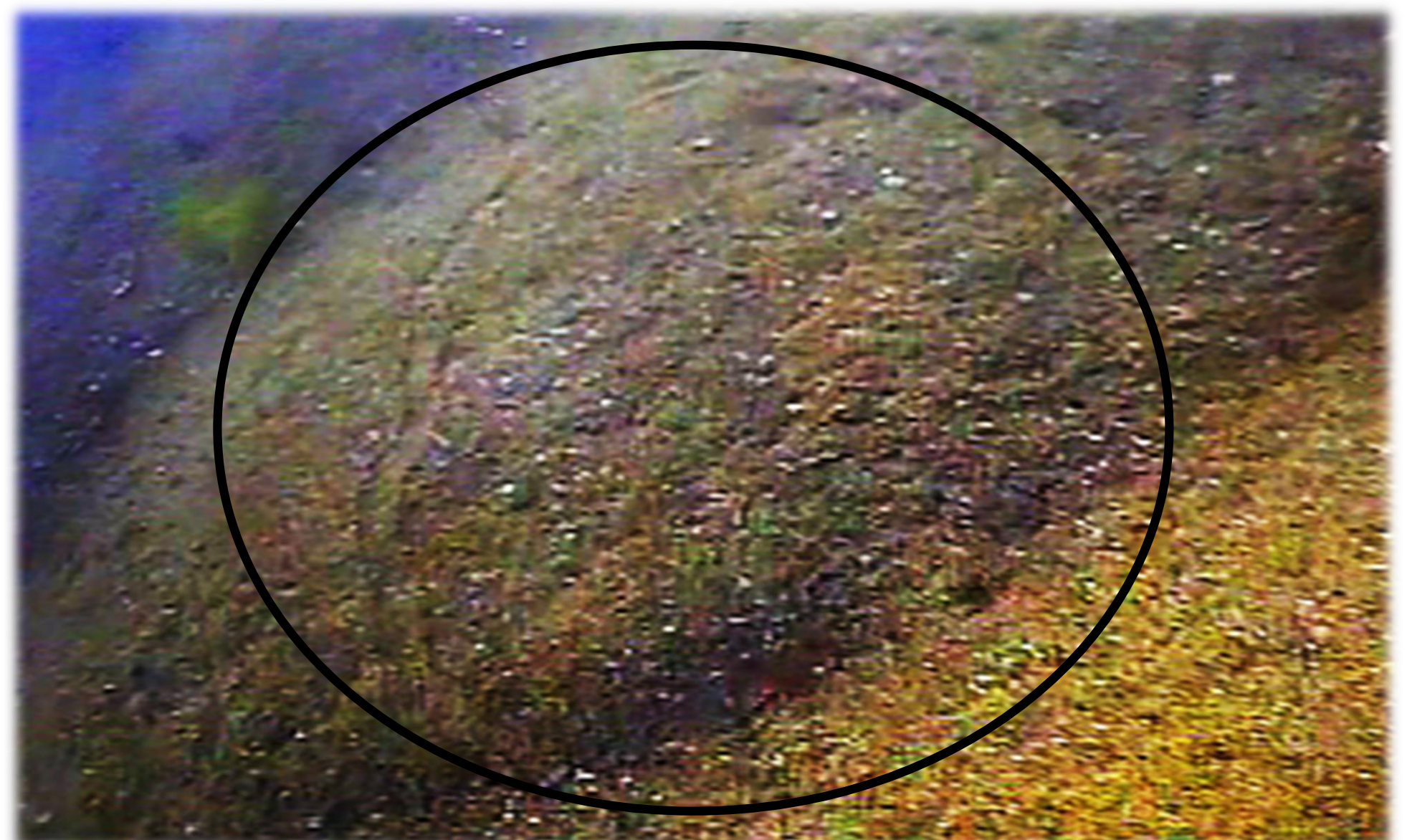
It can be speculated that this is a paleo river, which is possible because Falmouth Bay is a ria formed at the end of the last ice age 11,000 years ago. However, this can only be proved using a sub-surface profiler. On the other hand, it may be the result of a wake from a passing boat interfering with the backscatter. This would explain the abrupt change in bedforms as shown on the trace.



Video transect 1, 8:00 mins - *Marthasterias glacialis* characterised by longitudinal rows of spines along arms and grey/ blue colouration



Video transect 1, 7:13 mins- *Delesseria sanguinea* because red leafy and smaller than 30cm, or *Brongniartella byssoides* common during summer intertidally thick bushy and fern like branches up to 20cm.



Video transect 1, 4:31 mins- Animal tracks characteristic of *Holothuria forskali*, abundant along the South-west coast of Britain.

Conclusion

Four clear points of interest are notable on the habitat map that express deviations from the normal coarse sand sediment. There is weak trend of progression with these points of interest – from very rocky to fine sands with progression from the top to bottom of the habitat map. A grab of the sediment within the orange boundary confirmed both video footage and sidescan predictions of a coarse sandy sediment, populated with mearl beds. There is a level of consistency shown in the benthos from both sidescan and the two footage transects, no change is observed in sediment or biodiversity with no distinctive identifying species. The orange boundary of the habitat map is representative of the large areas of catenary transverse dunes that dominate this area of the sediment, these dunes are predominantly out of phase and are also representative of the limited and constant levels of biodiversity.

Video transect 1:		START 09:21 UTC	Eastings: 180361.4 Northings: 30174.2
		END 09:39 UTC	Eastings: 180478.2 Northings: 29903.5
Time (mins)	Key Findings	Sediment Structure	Bedform
04:00	<i>Rhodophyta</i> dominant - <i>Palmaria palmata</i> , <i>chlorophyta</i> and bivalves present but unidentifiable due to motion blur and low resolution footage.	Very coarse sand / biogenic mix (bivalves and mearl beds present).	Straight transverse
08:00	<i>Marthasterias glacialis</i> , <i>rhodophyta</i> dominant - <i>Delesseria sanguinea</i> , <i>chlorophyta</i> and bivalves present but unidentifiable due to motion blur and low resolution footage.	Very coarse sand / biogenic mix (bivalves and mearl beds present).	Straight transverse
12:00	<i>Rhodophyta</i> and bivalves present but unidentifiable due to motion blur.	Very coarse sand / biogenic mix (bivalves and mearl beds present).	No bedforms present
16:00	<i>Chlorophyta</i> present cannot identify due to low resolution.	Very coarse sand / biogenic mix (bivalves and mearl beds present).	Straight transverse

References

- Turk, S.M. and Tompsett, P.E. 2006, *Marine Algae of the Helford VMCA- checklist, with records from the 19th Century*, Helford Voluntary Marine Conservation Area Group.
- Dipper, F. 2001, *British Sea Fishes*, Underwater World Publications Ltd, Middlesex, pp. 88-89.
- Gibson, R., Hextall, B., Rogers, A. 2001, *Photographic Guide to the Sea and Shore Life of Britain and North-west Europe*, Oxford University Press, New York.
- Erwin, D. and Picton, B. 1995, *Guide to Inshore Marine Life*, Immel Publishing Ltd, London.