

INTRODUCTION AND METHODS

Date: 04/07/2018
 Time: 07:00 – 11:00 UTC
 Location: 50°32.84N 004°19.27W (Cawsand Bay)
 Sea state: Slight chop
 Cloud cover: 8 okta
 Vessel: MV Xplorer
 Wind: F3
 High Tide: 10:15 UTC at 4.70m (Devonport)

The aim of this investigation was to produce a benthic habitat survey map using a side scan sonar and video for species identification.

A Sea Star subsurface Dual frequency side scan sonar of 410kHz with a swath range of 75m. Four transects were attempted, however as evident from Figure 1, there is a lot of deviation from transect lines initially desired. After the side scan sonar was completed, two video transects were carried out to look at species and to attempt to identify them. With regard to the video transect, unfortunately due to confusion within the boats navigation they were not where we intended them to be and didn't cross the rocky outcrops shown on the side scan (Figure 4). As well as the side scan transects not being side by side to allow a more complete map, the time was reset on the ships track and therefore did not match up with the sonar reading, thus they are not present on the habitat map and we had measure each boundary points distance from each other and scale these to fit. Each transect had to be scaled separately as the boats speed changed 3 times in the course of the mapping.

SITE BACKGROUND

Cawsand bay is a bay on the South-East coast of Cornwall. The bay is orientated North to South and opens Eastward into Plymouth Sound. The bay is about 1 mile across and a mile and a half wide.

Plymouth Sound has two freshwater inputs – the River Tamar and the River Plym. Further up the River Tamar, the large River Lynher

The bay is situated within Plymouth Sound's Designated Special Area of Conservation for estuaries, shallow inlets and bays, subtidal reef biotopes, Atlantic salt meadows and sandbanks which are slightly submerged all the time.

SHIPS TRACK

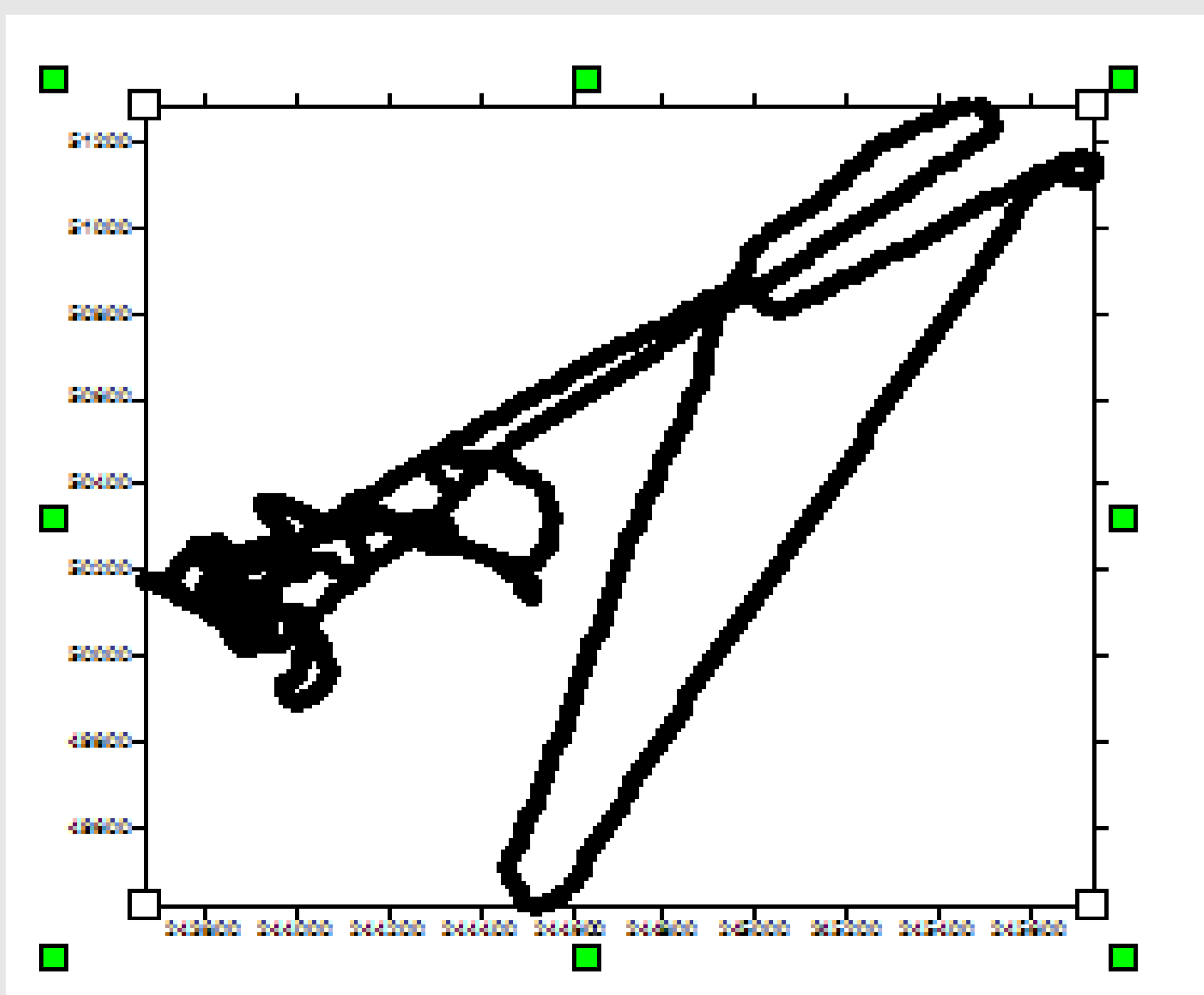


Figure 1: The original ships track, plotted on surfer, showing that the intended transects were not followed.

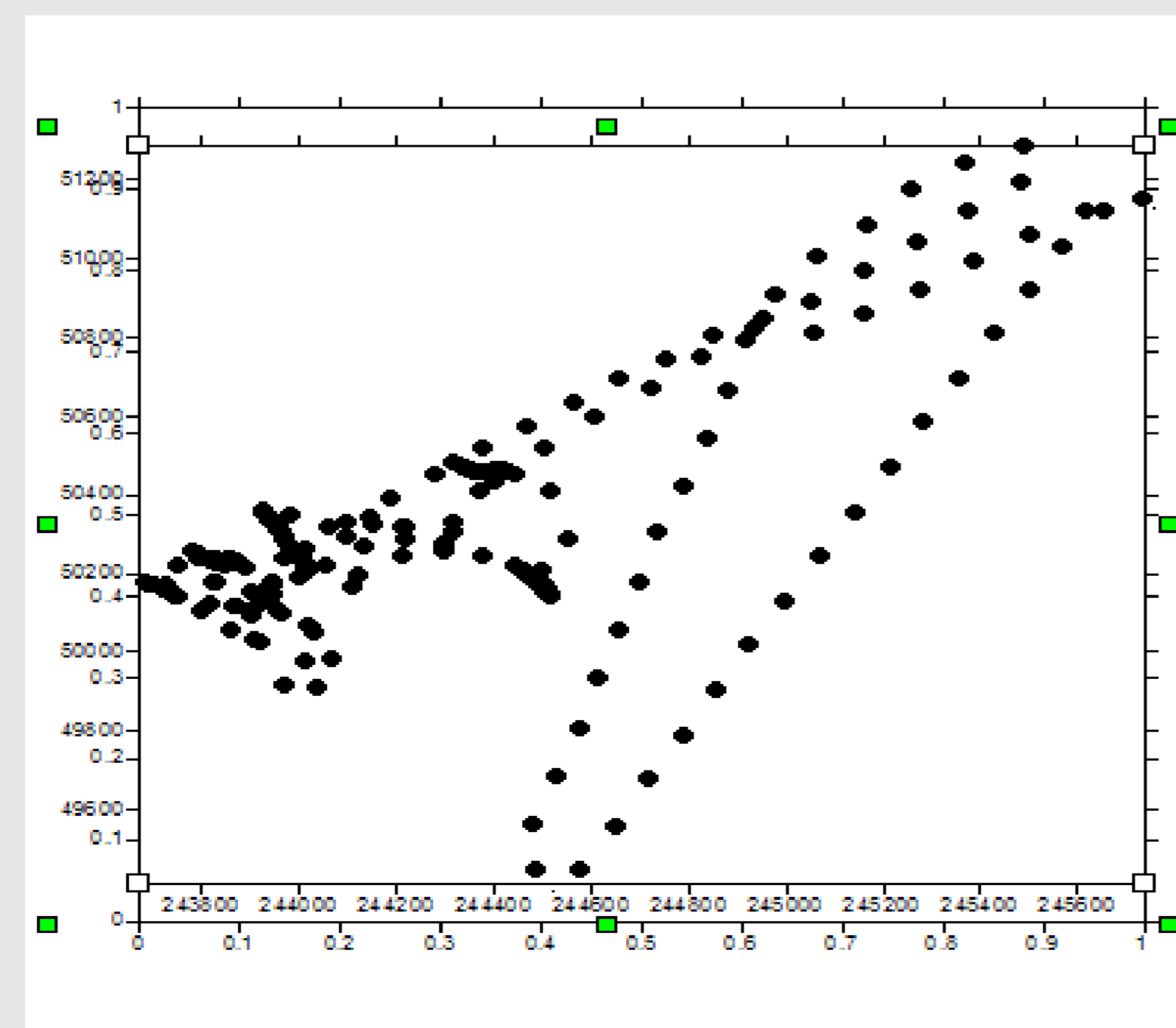


Figure 2: The modified ships track, having had the data frequency reduced to make plotting easier.

GEOPHYSICAL SURVEY OF CAWSAND BAY

SIDESCAN HABITAT PROFILE

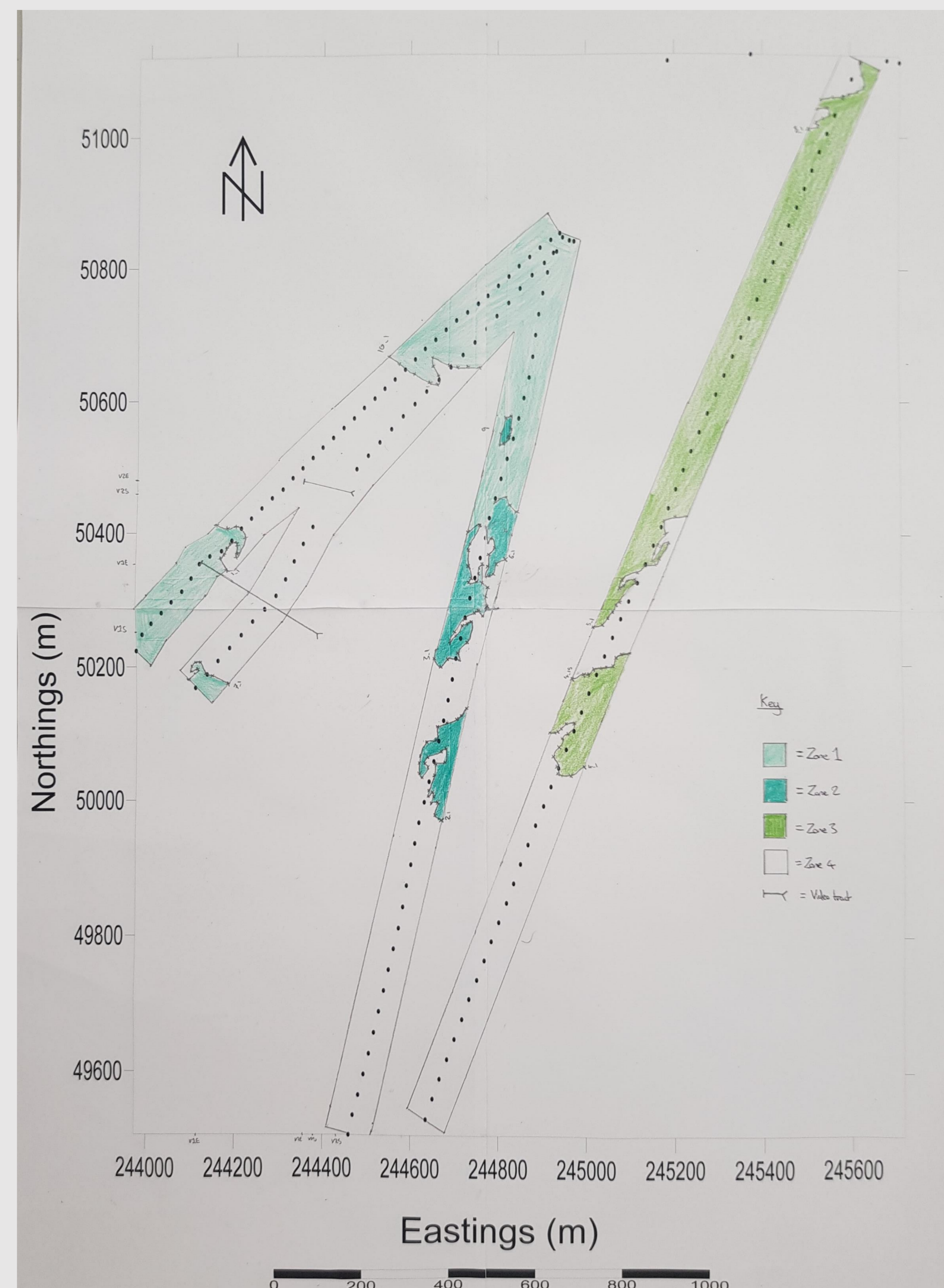


Figure 3: The completed habitat map marked with the different zones, It doesn't have the time stamps on as these were Reset by the captain so did not match the data properly.

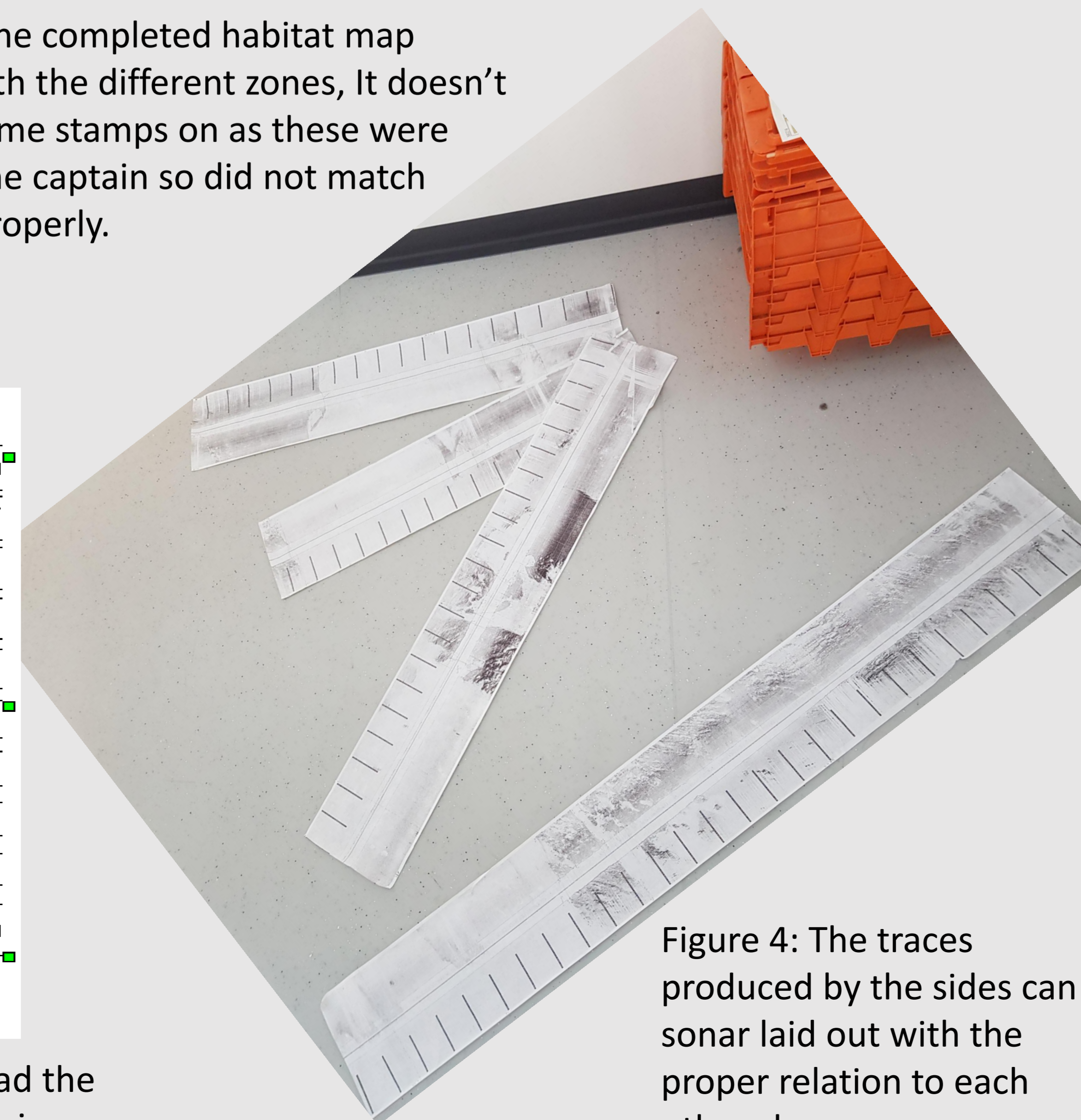


Figure 4: The traces produced by the sides can sonar laid out with the proper relation to each other shown.

VIDEO ANALYSIS

An analogue water proof live stream camera was connected to a housing to maintain the camera at a 150° angle from the tow rope. The camera was lowered to 0.5m above the seabed. Two transects were taken, unfortunately not in our desired location but did cross our side scan profile.

From the video, one species was identified – *Maja spp* (Figure 7) , one burrow was identified and some macroalgae. The sediment type across the whole transect was sand/ mud and the bathymetry was flat.

Analysis of the two video transects in primer gave a global R statistics of 0.891. As this result is close to 1, the two transects are closely related. The significance level of the sample statistic was 0.1%. As this is above 0.05% it means there was a difference between the transects but, it was not statistically significant. The two transects however should not be directly compared because camera angles were adjusted between transects, so that a frame is present in the first transect but not in the second – which obscured the cameras view. The actual sediment of each transect visually looked very similar which could be why the difference not significant.



Figure 5: The screenshot from the video showing the sediment type and burrow structures

Figure 6 (above): screenshot of video footage showing macroalgae

Figure 7 (left) : the screenshot of video footage showing *Maja spp*.

CONCLUSION

Looking at the completed habitat map (Figure 3) , we can see 4 distinct zones; the majority of the map is comprised of zone 4 which shows little to no backscatter, therefore we can infer that this is a soft muddy sediment. This is backed up by the video data as both video tracts pass over this zone and show this exact sediment type. Zone 1 has a darker shade on the side scan tract indicating a change from the norm. This could be down to a small change in sediment type or macroalgal cover, The end of the second video tract goes into this zone but shows no significant change in substrate type. Zone 2 is composed of a much harder substrate as can be seen by the very dark areas in (Figure 4), we believe this to be rock and it is where we initially wanted to run a video transect but were unable to. Zone 3 is very similar to zone 1 however it appears to be slightly harder thus leading to its differentiation from zone 1. Overall the bay seems to be made up of mainly muddy/sandy sediments with the occasional rocky outcrop. There does not seem to be an overabundance of benthic epifaunal fauna, however the burrows seen in the video indicate a thriving benthic infaunal community.