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ALSF East Coast Regional Environmental Characterisation Cruise CEND 09/09 / BGS 2009/04

Marine Geosciences

Internal Report IR/00/00

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ALSF East Coast Regional Environmental Characterisation Cruise CEND 09/09 / BGS 2009/04

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Front cover

Seabed image from site T1_56

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Foreword

This report provides information on the BGS 2009/04 / CEND 09/09 survey aboard the *R/V CEFAS Endeavour* which took place from the 18th May to the 14th June 2009 in an area located to the east of East Anglia. The cruise has been carried out under contract for the Aggregate Levy Sustainability Fund comprising the acquisition of ground-truthing data including vibrocore samples, clamshell grab samples, 0.1m^2 Hamon grab samples, 2m Jennings beam trawls and various camera techniques; and geophysical data including high-resolution multibeam echo-sounder and sidescan sonar data, as part of a Regional Environmental Characterisation. The sample sites were chosen based on data acquired on the BGS 2008/04 / CEND 18/08 geophysical survey which took place from the 27th September to the 30th October 2008. The survey was undertaken in joint collaboration between the British Geological Survey (BGS), the Centre for Ecology, Fisheries and Aquaculture Science (CEFAS) and Wessex Archaeology.

Acknowledgements

The scientists and surveyors would like to express their gratitude to the crew and officers of the *R/V CEFAS Endeavour*.

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1 Introduction

The aims of the *R/V CEFAS Endeavour* 09/09 / BGS 2009/04 cruise were to acquire ground-truthing data; vibrocore, clamshell grab and 0.1m^2 Hamon grab samples, 2m Jennings beam trawls and various camera techniques; and acoustic data; multibeam echo-sounder and dual frequency/single range sidescan sonar, in the East Coast Regional Environmental Characterisation area. This is the second phase of data acquisition following on from the geophysical survey carried out on board the *R/V CEFAS Endeavour* in September and October of 2008 (Cefas 2009). The cruise was carried out under contract for the Aggregate Levy Sustainability Fund.

The East Coast Regional Environmental Characterisation (EC REC) area is approximately 3300km^2 and extends approximately 44km east of Ness Point. An acquisition programme of geophysical survey lines was undertaken in 2008 on board the *RV CEFAS Endeavour*. A total of 2514.9 line kilometres of sidescan sonar, multibeam echo-sounder, magnetometer and AGDS (acoustic ground discrimination system) data were acquired of which 2365.2 line kilometres included surface tow boomer data.

The *R/V CEFAS Endeavour* 09/09 / BGS 2009/04 ground-truthing cruise acquired a total of 225 seabed samples and cores, photographic stills of the seabed from 81 sample sites, and processed 125 2m-beam trawls on board the vessel. A total of 1194.27 line kilometres of high-resolution acoustic data were acquired. The survey was split into two legs. Leg A took place from the 18th to 24th May and primarily concentrated on geological and archaeological ground-truthing which involved the use of the BGS 6m Vibroocorer and Clamshell Grab. Leg B, which took place between the 24th May to 14th June, largely focused on biological ground-truthing, involving the use of the 0.1m^2 Hamon grab, 2m-beam trawl and various camera techniques. Both legs were very successful.

The geophysical and ground-truthing data were acquired to compliment existing data held by project partners and other organisations in order to map sea-bed morphology, fine-scale sediment structure, broader scale habitats and palaeo-landscapes. The combination of fine- and broad-scale mapping is necessary for integrating the relationship between geophysical, archaeological and morphological features and the context in which they are found.

2 Cruise Narrative

2.1 MOBILISATION

Monday 18th & Tuesday 19th May 2009 **Alongside in Lowestoft**

Equipment was transported from BGS Marine Operations, Loanhead to Lowestoft on two 40 feet articulated Lorries on the 17th May. BGS personnel joined the vessel on the evening of the 17th May in order to unload the equipment on the 18th May. The Lorries arrived dockside at 07.30 GMT and all equipment was unloaded and onboard the *R/V CEFAS Endeavour* by 15.00 GMT on the 18th May. The Safety briefing was undertaken at 07.00 GMT on the 18th May for BGS personnel and at 16.00 GMT on the 19th May for all other personnel. A toolbox talk for the vibrocorer and clamshell grab was undertaken 09.30 GMT on the 19th May, during which a wet test of the vibrocorer was undertaken in the harbour whilst alongside. Cefas equipment required for the second leg of the survey was also mobilised at this time. All personnel were onboard by 15.00 GMT, and the vessel left Lowestoft at 16.30 GMT on the 19th May.

2.2 SURVEY

Tuesday 19th – Saturday 23rd May **Data Acquisition**

The vessel sailed at 16.30 GMT and proceeded directly to the first site, GEO28, arriving at 17.00 GMT. The clamshell grab was deployed successfully, followed by the first vibrocore. The vibrocore echo-sounder was giving erratic readings for penetration, so was re-targeted once back on deck. This sorted the problem, and data acquisition continued without further disruption for the remainder of the cruise leg.

All 30 of the top priority vibrocore and the 9 top priority clamshell grab sites were completed by 18.00 GMT on the 22nd May. The decision was taken to continue operations for a further 24 hour period during which time, the remaining second priority vibrocore and grab sample sites were completed.

Sunday 24th May **Alongside in Lowestoft**

The pilot was booked for 07.30 GMT on the 24th May, and the vessel was tied up alongside by 08.30 GMT. BGS equipment was demobilised as much as possible while in transit. All BGS equipment was demobbed and loaded onto the lorries for transport north by 12.30 GMT. All vibrocore data was backed up.

N Campbell, M Wilson, D Baxter, L Baines and M Mowat departed the vessel at 16.15 GMT. J Crummy stayed on the vessel for the second leg of the survey.

The remainder of the equipment required for the second leg of the cruise was mobilised, and all personnel were on board by 19.00 GMT. A safety briefing was undertaken at 19.00 GMT for all personnel joining the ship. The vessel sailed at 20.00 GMT and proceeded directly to the first sample site, T1_51 where a grab and a trawl were carried out.

Monday 25th May **Data Acquisition / Downtime**

The second sample site, T1_13, required the Camera Sledge, 0.1m^2 Hamon grab and the 2m-beam trawl. The Camera Sledge was deployed at 01:52 GMT. Visibility was very poor and it was decided to try another camera technique. The vessel was equipped with the Curtain Camera, the SPI-camera and the Ham-Cam. All 3 were deployed, and good quality images were acquired using the Curtain Camera, therefore the Curtain Camera was favoured for all sites requiring a camera tow.

Once all activities were completed it was discovered there was no Formaldehyde on board the vessel for the preservation of biological samples/specimens. At 10.00 GMT the vessel docked in Lowestoft to collect the Formaldehyde, and immediately sailed again, reaching the third sample site by 14.00 GMT. Data acquisition continued without further disruption.

Tuesday 26th – Thursday 28th May **Data Acquisition**

Data acquisition using a mixture of the 0.1m^2 Hamon grab, 2m Jennings beam trawl and the Curtain Camera continued. Visibility on the seabed cleared so a decision was made to try the Camera Sledge to acquire continuous video footage along the seabed. At 10.00 GMT on Thursday 28th May, the Curtain Camera and Camera Sledge were swapped over, and the Camera Sledge was deployed at site T1_5 at 10.45 GMT. Visibility was good, with features on the seabed clearly visible. In light of this, the planned route was altered in order to acquire good video footage at all the sites furthest offshore where the probability of better visibility is highest.

Friday 29th May **Downtime/Data Acquisition**

During the night of Thursday 28th the wind increased, causing visibility on the seabed to deteriorate. The Cameral Sledge was run at site T1_70_f, where visibility was very poor. This was in part due to the increased sea swell, and the location of the site being further inshore in shallower waters. During the tow, at 05.00 GMT, the Scientist-In-Charge made the decision to swap back over to the Curtain Camera for the remainder of the sites.

To compensate for the time needed to swap camera equipment, the vessel proceeded to site T1_26, where a grab and trawl were carried out. The vessel then continued on to T1_77, where the Curtain Camera was deployed at 07.15 GMT. During deployment it was noticed the cable had slackened and twisted around the winch drum, potentially damaging the cable. The Camera was recovered and the cable was unwound from the drum. No serious damage was caused to the cable, and it was wound back on the drum and operations continued at 11.30 GMT.

Saturday 30th & Sunday 31st May **Data Acquisition/Costerus Test**

Data acquisition continued without further problems, and the Tranche 1 samples sites were completed by 16.00 GMT on Sunday 31st May. Testing of the Costerus Grab was then carried out in a selected area; 10 Costerous grab samples and 10 0.1m^2 Hamon grab samples were collected for comparison.

Once these were completed, the vessel steamed to the beginning of the Tranche 2 survey, which kicked off with a high resolution acoustic survey (HIRES_1) in the south of the area.

Monday 1st June **Data Acquisition/Acoustic**

The high resolution acoustic survey (HIRES_1) started at 23.55 on Sunday 31st May and continued through Monday 1st June, finishing at 11.00 GMT. 10 lines of high resolution multibeam echo-sounder data were collected. On the first 2 lines, the sidescan sonar was deployed to check the fish and acquisition software.

At 11.47 GMT, the vessel arrived at the first sample site of Tranche 2, T2_30, where samples were collected using the 0.1m^2 Hamon grab and the 2m-beam trawl. Ground-truthing data acquisition continued through the rest of the day.

Tuesday 2nd June **Data Acquisition/Acoustic**

By 09.00 GMT, 15 of the Tranche 2 samples sites had been completed. The vessel transited to the start of the second high resolution acoustic survey areas, HIRES_2, in the centre of the EC REC survey area. The first line was started at 09.54 GMT. By 18:00 GMT, all 11 survey lines were completed, and ground-truthing data acquisition continued on the Tranche 2 sample sites.

Wednesday 3rd to Saturday 8th June **Data Acquisition/Acoustic**

The third high resolution acoustic survey, HIRES_3, in the Northeast of the area, was started at 07.00 GMT on Wednesday 3rd June. Good quality data was acquired on all 8 survey lines. The survey was completed at 17.39 GMT, and the vessel transited to the start of the fourth high resolution acoustic survey area, HIRES_4. The first line of the survey was started at 18.40 GMT, and continued through the night, finishing at 07.45 GMT on Thursday 4th June.

The vessel transited to site T2_34, where the 2m-beam trawl was deployed to confirm the presence of a sustained Sabellaria reef. Once this was completed, the ship proceeded to the start of the fifth high resolution acoustic survey area, HIRES_5. The survey commenced at 11.55 GMT and continued through the night into Friday 5th June, finishing 14.30 GMT. Good data was collected on all 26 survey lines.

Activities then continued on the Tranche 2 sample sites. Grab samples and trawl samples were collected at T2_18, T2_17 and T2_32. This brought the ship to the start of the sixth high resolution acoustic survey, HIRES_6. The survey started at 19.37 GMT on Friday 5th June. Good quality multibeam echo-sounder and sidescan sonar data was collected through the night on all 26 lines, and the survey was completed at 12.43 GMT on Saturday 6th June. Two more sites from Tranche 2, T2_33 and T2_19, were completed before commencing acoustic data acquisition on the last high resolution survey area of Tranche 2, HIRES_7 at 19.58 GMT.

Sunday 7th June **Data Acquisition/Acoustic/Archaeology Sampling**

The HIRES_7 acoustic survey was completed at 05.20 GMT on Sunday 7th June and the remaining 5 Tranche 2 samples sites were completed by 14.20 GMT.

From 15.27 GMT to 21.15 GMT, 30 grab samples were collected for Archaeological artefacts using the Costerus Grab. No artefacts were found, so 1 sample was targeted using the Scallop Dredge.

Once this was completed, the vessel proceeded to the first of the Tranche 3 sites, T3_47, where a grab sample and trawl sample were collected. The vessel then proceeded to the start of the first of the Tranche 3 high resolution acoustic surveys, GRAV_1.

Monday 8th & Tuesday 9th June **Acoustic/Data Acquisition**

The GRAV_1 survey commenced at 00.05 GMT. Good quality sidecan sonar and multibeam echo-sounder data was collected along every other line giving complete sidescan sonar data coverage. This gave the option of returning to infill with the multibeam echo-sounder if time would allow. The survey was completed at 08.04 GMT, and data acquisition continued on the Tranche 3 sample sites.

Wednesday 10th – Sunday 14th June **Data Acquisition/Acoustic**

Data acquisition continued until 08.30 GMT when the vessel steamed to Yarmouth to meet the Pilot boat in order for Matt Curtis and Marta Perez-Fernandez to depart the vessel at 10.30 GMT.

Sampling continued at 10.43 GMT on the near-shore sample sites. At 13.34 GMT acoustic data acquisition started on the second of the Tranche 3 high resolution acoustic survey areas, GRAV_2. 3 lines of data were acquired, finishing at 15.06 GMT. Data acquisition then continued on the sample sites.

By 12:11 GMT on Thursday 11th June, 63 of the Tranche 3 sample sites were completed, and the vessel proceeded to the start of the third high resolution acoustic survey, GRAV_3. Good quality sidescan sonar and multibeam echo-sounder data were acquired on 28 lines, and the survey was finished at 09.45 GMT on Friday 12th June.

Activities continued on the remaining Tranche 3 sample sites. The GRAV_4 high resolution acoustic survey lines were reached at 02.00 GMT on Saturday 13th June. The 3 survey lines were completed by 09.00 GMT, and the remaining 11 Tranche 3 sample sites were completed by 21.16 GMT. The vessel transited to the GRAV_1 high resolution acoustic survey area to fill in the remaining lines with the multibeam echo-sounder. 4 extra lines were added to the acoustic survey, and were completed at 05.58 GMT on Sunday 14th June marking the end of this survey.

2.3 DEMOBILISATION

Sunday 14th June **Transiting to Lowestoft/Alongside in Lowestoft**

The survey was completed at 05.58 GMT, and the vessel proceeded to Lowestoft to meet the Pilot boat at 13.00 GMT. During the transit, as much equipment as possible was demobilised, and the labs and deck were cleaned thoroughly ready for the next cruise. All data was backed up on to the hard drive.

The vessel tied up alongside in Lowestoft at 12.30 GMT and all samples were unloaded by 15.00 GMT. Much of the equipment stayed on board for the next survey. All scientific personnel departed the vessel by 17.00 GMT.

3 Navigation

Navigation data was logged using the Tower CEMap navigation software which is linked directly into the ships positioning system; the Fugro Seastar Network positioning system. All data acquisition systems received time stamps from this navigation signal ensuring seamless positioning of all data types acquired during this cruise. The Fugro Seastar Network system

calculates a virtual base station for the vessel location and does not use differential corrections from actual base stations. The GPS mask angle was 5°. All steering nodes (offsets, Table 1) were defined for the vessels central reference point (details of all offsets are in Appendix 6). The coordinate system used was WGS84 Zone 31N.

A gyro calibration was carried out on the 24th May 2006, the results of which can be found as Appendix 1 (page 48) in the CEND 07 08 Dogger Bank cruise report (Limpenny, 2008) which can be found on the BGS network (cruise folder: *NONBGS2008_CEFAS_CEND_7_08*).

Equipment	Steering Node
BGS 6m Vibrocorer	Stern gantry. Correction applied in real-time by Tower
BGS Clamshell Grab	Side gantry. Correction applied in real-time by Tower
Mini-Hamon Grab	Side gantry. Correction applied in real-time by Tower
2m-beam trawl	Stern gantry. Cable counter on winch. Correction applied in real-time by Tower
Camera	Stern gantry. Cable counter on winch. Correction applied in real-time by Tower
Sidescan Sonar	Stern gantry. Cable counter on winch. Automatically updated in Isis software.
Multibeam Echosounder	Drop keel reference point. Correction applied in real-time by acquisition software.

Table 1, List of equipment utilised during the cruise and which steering node each item utilised, for offsets from the steering node that need to be applied please see Appendix 6

3.1 TOWER CEMAP NAVIGATION SOFTWARE

The Tower CEMap navigation software receives the navigation string from the ships positioning system. All offsets are calculated in Tower. This software was used to record fixes for all ground-truthing samples. At the start of the survey, the fix numbers were zeroed. In order to link the navigation data with the sampling activities, an incremental station number was recorded along with the fix number in Tower, and on the logs.

For the vibrocorer and grab samples, once the equipment was on the seabed a manual fix was taken in Tower and the latitude and longitude, water depth, date and time were recorded on log sheets. For the 2m-beam trawl, Tower was set up to automatically take a fix at a set distance or time. Initially it was set to fix every 100m, however this did not give the required number of fixes, so it was changed to fix every 300 seconds. The latitude, longitude, date and time was recorded for the start and end of line on log sheets. When the camera sledge was deployed, a manual fix was taken every 60 seconds, when a still photo was taken. For the curtain camera, a manual fix was taken every 25m. The fix number and time of each fix was recorded on a log sheet.

Every 3 or 4 days the Tower navigation file was downloaded and backed-up on the vessel's server.

4 Ground-truthing Survey Equipment

4.1 BGS 6M VIBROCORER

The BGS 6m Vibrocorer is a steel open frame structure with electro-hydraulic winch retraction, seabed penetration monitoring unit and vibrator motor. The vibrocorer is 7.7m high with 5.5m span at the extremities of its feet, and weighs 4 tonnes. The vibrocorer is mobilised along with an 8' x 6'6'' x 6'6'' control cabin, and 7m x 1.2m x 1m core bench. The control cabin is connected to the vessel's power supply, and contains a 3phase electro-hydraulic power pack and PC which runs the vibrocoring software.

The Vibrocorer is deployed over the stern of the vessel. Once it is on the seabed, the vibrator motor is started and the core barrel penetrates the seabed. An echo-sounder monitors seabed penetration which is displayed in a time-depth graph on a monitor in the control cabin. Once either 6m depth has been reached, or the penetration curve levels off with time, the vibrator motor is stopped and the core barrel is retracted. The vibrocorer is then recovered on deck and the core barrel removed and carried to the core bench.

Figure 1, Recovering the vibrocorer

Figure 2, Removing the core liner from the core barrel

The core barrel is fitted with polycarbonate core liner with a diameter of 83mm. The core liner is removed from the core barrel and cut into 1m sections, measured from the top of the core. The ends are capped, taped with black electrical tape, and dipped in wax to seal. Different colour end caps are used; yellow for the top of the core and black for the base. The individual cores are labelled with the sample number and the number of sections.

The cores will be cut horizontally and processed at the Wessex Archaeology laboratory post-cruise.

4.2 CLAMSHELL GRAB

The BGS Clamshell grab is a hydraulically operated industrial 'hopper type' grab with a 340 litre capacity. The system uses a combination of high voltage electricity (415Volts) and high pressure hydraulics (200bar). The grab system requires a handling device ('A' frame, Gantry, Davit, Hiab or similar) with a minimum safe working load of 1000kgs at whatever reach is required to operate from the vessel. The grab is hydraulically powered from its own 3phase electro-hydraulic power pack.

The clamshell grab was deployed off the starboard side. Once on the seabed, the grab is closed hydraulically, penetrating the seabed sediments. The grab is then recovered on deck.

Figure 3, Recovering the Clamshell Grab

The sample was emptied out into a 2m x 1m stainless steel tray where it was mixed and sub-sampled; one 20 litre sample for Wessex Archaeology, one 20 litre sample for ALSF, one 10 litre sample for CEFAS for particle size analysis, and BGS collected a 1lb jar sample for archive.

Once the sub-samples had been collected, the remainder of the sample was sieved by the watch Archaeologist for any artefacts, which may be present.

Figure 4, Clamshell grab sample

4.3 0.1M^2 HAMON GRAB

During Leg B of the survey, seabed samples were collected using the Cefas 0.1m^2 Hamon grab. The 0.1m^2 Hamon grab is an effective sampler of coarse sediments for the analysis of benthic macrofauna and particle size distribution.

The grab consists of a rectangular frame forming a stable support for a sampling bucket attached to a pivoted arm. On reaching the seabed, tension in the wire is released which activates the grab. Tension in the wire during in-hauling then moves the pivoted arm through 90 degreees, driving the bucket through the sediment. The bucket stops against an inclined rubber-covered steel plate, which completely seals it, preventing any washout of sample material. The grab samples an area of 0.1m^2 and penetrates up to 0.15m into the seabed. The maximum sample volume is 12 litres.

Once on deck the sample was collected in a 70 litre container and carried over to the processing area. Here, the sample was photographed and the volume measured. A representative 0.5 litre sub-sample was collected for particle size analysis, and the remaining sample was sieved in 5mm and 1mm square mesh. The retained fauna and residual sediment was collected in a suitable container and preserved in a 10% formaldehyde solution.

4.4 2-METRE JENNINGS BEAM TRAWL

Epibenthic megafauna samples were collected using a 2m-beam trawl, and the samples used in conjunction with the 0.1m^2 Hamon grab to assess marine benthos. The gear comprises a heavy-duty steel beam, a chain mat to prevent the collection of large boulders, and chafers to limit net damage. A 4mm knotless mesh liner is used in the cod-end to retain smaller organisms.

The Cefas 2m-beam trawl is deployed from the vessel's stern with the amount of warp paid out being roughly three times the water depth. Tow distance was 500m for all trawls and vessel speed was kept between 1 and 1.5 knots.

Figure 5, Recovering the 2m-beam trawl

Once on deck, the net was emptied into 70 litre containers and carried over to the processing area of the vessel. Here, the catch was photographed, the volume measured, and sorted to obtain abundance data for each taxa in the catch. In some instances where there were highly numerous

species in a catch, sub-sampling of the catch was carried out. This was done by fully sorting one or more sub-samples of known volume until the cumulative numbers of individuals exceeded 100. The total abundance of the species in question was then accurately estimated by dividing the cumulative number by the sub-sample volume, then multiplying that number by the total volume of the catch. Once the highly numerous species was sub-sampled, the remainder of the catch was sorted for all other species.

Figure 6, Sorting the catch from the 2m-beam trawl

4.5 COSTERUS GRAB

The Costerus grab is a pneumatically operated twin grab. It is operated using a 12 litre SCUBA cylinder pressurised to 50 Bar, fixed to the inside of the grab. The Costerus grabs design is based on the Hamon grab; however it has 2 sample buckets with a maximum sample volume of 12 litres for each bucket.

The grab consists of a square frame forming a stable support for 2 sampling buckets attached to pistons. Once on the seabed the tension in the winch wire is released, which releases the compressed air firing the pistons. This drives the buckets through the sediment. The buckets stop against an inclined rubber-covered steel plate which completely seals them, preventing any washout of sample material.

Once on deck the samples were collected in 70 litre containers and carried over to the processing area. Here, the sample was photographed and the volume measured. A representative 0.5 litre sub-sample was collected for particle size analysis from one of the samples, and the other sample was sieved in 5mm and 1mm square mesh. The retained fauna and residual sediment was collected in a suitable container and preserved in a 10% formaldehyde solution for biological analysis post-cruise.

4.6 CAMERA EQUIPMENT

High quality video and stills images were required to interpret benthic habitats, including identifying epifauna and sediments. The EC REC area has potentially high tidal rates and difficult visibility therefore the principal gear used was the water curtain camera set up as drop camera which was transited in a series of dropdown locations. Where possible the camera sledge

was towed to identify the putative borders of acoustic areas. Further options included the Video grab (Ham-Cam) and Sediment Profile Imager (SPI). All equipment are depth rated to at least 100 metres, however normal operation depths were between 20 and 55 metres.

4.6.1 Curtain Camera

The Curtain Camera consists of a high resolution digital video/stills camera, Kongsberg OE14-208, mounted vertically in a square steel frame. A $1m^3$ fresh-water tank with a Perspex base is mounted in the frame which sits on 4 legs approximately 0.3m off the bottom. The camera looks vertically downwards through the tank, giving a clear image of the seabed. A dual LED (Seatronics SeaLED) lighting set up provides even 'white natural' lighting over the camera scene. Still shots are taken from the surface control unit. There is a remote focus and zoom facility on the video camera.

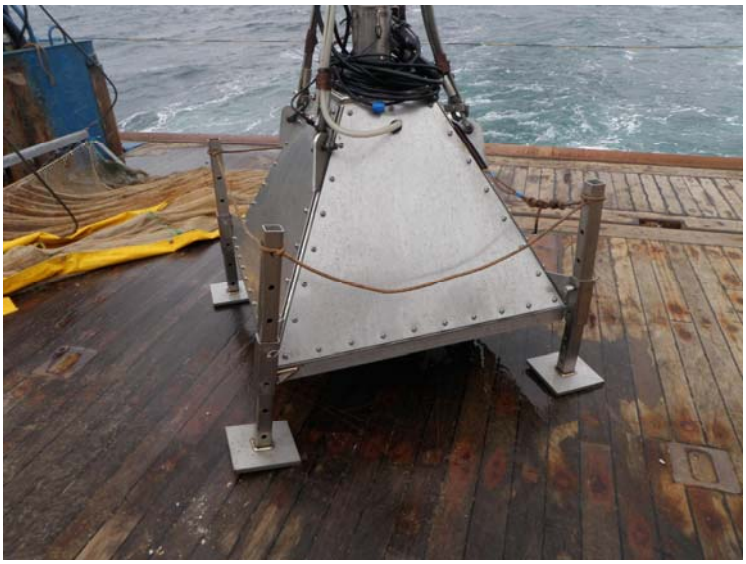


Figure 7, Curtain Camera

Positional data is fed into the Cefas developed video overlay. The vessel's position is logged to a separate data file at set intervals or by manual fix using the Tower CEMap system. The internal camera clock is synchronised with the GPS clock on the video overlay, so that the time-stamp on still images reflect the time-stamp on the video.

The Curtain Camera was deployed from the stern gantry. Video was taken of the seabed, and once the Curtain Camera was on the seabed, a still image was taken. Once the image was taken the Curtain Camera was lifted clear of the seabed, and the vessel moved 25m along a 250m tow line, where another image was taken. In areas where specific features were being targeted the spacing was adjusted according to conditions but typically between 5 and 10 metres.

4.6.2 Camera Sledge

The sledge is an alloy frame, 2.5m x 1.5m x 1.5m, which is configured with an oblique, forward-facing high resolution digital video/stills camera; Kongsberg OE14-208. A four LED (Seatronics SeaLED) lighting set up provides even 'white natural' lighting over the camera scene. The camera is operated remotely as described above, however the sledge camera obtains continuous video footage. The camera is fitted with a laser spot scaling system.

The Sledge Camera was deployed from the stern gantry, and once on the seabed, video data was recorded. The vessel moved along a 250m line at approximately 0.5 knotts, and still images were taken every 60 seconds.

4.6.3 Ham-Cam

The Cefas Ham-Cam consists of a miniature video camera (Bowtech), mounted in the Hamon grab frame so it looks vertically downwards. A single LED (Seatronics SeaLED) lighting set up provides even 'white natural' lighting over the camera scene. The same system is shared with the Curtain Camera but the Ham-Cam has no stills capability.

The Ham-Cam was deployed from the side gantry, and as with the Curtain Camera, video footage was recorded of the seabed every 25m along a 250m line. In areas where specific features were being targeted the spacing was adjusted according to conditions but typically between 5 and 10 metres.

4.6.4 SPI Camera

The Sediment Profile Imager (SPI) is operated in a similar way to the Curtain camera in a series of dropdown transects. The camera sits in a frame which is lowered over the side gantry to the seabed. Once on the seabed, a switch is activated which allows the camera to slide down the frame and penetrate the sediments. A still image is taken of the profile of the sediments, which is downloaded from the camera when it is recovered back on deck.

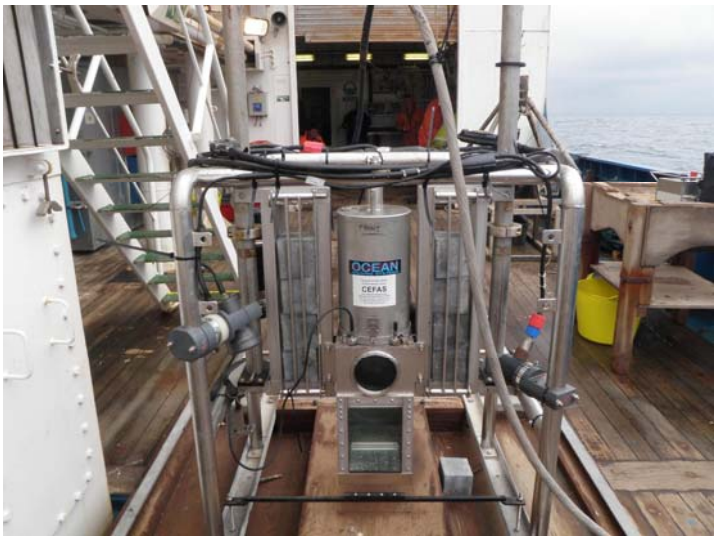


Figure 8, SPI Camera

5 Geophysical Survey Equipment

5.1 MULTIBEAM ECHO-SOUNDER

The *R/V CEFAS Endeavour* is fitted was a Kongsberg EM3002D swathe bathymetry system with data acquisition using the Kongsberg SIS multibeam acquisition software. The operating frequency for the system is 300kHz. QC of data were carried out during and following acquisition. All real-time data were monitored closely by surveyors.

The multibeam echo-sounder heads and sound velocity meter were mounted on a retractable blade which reduces noise caused by bubble blowdown and wave blanking around the hulls immediate interface with the water. The blades place the heads approximately 3.2m below the vessel hull. Sound velocity at the heads was measured using a Reson sound velocity meter. Measurements are filtered over a 60 second period and applied in real-time in the Kongsberg SIS multibeam acquisition software. Real-time sound velocity measurements ensure appropriate corrections are applied for beam-forming at the multibeam echo-sounder heads. The blade is lowered to 2m as surveyed, and fixed at calibration check time during voyage.

Vessel draft is measured by Druck PTX 1830 Depth/Level sensor (SN2069034) located in the blade space. The sensor which resolves draft to millimetres is connected via a 4-20mA current loop to the shipboard logging system and is logged with the navigation and parametric data in the general log file. It is also displayed in real-time on the logging displays as waterline level (distance between MRU and waterline as defined by Kongsberg SIS multibeam acquisition package). Readings are made when the vessel is stationary in the water to eliminate any offsets introduced through water suck down within the blade space whilst underway. The vessel draft is applied in the Kongsberg SIS software at the start of survey, where appropriate the change in vessel draft over time is applied as a "delta draft" during multibeam post processing in CARIS.

The multibeam echo-sounder data acquired during this cruise will be processed by BGS staff post-cruise and supplied to all partners once the processing is completed. Good quality data were obtained.

5.2 BENTHOS SIS1624 DUAL-FREQUENCY SIDESCAN SONAR

The sidescan sonar data were collected using a Benthos 1624 dual-frequency system and the TEI ISIS software package. The two frequencies acquired were 100 and 400 kHz. Data displayed in realtime ISIS where it was monitored by shipboard engineers and scientists. All data were stored electronically in .xtf format.

QC and post processing of data were carried out during and post acquisition. Sidescan sonar data were reviewed at frequent intervals with respect to quality, resolution and spatial coverage to ensure that the acquisition programme would provide adequate data to meet the objectives of the survey. QC of the data will be carried out by Cefas staff post-cruise and supplied to all partners once the processing is completed. Good quality data were obtained.

6 Ground-truthing Survey Leg A

Leg A of the survey was carried out between Monday 18th May and Sunday 24th May. This leg concentrated on geological and archaeological ground-truthing in the East Coast Regional Environmental Characterisation area.

During this leg, 38 vibrocores and 19 grab samples were collected. Figure 9 in Appendix 1 shows the location of all sample sites from Leg A, while Table 2 shows the location and description of the vibrocores, as well as the targeted depth and feature, and Table 3 shows the same information for the clamshell grab samples.

At each sample site, 2 vibrocores were collected; 1 with clear core liner and 1 with black core liner. Cores were collected with black core liner for Optical Spectrum Luminescence in order to date the sediments.

The vibrocores will be sent to Wessex Archaeology where they will be cut horizontally and logged. Carol Cotterill (BGS) will be working with Wessex Archaeology on this.

The sub-samples collected from the Clamshell grab samples will be sent to Wessex Archaeology for processing and archiving, and to Cefas for particle size analysis.

6.1 SURVEYING METHOD

At sample sites where both Clamshell grab samples and vibrocores were collected, the Clamshell grab was deployed first. On all vibrocore sites, a core was taken with the clear core liner first, and then the black core liner. This enabled us to gauge recovery to aid in cutting the black core liner into 1m length, or less, sections.

If no sample was recovered, the equipment was re-deployed for a second attempt.

Geological descriptions were recorded for all the Clamshell grab samples and the vibrocores. Only the vibrocores collected in the clear liner were logged. A smear was taken from the top of each metre length section, which were looked at under a microscope and described. The clear core liner enabled geologists to look for any sediment boundaries or structure along the core. Digital geological logs were produced in Strater (Appendix 3).

6.2 SAMPLE SITE SELECTION

Sample sites were selected based on data acquired on the 2008 Geophysical survey. The BGS selected a total of 53 potential sample sites through analysis of all the seismic reflection Boomer data collected. The sites were chosen based on:

- Geological / Geomorphological interest;
- Geographical spread across the survey area to enable accurate ground-truthing of a range of sites;
- Potential penetration depths based on sediment type;
- Uniqueness of sub-surface features within the survey area.

Once chosen, the sites were ranked according to priority – 15 low, 13 medium and 25 high – based on:

- Depth of target and possible penetration expected;
- Sediment and bedform distribution (e.g. proximity to large sandwaves may prevent coring of the feature of the vibrocore accidentally hits a sandwave crestline);
- Quality of the feature (a number of similar features were chosen, such as formation boundaries near sea bed, and the best example was ranked the highest).

Wessex Archaeology selected 30 vibrocore sample sites and 9 clamshell grab sample sites based on the seismic reflection Boomer data, high resolution multibeam echo-sounder data, sidescan sonar data and the magnetometer data collected. Formations and features targeted for archaeological interest were:

- Channels and associated fills;
- Edges of channels;
- Evidence of peat;
- Ravinement surfaces;
- Submerged channels.

Again these were ranked according to priority based on depth of the target and the quality of the feature.

Once both parties had selected their sites, a list of 30 sample sites and 10 reserve sites were chosen for the survey (Table 2, Appendix 1). The sample site locations were checked against the locations of underwater cables and pipelines. A 250m buffer around the cables and pipelines was required for sampling activities. Three sample sites had to be moved a short distance to outside the buffer zone, and two sites were discarded and replaced by the first two sample sites from the reserve list.

A total of 19 Clamshell grab sample sites were chosen based on their geological value in assessing the seabed sediment type, and the above formations and features targeted for archaeological interest (Table 3, Appendix 1).

6.3 SAMPLE NUMBERING SCHEME

Planned sample sites were numbered incrementally with a prefix of 'VC' for vibrocore sites, 'VCR' for vibrocore reserve sites and 'CG' for Clamshell grab sites. During the survey, sample sites were numbered incrementally with a prefix of 'GEO' (Tables 2 & 3, Appendix 1)). Each sampling activity was logged with a Station Number; an incremental number used throughout both legs of the survey. This linked the activity to the fix location in the Tower navigation software.

At all vibrocore sites, where 2 cores were collected, the cores were labelled with the 'GEO' number and the 'VC' number followed by 'C' for clear, and 'B' for black.

BGS used their own unique numbering scheme to enter the sample metadata into the BGS database. The BGS numbering scheme uses the degree square of the latitude and longitude the sample site lies within which is defined by the co-ordinates for the south-west corner, and an incremental number for that degree square, i.e. +52+02/12. For this survey, all samples were in the +52+01 and +52+02 degree squares. This numbering scheme was used for BGS use only.

7 Ground-truthing Survey Leg B

The second leg of the survey took place between Sunday 24th May and Sunday 14th June 2009. This part of the survey concentrated on biological ground-truthing which involved the acquisition of seabed grab samples using the $0.1m^2$ Hamon grab, epibenthic megafauna using the 2m-beam trawl, and photographic still and video data using various camera equipment.

During this leg, a total of 168 grab samples were acquired, 125 trawls were processed on board, and photographic stills were collected from 81 sites.

In order to guarantee geographic spatial coverage in the event of downtime, the survey was divided into three tranches. Tranche 1 consisted of 79 sample sites which included; 61 grab samples, 61 trawls and 52 camera tows (Table 4, Appendix 2). Tranche 1 was completed on Sunday 31st May. Figure 10 (Appendix 2) shows the location of the Tranche 1 sample sites.

Tranche 2 consisted of 34 sites, and 7 high resolution acoustic survey areas. Of the 34 sample sites, 1 was a grab, trawl and camera tow site, 1 was a trawl only site, and the remaining 32 were grab and trawl sites. Tranche 2 was completed on Sunday 6th June. Figure 11 (Appendix 2) shows the location of the Tranche 2 sample sites and survey areas.

Tranche 3 consisted of 112 sample sites from which 64 Hamon grab samples and 30 Costerus grab samples were collected, 33 trawls were processed, and photograph and video images were collected from 28 sites. Multibeam echo-sounder and sidescan sonar data were collected from 4 high-resolution acoustic survey areas. Figure 12 (Appendix 2) shows the location of the Tranche 3 sample sites and survey areas.

Grab samples were collected using the $0.1m^2$ Hamon grab, and were sub-sampled for particle size analysis and faunal abundance. The 2m-beam trawls were processed on board the vessel. Species were counted and the abundances recorded in an excel spreadsheet. The 2m-beam trawl samples were used in conjunction with the Hamon grab samples to assess marine benthos.

Photographic and video data were acquired using both the Camera Sledge and the Curtain Camera. The Camera Sledge generally gave poor results as visibility on the seabed was poor; therefore the Curtain Camera was used for the majority of sites.

7.1 SURVEYING METHOD

At the beginning of each Tranche, all the sample sites were entered into the Tower navigation software.

At sample sites where grab, trawl and camera data were required, the Camera equipment was deployed first. The procedure followed MESH guidelines. Data was collected from camera tows of 250m. Photographic stills were taken every 60 seconds when using the Camera Sledge and every 25m when using the Curtain Camera and Ham-Cam. In areas where specific features were being targeted the spacing was adjusted according to conditions but typically between 5 and 10 metres. Once recovered on deck, a grab sample was collected using the Hamon grab. The sample was collected within 50m of the specified sample station. Once a sample had been successfully recovered, the 2m-beam trawl was deployed over a distance of 500m.

At sample sites where grab and trawl data were required, the grab was generally deployed first.

If no sample or a poor sample was recovered (<5 litres), an additional 2 drops were carried out. Where none of the 3 samples achieved a volume of 5 litres, the largest sample was processed in order to characterise the site.

On all the high resolution acoustic surveys, the lines requiring sidescan sonar data acquisition were run first. The sidescan sonar data coverage was approximately 400m and the multibeam echo-sounder data coverage was approximately 200m, therefore sidescan sonar data was generally acquired on alternate lines. Once the sidescan sonar data had been collected, the fish was recovered on deck, and the remaining survey lines were completed with the multibeam echo-sounder.

7.2 SAMPLE SITE SELECTION

In order to characterise the EC REC area a set of regional maps were produced by Envision and Cefas. The Envision map was based on singlebeam bathymetry and segmented the region into a set of morphological strata. The Cefas map was based on sidescan sonar data and classified the area based on acoustic properties. By combining the two maps a set of 56 samples, which was representative of the combined strata were initially chosen. The frequency of samples were weighted based on the areal extent of the strata with larger and less homogenous strata having more samples than smaller and more homogenous strata. There were a further five sites chosen from inspection of the multibeam echo-sounder data and sidescan sonar data and represent sites that would appear to be unusual in terms of fine scale topography and texture, possibly indicating biogenic activity. These 61 sample sites were ranked priority 1 and made up the first Tranche of this leg of the survey.

Further second and third priority sites were selected partly to reinforce the primary sites with additional samples. However, an emphasis was placed on areas of backscatter heterogeneity. These sample sites made up Tranche 2 and 3 of the survey.

7.3 SAMPLE NUMBERING SCHEME

All sample sites were labelled with the numbering scheme adopted in the planning stages of the survey. Sample sites from Tranche 1 were labelled with an incremental number and pre-fixed with ‘T1’. Sample site numbers from Tranche 2 were pre-fixed with ‘T2’, and sample site numbers from Tranche 3 were pre-fixed with ‘T3’.

Individual sampling activities were assigned an incremental Station Number, which linked the activity to the fix location in the Tower navigation software.

7.4 LINE NUMBERING SCHEME

The Tranche 2 high resolution acoustic surveys were labelled HIRES_1 to HIRES_7. Lines were numbered sequentially, pre-fixed with the survey name, i.e. HIRES1_1.

The Tranche 3 surveys were labelled GRAV_1 to GRAV_4, and the lines were numbered sequentially pre-fixed with the survey name.

8 High Resolution Acoustic Survey

During Tranche 2 and Tranche 3, 11 high resolution acoustic surveys were carried out, totalling 1194.27 line kilometres of which 698.45 line kilometres included sidescan sonar data. Multibeam echo-sounder data was acquired on all survey lines. The survey areas were selected based on ground-truthing data from Tranche 1 and acoustic data collected during the 2008 EC REC Geophysical survey.

On all survey lines, good quality multibeam echo-sounder data was acquired. A CTD cast was carried out at the beginning of each survey in order to apply an accurate sound velocity profile to the data. The multibeam echo-sounder data will be processed by the BGS and circulated to all partners in due course.

Good quality sidescan sonar data was collected on each of the survey areas. Sidescan sonar data was processed by CEFAS on board. QC of the data will be carried out by Cefas staff post-cruise and supplied to all partners once the processing is completed.

9 Costerus Grab Trial

The design of the Costerus Twin Grab was funded by ALSF, and is based on the Hamon grab. It has previously been tested in soft sediments; however no comparison with the Hamon grab had been carried out. This survey presented an ideal opportunity to test the Costerus grab against the Hamon grab. A total of 20 sample sites; 10 Costerus and 10 Hamon grab sites, were randomly selected in a 200m x 200m area of gravel.

A sub-sample was collected for particle size analysis from the Hamon grab sample and the rest was sieved and the retained fauna and residual sediment was collected for biological analysis. A sub-sample was collected from one of the samples from the Costerus grab for particle size analysis, and the other sample was sieved and the retained fauna and residual sediment was collected for biological analysis.

Adequate samples were collected from each grab site. A comparison will be carried out on the particle size and biological analyses.

10 Archaeological Sampling

During Leg A of the survey, a piece of worked flint was discovered in a Clamshell grab sample, GEO18 (Figure 12, ARCH 01 area). Based on this, 30 grab samples were collected using the Costerus Twin grab in an area of 550m x 1250m, around the GEO18 sample site. The samples were sieved in the 5mm square mesh. No archaeological artefacts were found.

11 Health & Safety

The health and safety guidance for this cruise was written and approved by BGS prior to operations being undertaken (Campbell, 2009). All BGS personnel read the H&S document and signed the confirmation sheet. There was no separate CEFAS health and safety document that BGS personnel were asked to read.

All BGS personnel attended a safety briefing on Monday 18th May 2009. CEFAS personnel who had not sailed on the *R/V CEFAS Endeavour* within the last 6 months and Wessex Archaeology personnel attended a safety briefing on Tuesday 19th May prior to sailing. Following the crew change on Sunday 24th May, a safety briefing was carried out for all new members of survey. A muster was carried out at 16.00 GMT on Friday 29th May for all personnel. Personnel were required to gather at the muster station and don lifejackets. A second muster was carried out on Tuesday 9th June at 16.00 GMT. All personnel were required to gather at the muster station and a fire drill and casualty evacuation drill were carried out.

All staff recovering and deploying equipment at the stern of the vessel were required to wear lifejackets, as per the vessel regulations.

Appendix 1 Leg A Groundtruthing

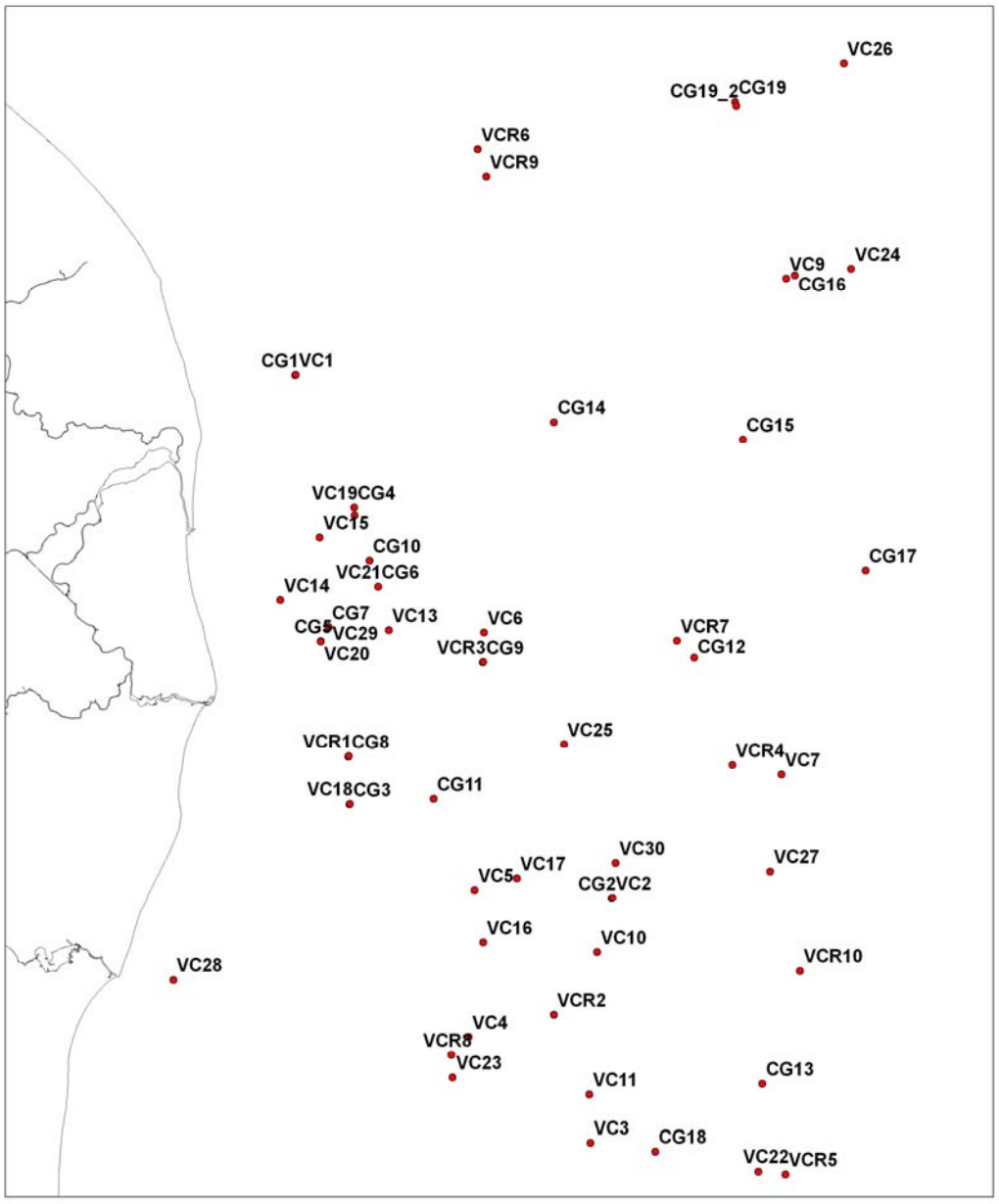


Figure 9, Map showing Leg A sample site locations

Table 2, Vibrocore sample sites and core descriptions

GEO number	VC number	Latitude	Longitude	Target Depth	Target	Cored Depth	Description
GEO1	VC1	52 39.770 N	1 49.935 E	4.5m	Cross Sands Anomaly - possible Swarte Bank Formation	1.6	Gravelly muddy sand, orangey brown in colour which gradually changes to grey coarse sand. Contains pebbles and shell fragments. From 0.3m, medium grey sand with shell fragments (~5%) becoming finer towards base of core
GEO2	VC2	52 21.809 N	2 08.290 E	5m	Causeway Anomalies. Target area just off one of the anomalies - MBES suggests causeway may have outcropping rock	1.64	Medium-coarse sand, lightish brown, no shell fragments. Distinct boundary at 0.88m into coarser gravelly sand. More greyish brown in colour. Contains shell fragments (~7%). At base of core, fine-medium sand with shells to 40mm. Orangey brown colour.
GEO3	VC3	52 13.344 N	2 7.214 E	4.5m	Discrete sediment lens following the topography of the present day seafloor. Unusual seismic signature compared to the surrounding sediments.	3.95	Fairly homogenous dark grey sand mud. Very fine grained/silty. Some silt horizons interbedded with sandier mud. Bioturbation. Well sorted. Very dry.
GEO4	VC4	52 16.912 N	2 00.298 E	5.0m	Edge of a broad channel feature. Onlap of channel fill onto older sediments.	3.61	Fairly homogeneous grey/green sandy mud. Very well sorted. Sandier horizons throughout. Anoxic lenses at about 3.2m. Gravel up to 15mm at seabed.
GEO5	VC5	52 22.016 N	2 00.506 E	5.0m	Sub-surface erosional surface with onlap of younger sediments - formation boundary?	1.67	Grey/brown medium grained muddy sand, moderately sorted, no shell material.
GEO6	VC6	52 30.942 N	2 00.848 E	4.5m	Inclined reflector coming ro near surface with near horizontal onlapping reflectors beneath.	2.43	Fairly homogeneous sandy mud, dark grey colour. Shoe - Very dry dark grey sandy mud as rest of core but contains shell fragments (~3%).
GEO7	VC7	52 26.132 N	2 17.756 E	4.5m	Topographic high showing internal structure.	2.09	Gravelly muddy sand, orangey brown colour, coarse grains, moderately sorted with shell fragments up to 20mm. Becomes finer grained and very well sorted at ~1m, before becoming coarser again at the base of the core.
GEO8	VC9	52 43.313 N	2 17.750 E	5.0m	Internal dipping reflectors within sandwave - best example of internal geometry	5.2	Fine grained slightly muddy sand down to 1.5m then gradual change into dark grey muddy sand which becomes very dark, almost black towards base of core. Metallic smell to very black sediment at base of core.
GEO9	VC11	52 14.988N	2 7.129E	4.5m	Large channel - like feature containing present day topographic high. Possible formation boundary coming to near surface. Evidence of a secondary erosional surface	2.82	Coarse gravelly sand with abundant shell fragments and complete shells, down to 0.2m. Grey medium grained sand, very well sorted. No obvious structure. Becoming darker grey finer grained sand towards base.
GEO10	VC13	52 30.983 N	1 55.450 E	5m	Discrete sediment lens at the base of a channel-like feature, mirrored by present day topography	2.62	Medium-coarse grained sand, reddish brown colour, shell fragments, ~1%, maximum 10mm in size. At 0.3m changes to medium grained muddy sand, grey in colour with darker patches. Stiff to touch - clay matrix

GEO11	VC14	52 31.972 N	1 49.286 E	5m	Strong sub-surface horizon within a topographic bank feature. Evidence of multiple internal reflectors - only example of this kind	2.46	Fine grained grey/brown sand. Well sorted. Contains small % shell fragments. Colour variations through core - layers grey and bown sand.
GEO12	VC15	51 34.160 N	1 51.457 E	5m	Inclined horizons coming to near surface with overlying near horizontal reflectors - laterally variable in extent	0.78	Grey muddy sand, fine grained, watery. Well sorted. Top 0.12m is slightly gravelly coarse sand, poorly sorted, contains shell fragments up to 3mm.
GEO13	VC16	52 20.204 N	2 01.033 E	5.0m	Sub-surface mound-like feature with a different acoustic signature beneath it	1.46	Muddy sand, grey in colour, fine grained. Poorly sorted with up to 40% shell material. Shell material disappears towards base of core.
GEO14	VC17	52 22.451 N	2 02.886 E	5-6m	Sub-surface topographic high with moat like features on either side. Higher internal reflectors	2.48	Coarse sandy gravelly mud, very poorly sorted. Contains shell fragments (low percentage). Gradually changes at ~1m to dark grey sandy mud, very fine to fine grained. Very watery.
GEO15	VC18	52 24.939 N	1 53.405 E	4.5m	Cut into Westkappelle Ground Formation. Yarmouth Roads or Brown Bank fill? Within southern extent of possible remnant channel	2.25	Sandy mud, very fine grained, poorly sorted becoming coarser downhole. Gravelly sand with shell and clasts up to 4mm at base.
GEO16	VC19	52 35.213 N	1 53.390 E	3m	Small channel cut into bank feature - fine grained sediment unit?	3.13	At seabed, gravel clasts up to 20mm, angular and shell fragments up to 35mm. Dark grey sandy mud, soft to touch, very fine grained, well sorted. Becomes lighter grey and coarser downhole, with increasing % shell material. At base, coarse gravelly sand with ~5% shell material. Clasts up to 10mm.
GEO17	VC20	52 30.547 N	1 51.602 E	5.0m	Holocene overlying fill. Fill possibly associated with submerged channel	1.03	Gradual change from ~0.3m from reddish brown coarse sand with ~3% shell fragments to a brown/grey very coarse sand with abundant shell fragments (~20%) and gravel clasts up to ~1cm. Very dark patch about 5cm wide at 0.35m.
GEO18	VC21	52 32.489 N	1 54.821 E	4.5m	Minor cut within Area 240. Unknown fill.	0.64	Coarse gravelly sand, light brown. Moderately sorted. No shell fragments. From ~0.3m gets more gravelly with clasts up to 1cm.
GEO19	VC22	52 12.436 N	2 16.669 E	4.5m	V-shaped cut and fill. Fill acoustically transparent. Possible fine-grained sediments	1.56	Very coarse sand, moderately-poorly sorted. Shell fragments to 12mm, clasts up to 2mm. Around a 0.1m wide horizon rich in shell material (~50%) at 0.25m depth.
GEO20	VC23	52 15.507 N	1 59.420 E	4.5m	Sediment unit (?Brown Bank) cutting into 2 earlier units.	2.61	Brownish grey gravelly muddy sand, coarse grained with gravel clasts up to 2cm. Very poorly sorted. Contains shell fragments (~5%). From ~1m, fairly homogenous dark grey clay with rare shell fragments, well compacted, well sorted. At base of core, coarse muddy sand, poorly sorted with ~5% shell fragments.
GEO21	VC24	52 43.675 N	2 21.444 E	5.0m	Complex sediment unit. Layers of sands and gravels?	3.35	Coarse grained sand. Very dark grey/black down to 0.80m, then quite sharp change to grey/brown colour.
GEO22	VC25	52 27.098 N	2 05.453 E	4.0m	Dipping reflectors beneath surficial sediments. Evidence of at least two sediment layers	1.77	Coarse sand (poorly sorted) suspended in very fine grained matrix, very watery. Top 30cm very gravelly with abundant shell fragments. Relatively sharp change at 0.7m into medium sand, dark grey in colour with patches of very black sand.

GEO23	VC26	52 50.798 N	2 20.924 E		Small sub-surface topographic high - possible formation boundary	3.4	Very fine sand, lightish grey becoming darker towards base of core. Well rounded grains, predominantly quartz with abundant larger black grains (haematite?). At 2.3m, very gradual change into sandy mud, very stiff to touch. Very dark grey/black.
GEO24	VC27	52 22.785 N	2 17.180 E	4.0m	Edge of cut feature. Layerd fill unit.	5.95	Grey sandy mud (fine/silt) containing shell fragments up to 30mm. Well sorted. At ~1m unit becomes much darker in colour, and becomes finer downhole to ~5.5m where it becomes sandy. The base of the core is sandy gravel containing shells and clasts to 30mm. Very poorly sorted.
GEO25	VC28	52 18.742 N	1 43.602 E	4.0m	Nature of coarse grained sediments - remains of onshore gravels?	1.74	Very dark grey sandy mud, fine grained. Very poorly sorted. Contains shell fragments (~10%). Gradual change at 1.1m into medium grained sandy gravel. Contains shell fragments. Very poorly sorted.
GEO26	VC29	52 31.063 N	1 52.053 E	3m	Bank feature. Nature of bank is unknown. Bank is on the edge of possible remnant submerged channel	3.36	Top 0.30m coarse sand, moderatley well sorted, occasional shell fragments (1%). Gradual change at ~0.30m to fairly homogenous dark grey medium muddy sand. Very well sorted. Stiff to touch - clayey.
GEO27	VC30	52 23.021 N	2 08.457 E	5m	Two strong horizons coming to near surface - possibly formation boundaries and/or different periods of infill.	3.42	Gravelly muddy sand, brownish grey. Gravel clasts up to 30mm. Contains shell fragments. Very poorly sorted. Banding observed from 0.6m. From 1m, core is dark grey sandy mud, very well sorted with same banding.
GEO28	VCR1	52 26.585 N	1 53.289 E	4.5m	Sub-surface erosional surface with laterally localised down-dipping reflectors	1.15	Coarse muddy sand with shell fragments, becoming coarser downhole. At base, very coarse grained sandy gravel with <1% shell fragments.
GEO29	VCR2	52 17.729 N	2 5.071 E	4.0m	Shallow cut close to seabed	2.18	Very coarse grained shelly sand up to 40% shell material. Fragments up to 2mm. No obvious structure through core. Poorly sorted.
GEO30	VCR3	52 29.927 N	2 00.807 E	3.0m	Edge of bank. Similar bank structure that is known to contain peat further north	1.13	Gravelly sand with abundant worm casts (Sabellaria) at seabed. Medium grained sand, reddy brown colour, well sorted. No obvious structure through core.
GEO31	VCR4	52 26.445 N	2 14.970 E	4.0m	Holocene over ?Yarmouth Roads.	2.49	At seabed, coarse slightly gravelly sand with ~10% shell material, brown in colour. Disinct change at 0.25m into grey coarse sand with shell fragments to 2mm (~8%). Becomes progressively darker downhole. From ~0.8m sediment is medium grained sand with up to 4% shell material, becoming finer towards the based of the core.
GEO32	VCR5	52 12.340 N	2 18.202 E	3.6m	Small cut and fill. Nature of the fill?	2.82	Fairly homogenous medium-coarse grained sand. First 20cm is light brown in colour, gradually becoming greyer down core. No obvious structure through core. Shell fragments at base of core (~15%).
GEO33	VCR6	52 47.675 N	2 00.111 E		Sub-surface erosional horizon with small topographic high on top of it	2.34	Coarse sand, light brown colour. Shell fragments ~3%. Gradual change at about 0.5m into a finer dark grey sand with clay matrix - stiff to touch.
GEO34	VCR7	52 20.743 N	2 11.777 E	4.5m	Fill marked by undulating reflector extending into bank feature	2.78	Coarse (slightly muddy) sand, moderately sorted with ~5% (up to 10% at seabed) shell material. Becomes finer grained downhole and has variations in colour from brown/grey to dark grey.

GEO35	VCR8	52 16.277 N	1 59.318 E	4m	Inclined formation boundary coing to near surface	3.35	Medium grained shelly sand (up to 25% shell material), which becomes finer grained with depth. Sharp boundary at 2.4m into stiff grey mud/clay, very well sorted.
GEO36	VCR9	52 46.729 N	2 00.620 E	5m	Inclined horizon coming to near surface to form a topographic high - younger onlapping horizons	1.27	Fairly homogeneous coarse grained sand. Greeny grey in colour, darker towards base. Rare shell fragments. No structure through core.
GEO37	VCR10	52 19.347 N	2 18.916 E	4.5m	Modern day sandwave feature with sub-surface reflectors coming up to form a mound - past deposition guiding present day formations?	2.77	Medium-coarse grained muddy sand (very slightly gravelly), greyish/brown in colour. Shell fragments (~5%). Poorly sorted. At ~2.3m sediment becomes more fine grained, muddy sand with no shell fragments - gradual change.
GEO48	VC10	52 19.921 N	2 07.476 E	4.5m	Sub-surface topographic high with indications of a complex internal sediment stratigraphy. Onlap to either side. Present day seafloor guided by this sub-surface high	1.75	Fairly homogeneous grey medium sand (slightly muddy) with rare shell fragments up to 1mm in size. Whole shells at seabed. No visible structure throughout.

Table 3, Clamshell grab sample sites and descriptions

GEO number	CG number	Latitude	Longitude	Target	Cored Depth	Description
GEO1	CG1	52 39.751 N	1 49.926 E	Cross Sands Anomaly - possible Swarte Bank Formation	25cm	Gravelly coarse muddy sand containing pebbles/cobbles, shells and shell fragments. Brown and grey sand very poorly sorted.
GEO2	CG2	52 21.794 N	2 08.247 E	Causeway Anomalies. Target area just off one of the anomalies - MBES suggests causeway may have outcropping rock	30 cm	Clean gravelly medium/coarse sand. Small amount of complete and broken shell. About 50/50 sand/gravel mixture - very poorly sorted.
GEO15	CG3	52 24.922 N	1 53.388 E	Cut into Westkappelle Ground Formation. Yarmouth Roads or Brown Bank fill? Within southern extent of possible remnant channel	34cm	Very fine grain slightly sandy mud. This sandy horizons. Lamination throughout.
GEO16	CG4	52 35.206 N	1 53.390 E	Small channel cut into bank feature - fine grained sediment unit?	0.2cm	Handful of pebbles and grey wet sand. Dark grey sandy mud. Well sorted.
GEO16	CG4-2	52 34.945 N	1 53.406 E		12cm	Coarse gravelly sand containing pebbles and cobbles up to ~60mm. Very poorly sorted. Contains shell fragments (~3%).
GEO17	CG5	52 30.565 N	1 51.617 E	Holocene overlying fill. Fill possibly associated with submerged channel	24 cm	Coarse sandy gravel. Gravel clasts to 50mm plus shell fragments (5%).
GEO18	CG6	52 32.490 N	1 54.819 E	Minor cut within Area 240. Unknown fill.	25cm	Clean gravelly sand with occasional flint/quartz cobbles/pebbles on top. Mostly well rounded and sub-angular flint. Max 17cm. Contains shell fragments. Very poorly sorted.
GEO26	CG7	52 31.042 N	1 52.043 E	Bank feature. Nature of bank is unknown. Bank is on the edge of poaaible remnant submerged channel	31cm	Very coarse grained shelly gravelly sand. Angular gravel clasts to 12mm, rare large cobbles. Up to 20% shell material.
GEO28	CG8	52 26.566 N	1 53.276 E	Sub-surface erosional surface with laterally localised down-dipping reflectors	~30cm	Top 10 cm dark sandy mud underlain by coarse/medium shelly sand. At 20cm 2cm of very dark anoxic material. Possibly peat. Below that coarse shelly sand. Occassional cobbles.

GEO30	CG9	52 29.913 N	2 00.785 E	Edge of bank. Similar bank structure that is known to contain peat further north	33 cm	Medium grained sand. First 20cm very well sorted. Underlain by coarse gravelly sand with abundant shell material (20%), clasts up to 5cm+. Layers of very black anoxic (peat?) sediment - very fine grained/silty. Sabellaria worm casts on seabed.
GEO38	CG10	52 33.384	1 54.293	Sediment boundary confirmation	44cm	Very coarse sand with shell fragments of up to 2mm (~10%). Some coarse layers with up to 25% shell material. Moderately sorted.
GEO39	CG11	52 25.148 N	1 58.130 E	Sediment boundary confirmation	20cm	Seabed covered in pebbles and cobbles up to 15cm, mostly subrounded. Also worm casts. Only about 10cm of gravelly sand, sharp boundary into fine-medium grained sand, grey in colour with patches of very dark grey/ black. Very well sorted.
GEO40	CG12	52 30.163 N	2 12.762 E	Sediment boundary confirmation	40cm	Gravelly sand, orangey brown. Very poorly sorted. Coarse sand. Shell fragments (10%).
GEO41	CG13	52 15.413 N	2 16.857 E	Sediment boundary confirmation	35cm	Coarse grained shelly sand becoming gravelly at base of sample.
GEO42	CG14	52 38.259 N	2 04.656 E	Sediment boundary confirmation	25cm	Gravelly sand. Clasts up to 15mm. Coarse to very coarse sand. Shell fragments (1%).
GEO43	CG15	52 37.733 N	2 15.381 E	Sediment boundary confirmation	23cm	Gravelly sand on top 5cm overlying coarse sand. Shell fragments and whole shells (1%).
GEO44	CG16	52 43.418 N	2 18.241 E	Sediment boundary confirmation	27cm	Very dark grey/black very fine mud (slightly sandy). First 20cm very silty becoming sandier at base of sample. Very well sorted, rare shell fragments.
GEO45	CG17	52 33.248 N	2 22.420 E	Sediment boundary confirmation	40cm	Slightly gravelly sand. Brown, coarse to very coarse. Not much gravel. Some brown shell fragments ~2%.
GEO46	CG18	52 13.068 N	2 10.868 E	Sediment boundary confirmation	32cm	Coarse grained sand, moderately sorted. Contains shell fragments (~3%).
GEO47	CG19	52 49.430 N	2 14.739 E	Sediment boundary confirmation	NIL	No sample
GEO47	CG19_2	52 49.300 N	2 14.813 E		33cm	Dark grey sandy mud with layers of very dark/black silt, anoxic. Becomes sandier at base of sample.

Appendix 2 Leg B Groundtruthing

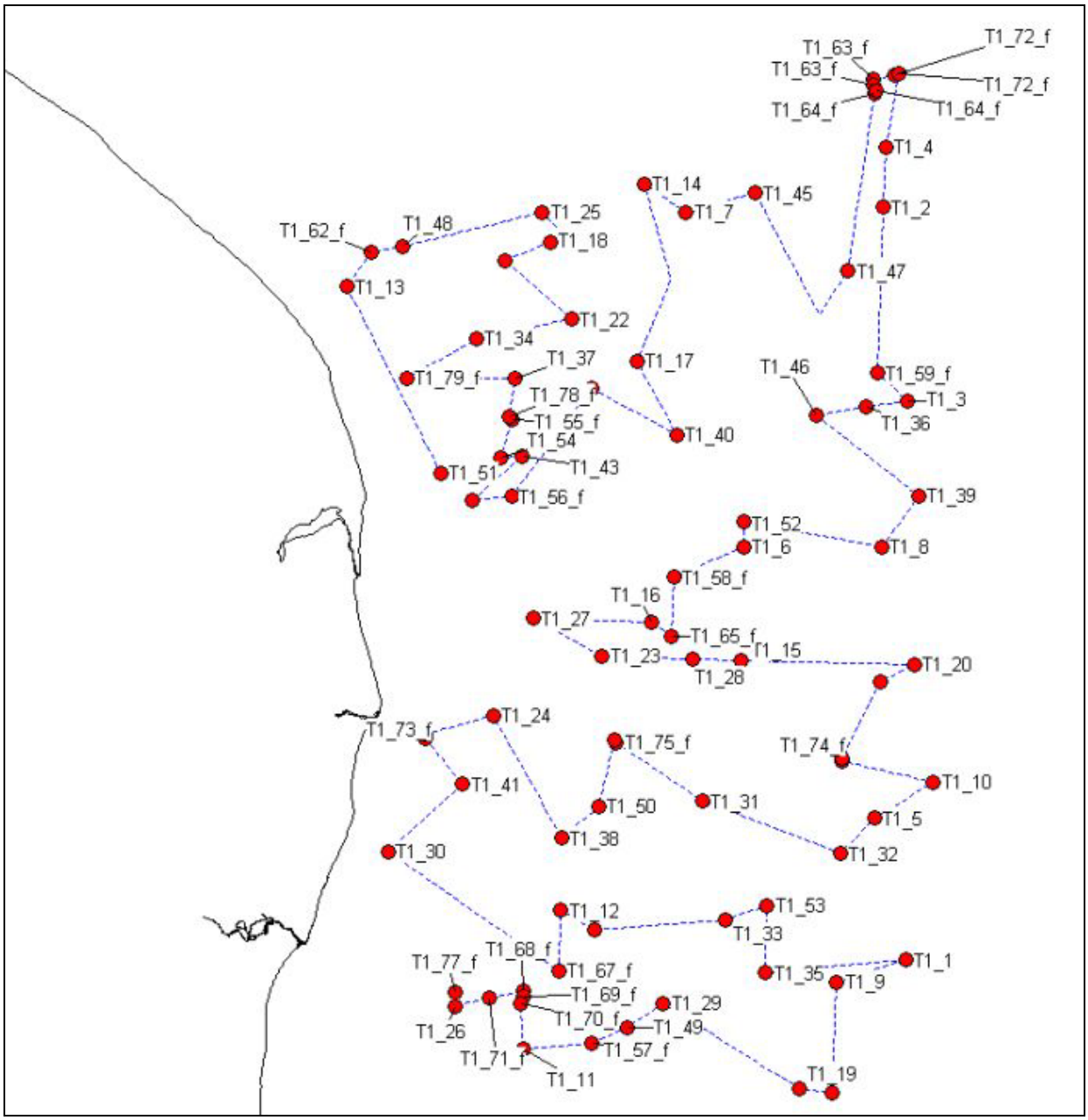


Figure 10, Map showing Tranche 1 sample site locations

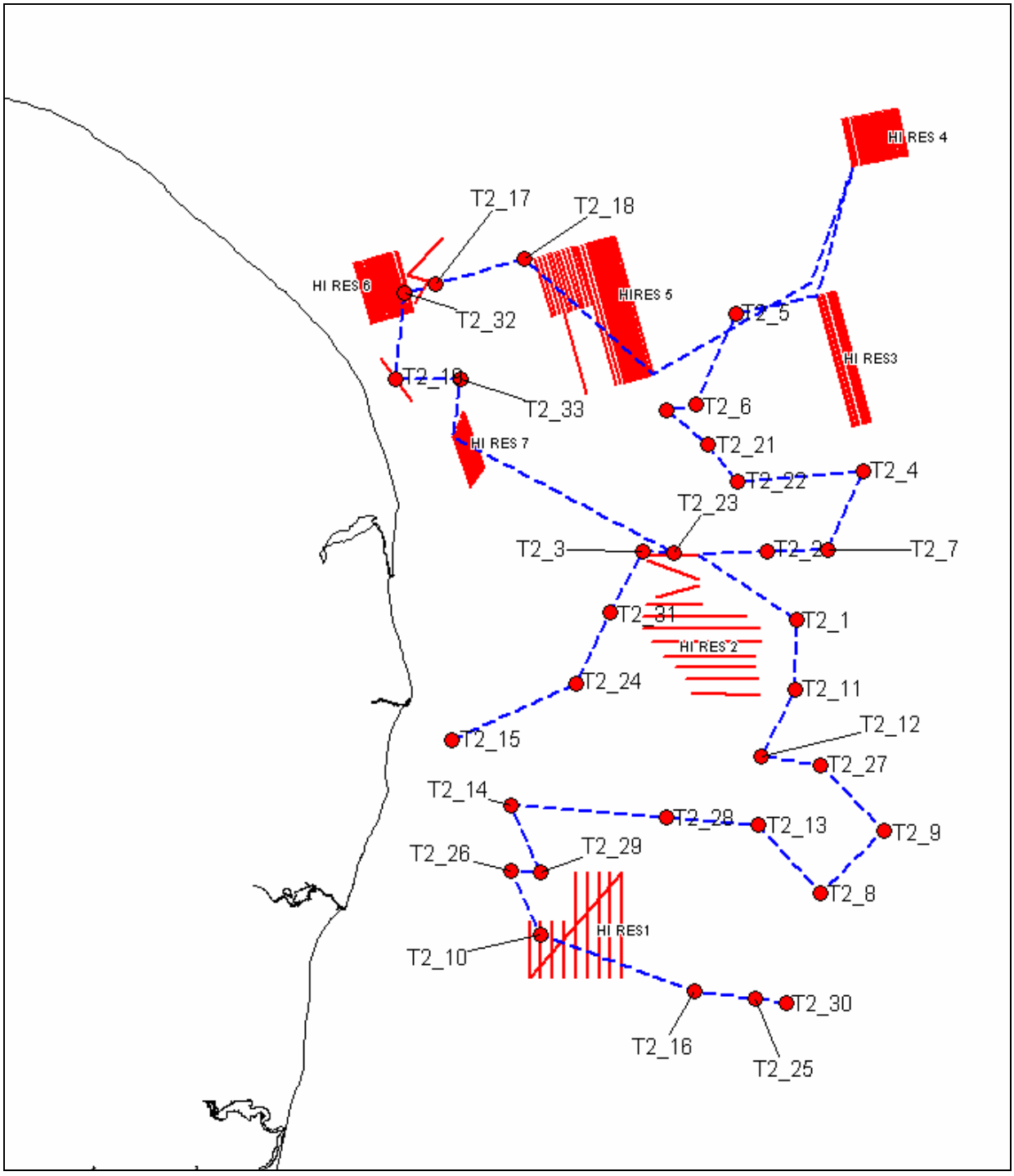


Figure 11, Map showing Tranche 2 sample site and high resolution acoustic survey locations

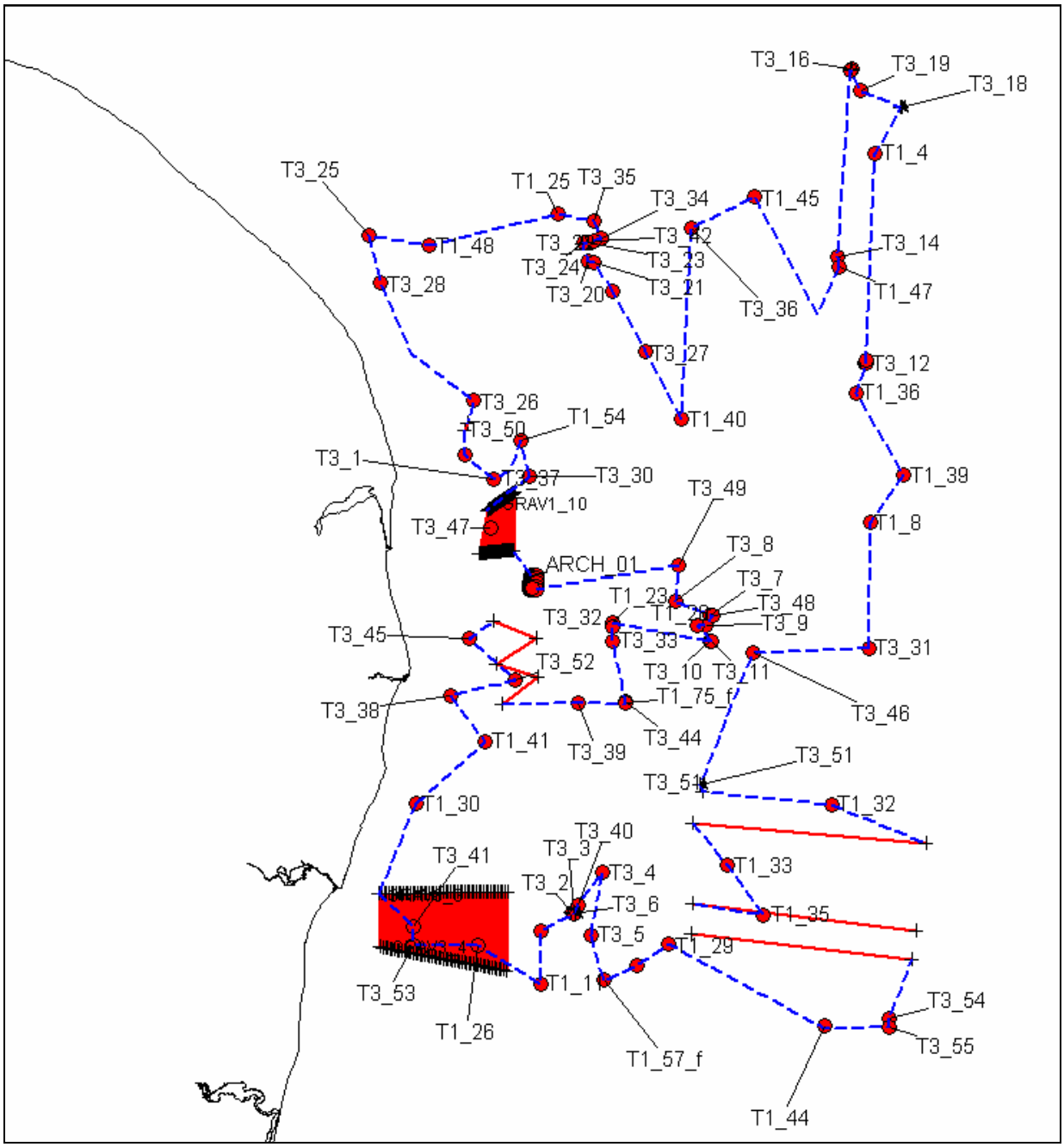
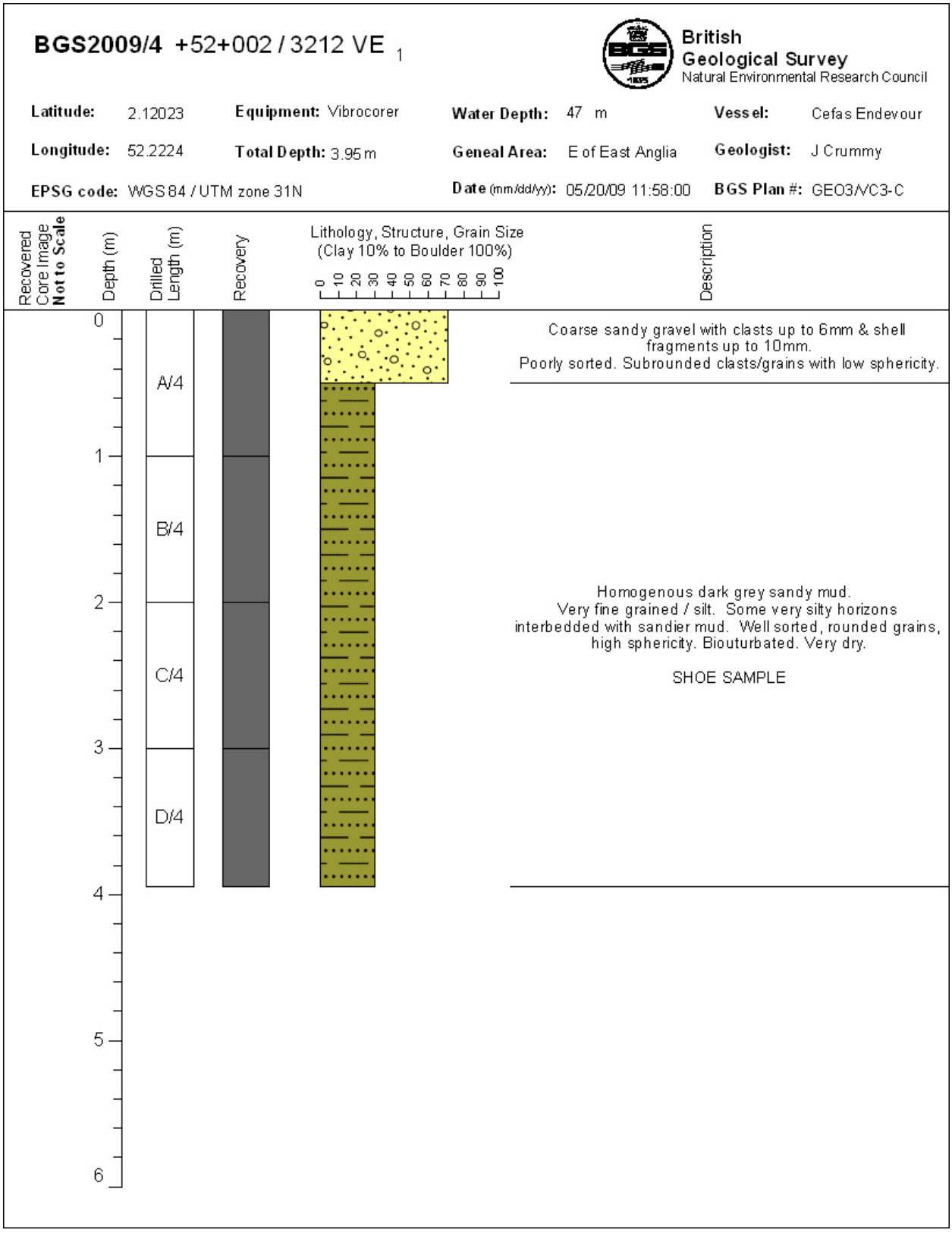


Figure 12, Map showing Tranche 3 sample site and high resolution acoustic survey locations

Tranche	No. of stations	0.1 m^2 Hamon grabs	2m beam trawl	Camera	Costerus Twin grab	Scallop dredge	Multibeam (km)	Sidescan (km)
1	79	61	61	52	10	0	0	0
2	34	33	34	1	0	0	858.42	491.51
3	112	64	33	28	30	1	492.96	206.94
TOTAL	**225**	**158**	**128**	**81**	**40**	**1**	**1351.38**	**698.45**

Table 4, Summary table of Leg B ground-truthing

Appendix 3 Geological Log



Appendix 4 Daily Log

The daily logs were completed by the Senior Scientist. For a daily narrative of onboard operations please see Chapter 2 of this report.

18th May 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	**E-mail**	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	1		
Period	18th May 2009		

1. Ship's Position & Status

Date	18th May 2009		Latitude	52 28.388 N
Time	GMT	24:00	Longitude	01 44.625 E
Present Activity		Alongside in Lowestoft		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	24:00	24:00	Mob	Mobilising vibrocorer and clamshell grab

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops			
Standby at sea (weather)	StbyW			
Stand-down alongside	StbyO			
Mob / Demob	Mob	24:00	0	24:00
Contractors Time (Vessel)	CtV			
Contractor's Time (Operations)	Ct			
	Total:	**24:00**	**0**	**24:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0				10	
Vibrocores	0				30	
Hamon grabs	0				60	
Camera stations	0				30	
Beam trawls	0				20	
High resolution surveys (km)	0				N/A	

5. Weather

Time	**Obs Wind**	**Obs Sea State**	**Remarks**
04:00	Alongside in Lowestoft		
08:00			
12:00			
16:00			
20:00			
24:00			

Outlook Inshore shipping forecast & Navtex:

6. Safety & Environmental

Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew		*Survey Crew*	
Master	A Reading	Senior scientist	Dave Limpenny
1st Mate	G Ritchie	Survey engineer	Nigel Lyman
2nd Mate	R Hitcham	Survey engineer	Neil Campbell

3rd Mate	A Oakham	Survey engineer	Lee Baines
Chief Engineer	S Tweedie	Survey engineer	Michael Wilson
+ 12 additional crew		Survey engineer	David Baxter
		Geologist	Julia Crummy
		Geologist	Mary Mowatt
		Archaeologist	Stephanie Arnott
		Archaeologist	Marta Perez-Fernandez
Total crew	***17***	***Total survey***	***10***

Others

Client representative	John Coppock
MEPF Student	Theo Gaussen
Total	***2***
Total persons onboard	**29**

8. Next 24 Hours
Plan to sail on PM tide on 19th May.

9. Key Dates	**Location**	**Date**
Last Port call	Lowestoft	18th May
Next crew change		TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	N/A	
Next safety muster	20th May	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Vessel mobbing alongside in Lowestoft. Plan to sail on PM tide on 19th May.

12. Report submitted by:

Party Chief	Dave Limpenny	Client Representative	J Coppock	Master	A Reading

19th May 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	E-mail	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	2		
Period	19th May 2009		

1. Ship's Position & Status

Date	19th May 2009	Latitude	52 24.9 N
Time	GMT 24:00	Longitude	01 53.4 E
Present Activity	Vibrocore/Clamshell grabs		

2. Summary of Events
Time zone GMT

From	To	Duration	Code	Activity
00:00	17:00	17:00	Mob	Mobilising vibrocorer and clamshell grab and transit to site
17:00	24:00	07:00	Ops	Collecting vibrocores and clamshell grabs

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	07:00	0	07:00
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0

Mob / Demob	Mob	17:00	24:00	41:00
Contractors Time (Vessel)	CtV	0	0	0
Contractor's Time (Operations)	Ct	0	0	0
	Total:	**24:00**	**0**	**48:00**

4. Production Summary

Data gathered	Today	Previous	Total	Remaining	Planned	% Complete
Clamshell grabs	2	0	2	8	10	20
Vibrocores	2	0	2	28	30	6.6
Hamon grabs	0	0			60	
Camera stations	0	0			30	
Beam trawls	0	0			20	
High resolution surveys (km)	0	0			N/A	

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	Alongside in Lowestoft		
08:00	Alongside in Lowestoft		
12:00	Alongside in Lowestoft		
16:00	Alongside in Lowestoft		
20:00	SW 18kn	1-2m	
24:00	SW 19kn	2m	

Outlook Inshore shipping forecast & Navtex: S to SW 4-5.

6. Safety & Environmental

Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew		***Survey Crew***	
Master	A Reading	Senior scientist	Dave Limpenny
1st Mate	G Ritchie	Survey engineer	Nigel Lyman
2nd Mate	R Hitcham	Survey engineer	Neil Campbell
3rd Mate	A Oakham	Survey engineer	Lee Baines
Chief Engineer	S Tweedie	Survey engineer	Michael Wilson
+ 12 additional crew		Survey engineer	David Baxter
		Geologist	Julia Crummy
		Geologist	Mary Mowatt
		Archaeologist	Stephanie Arnott
		Archaeologist	Marta Perez-Fernandez
Total crew	***17***	***Total survey***	***10***

Others

Client representative	John Coppock
MEPF Student	Theo Gaussen
Total	***2***
Total persons onboard	**29**

8. Next 24 Hours

Continue clamshell grabs and vibrocores

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change		TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	N/A	
Next safety muster	20th May	

10. Vessel Status

Fuel Remaining Lub Oil Remaining Water Remaining

11. Party Chief Comments

Mobbing completed successfully. Sailed at 15:30hrs. Sampling going well.

12. Report submitted by:

Party Chief Dave Limpenny Client Representative J Coppock Master A Reading

20th May 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	E-mail	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	3		
Period	20th May 2009		

1. Ship's Position & Status

Date	20th May 2009		Latitude	52 19.9 N
Time	GMT	24:00	Longitude	02 07.5 E
Present Activity		Vibrocore/Clamshell grabs		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	24:00	24:00	Ops	Collecting vibrocore samples

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	07:00	31:00
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	0	0
Contractor's Time (Operations)	Ct	0	0	0
	Total:	**24:00**	**0**	**72:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	2	2	8	10	20
Vibrocores	9	2	11	19	30	36.6
Hamon grabs	0	0			60	
Camera stations	0	0			30	
Beam trawls	0	0			20	
High resolution surveys (km)	0	0			N/A	

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	15kn SW	0.5	
08:00	14kn SW	0.5	
12:00	15kn SW	0.5	
16:00	8kn SW	0.5	
20:00	7kn SE	0.5	
24:00	14kn S	0.5	

Outlook Inshore shipping forecast & Navtex: SW 4-5.

6. Safety & Environmental

Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
2nd Mate	R Hitcham
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	

Survey Crew

Senior scientist	Dave Limpenny
Survey engineer	Nigel Lyman
Survey engineer	Neil Campbell
Survey engineer	Lee Baines
Survey engineer	Michael Wilson
Survey engineer	David Baxter
Geologist	Julia Crummy
Geologist	Mary Mowatt

		Archaeologist	Stephanie Arnott
		Archaeologist	Marta Perez-Fernandez
Total crew	***17***	***Total survey***	***10***

Others

Client representative	John Coppock
MEPF Student	Theo Gaussen
Total	***2***
Total persons onboard	**29**

8. Next 24 Hours
Continue clamshell grabs and vibrocores

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change		TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	N/A	
Next safety muster	21st May	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Sampling going well. No problems encountered.

12. Report submitted by:

Party Chief	Dave Limpenny	Client Representative	J Coppock	Master	A Reading

21st May 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	E-mail	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	4		
Period	21st May 2009		

1. Ship's Position & Status

Date	21st May 2009		Latitude	52 31.0 N
Time	GMT	24:00	Longitude	01 52.0 E
Present Activity		Vibrocore/Clamshell grabs		

2. Summary of Events
Time zone GMT

From	To	Duration	Code	Activity
00:00	24:00	24:00	Ops	Collecting Priority 1 vibrocore and clamshell samples

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	31:00	55:00
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	00:00	41:00	41:00
Contractors Time (Vessel)	CtV	0	0	0
Contractor's Time (Operations)	Ct	0	0	0
	Total:	**24:00**	**0**	**96:00**

4. Production Summary

Data gathered	Today	Previous	Total	Remaining	Planned	% Complete
Clamshell grabs	4	2	6	2	10	60
Vibrocores	11	11	22	8	30	73.3
Hamon grabs	0	0			60	
Camera stations	0	0			30	
Beam trawls	0	0			20	
High resolution surveys (km)	0	0			N/A	

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	10kn S	0	
08:00	6kn SW	0	
12:00	11kn SW	0	
16:00	6kn SW	0	
20:00	7kn E	0	
24:00	Light airs	0	

Outlook Inshore shipping forecast & Navtex: W to SW 3-4

6. Safety & Environmental

Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew		***Survey Crew***	
Master	A Reading	Senior scientist	Dave Limpenny
1st Mate	G Ritchie	Survey engineer	Nigel Lyman
2nd Mate	R Hitcham	Survey engineer	Neil Campbell
3rd Mate	A Oakham	Survey engineer	Lee Baines
Chief Engineer	S Tweedie	Survey engineer	Michael Wilson
+ 12 additional crew		Survey engineer	David Baxter
		Geologist	Julia Crummy
		Geologist	Mary Mowatt
		Archaeologist	Stephanie Arnott
		Archaeologist	Marta Perez-Fernandez
Total crew		***Total survey***	***10***

Others

Client representative	John Coppock
MEPF Student	Theo Gaussen
Total	***2***
Total persons onboard	**29**

8. Next 24 Hours

Complete Priority 1 clamshell grabs and vibrocores. Start Priority 2 clamshells and vibrocores.

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	Lowestoft	24th May
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	N/A	
Next safety muster	22nd May	

10. Vessel Status

Fuel Remaining Lub Oil Remaining Water Remaining

11. Party Chief Comments

Sampling going well. No problems encountered. Plan to dock on morning tide of Sunday 24th May. Logistics are being arranged.

12. Report submitted by:

Party Chief Dave Limpenny Client Representative J Coppock Master A Reading

22nd May 2009

Cefas Endeavour **Cefas**

Mini-M Phone 00 871763998027 **Mobile** 07799773456

Mini-M Fax	N/A	**E-mail**	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	5		
Period	22nd May 2009		

1. Ship's Position & Status

Date	22nd May 2009		Latitude	52 47.60 N
Time	GMT	24:00	Longitude	02 00.00 E
Present Activity		Vibrocore/Clamshell grabs		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	24:00	24:00	Ops	Complete collectioin of Priority 1 vibrocore and clamshell samples. Initiate collection of Priority 2 vibrocore and clamshell samples.

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	55:00	79:00
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	00:00	41:00	41:00
Contractors Time (Vessel)	CtV	0	0	0
Contractor's Time (Operations)	Ct	0	0	0
	Total:	**24:00**	**96:00**	**120:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	5	6	11	0	10	110
Vibrocores	10	22	32	0	30	106
Hamon grabs	0	0			60	
Camera stations	0	0			30	
Beam trawls	0	0			20	
High resolution surveys (km)	0	0			N/A	

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	Light Airs	0	
08:00	10kn SW	0	
12:00	14kn SW	0	
16:00	5kn SW	0	
20:00	7kn SW	0	
24:00	Light Airs	0	

Outlook

Inshore shipping forecast & Navtex: SW 4-5. Decreasing 3-4 later.

6. Safety & Environmental

Safety incidents: None

Cetacean watch: None

7. Personnel

Marine Crew		*Survey Crew*	
Master	A Reading	Senior scientist	Dave Limpenny
1st Mate	G Ritchie	Survey engineer	Nigel Lyman
2nd Mate	R Hitcham	Survey engineer	Neil Campbell
3rd Mate	A Oakham	Survey engineer	Lee Baines
Chief Engineer	S Tweedie	Survey engineer	Michael Wilson
+ 12 additional crew		Survey engineer	David Baxter
		Geologist	Julia Crummy
		Geologist	Mary Mowatt
		Archaeologist	Stephanie Arnott
		Archaeologist	Marta Perez-Fernandez
Total crew	***16***	***Total survey***	***10***

Others

Client representative	John Coppock
MEPF Student	Theo Gaussen
Total	***2***
Total persons onboard	**29**

8. Next 24 Hours
Complete Priority 1 clamshell grabs and vibrocores. Start Priority 2 clamshells and vibrocores.

9. Key Dates	**Location**	**Date**
Last Port call	Lowestoft	18th May
Next crew change	Lowestoft	24th May
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	N/A	
Next safety muster	22nd May	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Sampling going well. Started on Priority 2 samples during evening. Plan to complete all Priority 2 samples before docking. Pilot booked for 08:30hrs on 24th May. All logistics in place to demobilise and re-mobilise on a 12hr turnaround.

12. Report submitted by:

Party Chief	Dave Limpenny	Client Representative	J Coppock	Master	A Reading

23rd May 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	**E-mail**	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	6		
Period	23rd May 2009		

1. Ship's Position & Status

Date	23nd May 2009		Latitude	52 33.84 N
Time	GMT	24:00	Longitude	01 54.13 E
Present Activity		Vibrocore/Clamshell grabs		

2. Summary of Events
Time zone GMT

From	To	Duration	Code	Activity
00:00	24:00	24:00	Ops	Complete collection of Priority 2 vibrocore and clamshell samples.

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	79:00	103:00
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	00:00	41:00	41:00
Contractors Time (Vessel)	CtV	0	0	0
Contractor's Time (Operations)	Ct	0	0	0
	Total:	**24:00**	**120:00**	**144:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	8	11	19	0	10	190
Vibrocores	6	32	38	0	30	126
Hamon grabs	0	0			60	

Camera stations	0	0	30
Beam trawls	0	0	20
High resolution surveys (km)	0	0	N/A

5. Weather

Time		Obs Sea State	Remarks
04:00	Light Airs	0	
08:00	7kn S	0	
12:00	6kn S	0	
16:00	6kn S	0	
20:00	8kn S	0	
24:00	Light Airs	0	

Outlook

Inshore shipping forecast & Navtex: S 4-5.

6. Safety & Environmental

Safety incidents: None

Cetacean watch: None

7. Personnel

Marine Crew		*Survey Crew*	
Master	A Reading	Senior scientist	Dave Limpenny
1st Mate	G Ritchie	Survey engineer	Nigel Lyman
2nd Mate	R Hitcham	Survey engineer	Neil Campbell
3rd Mate	A Oakham	Survey engineer	Lee Baines
Chief Engineer	S Tweedie	Survey engineer	Michael Wilson
+ 12 additional crew		Survey engineer	David Baxter
		Geologist	Julia Crummy
		Geologist	Mary Mowatt
		Archaeologist	Stephanie Arnott
		Archaeologist	Marta Perez-Fernandez
Total crew	***16***	***Total survey***	***10***

Others

Client representative	John Coppock
MEPF Student	Theo Gaussen
Total	***2***
Total persons onboard	**29**

8. Next 24 Hours

Complete Priority 1 clamshell grabs and vibrocores. Start Priority 2 clamshells and vibrocores.

9. Key Dates	**Location**	**Date**
Last Port call	Lowestoft	18th May
Next crew change	Lowestoft	24th May
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	N/A	
Next safety muster	25th May	

10. Vessel Status

Fuel Remaining | Lub Oil Remaining | Water Remaining

11. Party Chief Comments

Sampling continued to go well with no incidents or hold-ups. All planned samples completed.

12. Report submitted by:

Party Chief Dave Limpenny | Client Representative J Coppock | Master A Reading

24th May 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	E-mail	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	7		
Period	24th May 2009		

1. Ship's Position & Status

Date	24th May 2009		Latitude	52 38.6 N
Time	GMT	24:00	Longitude	01 49.9 E
Present Activity		$0.1m^2$ Hamon grabbing/2m beam trawling/camera		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	24:00	24:00	Ops	Exchanging gear and staff at Lowestoft, sail at 20:00.

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	103:00	127:00
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	0	0
Contractor's Time (Operations)	Ct	0	0	0
	Total:	**24:00**	**144:00**	**168:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	1	0	1	59	60	
Camera stations	0	0	0	30	30	
Beam trawls	1	0	1	19	20	
High resolution surveys (km)	0	0	NA	NA	N/A	

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	In port	In port	
08:00	In port	In port	
12:00	In port	In port	
16:00	In port	In port	
20:00	Light airs	Slight	
24:00	Light airs	Slight	

Outlook STRG NW, SW for a time

6. Safety & Environmental

Safety incidents: None

Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Total crew ***16***

Others

Client representative John Coppock

MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
Continue 0.1m^2 Hamon grabbing/2m beam trawling/camera (Tranche 1)

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	N/A	
Next safety muster	ASK TONY	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Mob straightforward. Toolbox talk on Costerus grab at 13:00 whilst alongside.

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

25th May 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	Mobile	07799773456
Mini-M Fax	N/A	E-mail	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	8		
Period	25th May 2009		

1. Ship's Position & Status

Date	25th May 2009		Latitude	52 47.51' N
Time	GMT	24:00	Longitude	01 54.10' E
Present Activity		0.1m^2 Hamon grabbing/2m beam trawling/camera		

2. Summary of Events
Time zone GMT

From	To	Duration	Code	Activity
00:00	07:24	07:24	Ops	
07:24	13:05	5:41	Ct	Return to Port for missing Formaldehyde
13:05	24:00	10:55	Ops	

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	18:15	127:00	145:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	5:45	0	5:45
Contractor's Time (Operations)	Ct	0	0	0
	Total:	24:00	168:00	192:00

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	6	1	7	73	80	12
Camera stations	4	0	4	26	30	13

Beam trawls	6	1	7	23	30	35
High resolution surveys (km)	0	0	NA	NA	N/A	N/A

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	120° 14	Slight	
08:00	145° 05	Slight	
12:00	070° 24	070° <1m	
16:00	070° 15	070° 1m	
20:00	100° 15	090° 1.2m	
24:00	220° 08	090° 1m	

Outlook
E-NE 3-4, later veering southeast

6. Safety & Environmental

Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	
Total crew	*16*

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	*12*

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	*2*
Total persons onboard	30

8. Next 24 Hours

Continue 0.1m^2 Hamon grabbing/2m beam trawling/camera (Tranche 1)

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	N/A	
Next safety muster	TBA	

10. Vessel Status

Fuel Remaining | Lub Oil Remaining | Water Remaining

11. Party Chief Comments

Ship returned to Lowestoft to pick-up chemicals (chemicals crate had been craned aboard on 18th May but was found to be empty).

12. Report submitted by:

Party Chief Keith Cooper | Client Representative J Coppock | Master A Reading

26th May 2009

Cefas Endeavour **Cefas**

Mini-M Phone 00 871763998027 **Mobile** 07799773456

Mini-M Fax	N/A	E-mail	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	9		
Period	26th May 2009		

1. Ship's Position & Status

Date	26th May 2009		Latitude	52 49.300 ' N
Time	GMT	24:00	Longitude	02 04.500' E
Present Activity		$0.1m^2$ Hamon grabbing/2m beam trawling/camera		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	24:00	24:00	Ops	$0.1m^2$ Hamon grabbing/2m beam trawling/camera

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	145:15	169:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5:45	5:45
Contractor's Time (Operations)	Ct	0	0	0
	Total:	**24:00**	**192:00**	**206:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	10	7	17	63	80	21
Camera stations	9	4	13	17	30	43
Beam trawls	10	7	17	13	30	57
High resolution surveys (km)	0	0	NA	NA	N/A	N/A

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	220° 05	090° 1.0 m	
08:00	310° 17	270° 1.2 m	
12:00	270° 11	270° 1.2 m	
16:00	270° 20	270° 2.0 m	
20:00	270° 11	270° 1.2 m	
24:00	260° 08	270° 1.0 m	

Outlook

.SW 6-7

6. Safety & Environmental

Safety incidents: None

Cetacean watch: None

7. Personnel

Marine Crew		***Survey Crew***	
Master	A Reading	Senior scientist	Keith Cooper
1st Mate	G Ritchie	Survey engineer	Bill Meadows
3rd Mate	A Oakham	Survey engineer	Ken May
Chief Engineer	S Tweedie	Survey engineer	Simon Pearson
+ 12 additional crew		Benthic ecologist	Chris Barrio
		Benthic ecologist	Matt Curtis
		Benthic ecologist	Suzanne Ware

Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Total crew	***16***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
Continue 0.1m^2 Hamon grabbing/2m beam trawling/camera (Tranche 1)

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	N/A	
Next safety muster	ASK TONY	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Work progressing to plan. No problems to report

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

27th May 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
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Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	10		
Period	27th May 2009		

1. Ship's Position & Status

Date	27th May 2009	Latitude	52 41.500 ' N
Time	GMT 24:00	Longitude	02 18.900' E
Present Activity	0.1m^2 Hamon grabbing/2m beam trawling/camera		

2. Summary of Events
Time zone GMT

From	To	Duration	Code	Activity
00:00	24:00	24:00	Ops	0.1m^2 Hamon grabbing/2m beam trawling/camera

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	169:15	193:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5:45	5:45

Contractor's Time (Operations)	Ct	0	0	0
	Total:	**24:00**	**216:00**	**240:00**

4. Production Summary

Data gathered	Today	Previous	Total	Remaining	Planned	% Complete
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	9	17	26	54	80	33
Camera stations	7	13	20	10	30	67
Beam trawls	9	17	26	4	30	87
High resolution surveys (km)	0	0	NA	NA	N/A	N/A

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	260° 20	270° 2.0 m	
08:00	260° 21	270° 2.0 m	
12:00	240° 24	270° 2.0 m	
16:00	220° 30	220° ¾ m	
20:00	230° 15	220° 2.0 m	
24:00	245° 16	220° 2.0 m	

Outlook
W/NW 4-5 decreasing N/NW 1-3

6. Safety & Environmental
Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	
Total crew	***16***

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
Continue 0.1m^2 Hamon grabbing/2m beam trawling/camera (Tranche 1)

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	N/A	
Next safety muster	ASK TONY	

10. Vessel Status
Fuel Remaining Lub Oil Remaining Water Remaining

11. Party Chief Comments

Work progressing to plan. No problems to report

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

28th May 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
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Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	11		
Period	28th May 2009		

1. Ship's Position & Status

Date	28th May 2009		Latitude	52 30.700 ' N
Time	GMT	24:00	Longitude	02 10.400' E
Present Activity		0.1m^2 Hamon grabbing/2m beam trawling/camera		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	24:00	24:00	Ops	0.1m^2 Hamon grabbing/2m beam trawling/camera

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	193:15	217:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5:45	5:45
Contractor's Time (Operations)	Ct	0	0	0
	Total:	**24:00**	**240:00**	**264:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	11	26	37	43	80	46
Camera stations	8	20	28	2	30	93
Beam trawls	11	26	37	0	30	123
High resolution surveys (km)	0	0	NA	NA	N/A	N/A

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	245° 20	220° 2.0 m	
08:00	270° 10	220° 1.2 m	
12:00	330° 14	220° 1.0 m	
16:00	Light Airs	Slight	
20:00	Light Airs	Slight	
24:00	Light Airs	Slight	

Outlook

E/NE 2-3 increasing 3-4 later

6. Safety & Environmental

Safety incidents: None

Cetacean watch: None

7. Personnel

Marine Crew		***Survey Crew***	
Master	A Reading	Senior scientist	Keith Cooper

1st Mate	G Ritchie	Survey engineer	Bill Meadows
3rd Mate	A Oakham	Survey engineer	Ken May
Chief Engineer	S Tweedie	Survey engineer	Simon Pearson
+ 12 additional crew		Benthic ecologist	Chris Barrio
		Benthic ecologist	Matt Curtis
		Benthic ecologist	Suzanne Ware
		Benthic ecologist	Bryony Pearce
		Benthic ecologist	Lisa Grubb
		Geologist	Christean Wilson
		Geologist	Julia Crummy
		Archaeologist	Marta Perez-Fernandez
		Total survey	***12***
Total crew	***16***		

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours

Continue 0.1m^2 Hamon grabbing/2m beam trawling/camera (Tranche 1).

Following a period of calm conditions over the past 48 hours, we will reassess the camera sledge for collecting underwater stills and video at station T1_5 (offshore). If successful we will continue with this gear, targeting the offshore stations in the 1st instance.

In addition, we will begin the process of assessing the data collected thus far (e.g. curtain camera and grab/trawl sample images, beam trawl data, acoustics from previous geophysical survey) to identify a suitable sites for the trial of the Costerus twin grab and for the high resolution acoustic surveys.

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	N/A	
Next safety muster	16:00 29/05/2009	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments

Work progressing to plan. No problems to report

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

29th May 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
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Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	12		
Period	29th May 2009		

1. Ship's Position & Status

Date	29th May 2009		Latitude	52 16.300 ' N
Time	GMT	24:00	Longitude	02 04.780' E

Present Activity $0.1m^2$ Hamon grabbing/2m beam trawling/camera

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	24:00	24:00	Ops	$0.1m^2$ Hamon grabbing/2m beam trawling/camera

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	217:15	241:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5:45	5:45
Contractor's Time (Operations)	Ct	0	0	0
	Total:	**24:00**	**264:00**	**288:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	12	37	49	31	80	61
Camera stations	8	28	36	0	30	120
Beam trawls	12	37	49	0	30	160
High resolution surveys (km)	0	0	NA	NA	N/A	N/A

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	Light Airs	Slight	
08:00	090° 08	Slight	
12:00	090° 10	Slight	
16:00	090° 10	Slight	
20:00	070° 15	090° 1.2 m	
24:00	070° 19	090° 1.2 m	

Outlook

E/NE 4-5, decreasing NE 3-4 later

6. Safety & Environmental

Safety incidents: None

Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Total crew ***16***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin

Total ***2***

Total persons onboard **30**

8. Next 24 Hours

Continue 0.1m^2 Hamon grabbing/2m beam trawling/camera (Tranche 1).

Whilst we have successfully deployed the camera sledge at 4 offshore stations in the past 24 hours, we may have to switch back to the curtain camera for the inshore stations (visibility here has been very poor).

We remain on target to complete all work within the first of 3 survey tranches by the end of Sunday 1st June

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	16:00 29/05/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments

Work progressing to plan. No problems to report

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

30th May 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
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Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	13		
Period	30th May 2009		

1. Ship's Position & Status

Date	30th May 2009		Latitude	52 18.000 ' N
Time	GMT	24:00	Longitude	02 06.700' E
Present Activity		0.1m^2 Hamon grabbing/2m beam trawling/camera		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	08:20	08:20	Ops	0.1m^2 Hamon grabbing/2m beam trawling/camera
08:20	13:20	05:00	CtV	Camera cable became tangled on its winch drum. Problem successfully rectified after 5 hours downtime.
13:20	24:00	10:40	Ops	0.1m^2 Hamon grabbing/2m beam trawling/camera

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	19:00	241:15	260:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	5	0	5:00
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**288:00**	**312:00**

NB/ In previous reports the Contractors downtime, up to 24:00, 29/05/2009, should have been assigned to Ct and not CtV. All times now corrected.

4. Production Summary

Data gathered	Today	Previous	Total	Remaining	Planned	% Complete
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	5	49	54	26	80	67
Camera stations	9	36	45	0	30	150
Beam trawls	6	49	55	0	30	183
High resolution surveys (km)	0	0	NA	NA	N/A	N/A

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	070° 15	090° 1 - 2 m	
08:00	070° 14	090° 1 - 2 m	
12:00	080° 14	090° 1 m	
16:00	080° 15	090° 1 m	
20:00	070° 16	090° 1 m	
24:00	060° 14	090° 1 m	

Outlook
NE 4-6

6. Safety & Environmental

Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	
Total crew	***16***

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***

Total persons onboard **30**

8. Next 24 Hours

Over the next 24 hours we expect to complete the first tranche of survey work (61 x 0.1m^2 Hamon grabbing; 61 x 2m beam trawls; 38 x camera tows). We will then undertake the planned comparison of the 0.1m^2 Hamon and Corteus Twin grabs. This work will be undertaken at a previously sampled station from tranche 1 that was characterised by sandy gravel sediments.

On completion of the grab comparison we will start work on the second tranche of survey work. Tranche 2 comprises 33 x 0.1m^2 Hamon grab samples, 1 x camera tow and 4 days of high resolution acoustic surveys. Where conditions allow, we will also collect additional 2m beam trawl samples to augment the data collected to date.

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	16:00 29/05/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments

Poor underwater visibility in the inshore half of the survey area necessitated a switch back to the curtain camera. However, the camera sledge was successfully employed at 5 stations in the south-west of the survey area (offshore, relatively deep water).

Camera winch problems were successfully resolved without affecting the schedule (see above).

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

31st May 2009

Cefas Endeavour			**Cefas**
Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	E-mail	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	14		
Period	31th May 2009		

1. Ship's Position & Status

Date	31th May 2009		Latitude	52 14.700 ' N
Time	GMT	24:00	Longitude	02 0.200' E
Present Activity		High resolution acoustic survey		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	17:00	17:00	Ops	0.1m^2 Hamon grabbing/2m beam trawling/camera (Tranche 1)
17:00	23:00	06:00	Ops	0.1m^2 Hamon/Corteus Twin grab comparison
23:00	24:00	01:00	Ops	High resolution acoustic survey

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	260:15	284:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5	5:00
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**312:00**	**336:00**

NB/ In previous reports the Contractors downtime, up to 24:00, 29/05/2009, should have been assigned to Ct and not CtV. All times now corrected.

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	8	54	62	18	80	78
Camera stations	4	45	49	0	30	150
Beam trawls	8	55	63	0	30	210
High resolution surveys (km)	0	0	NA	NA	N/A	N/A
Hamon grabs (grab comparison)	10	0	10	0	10	100
Costerus Twin grabs (grab comparison)	10	0	10	0	10	100

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	060° 12	090° 1 m	
08:00	050° 14	070° 1 - 2 m	

12:00	060° 16	070° 1 m
16:00	060° 18	070° 1 m
20:00	025° 17	050° 1 – 2 m
24:00	045° 16	090° 1 - 2 m

Outlook
NE 4-5

6. Safety & Environmental

Safety incidents:	None
Cetacean watch:	None

7. Personnel

Marine Crew	
Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	
Total crew	***16***

Survey Crew	
Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
Collection of high resolution acoustic data from the 1st targeted survey area, followed by Tranche 2 ground-truthing stations.

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	16:00 29/05/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Work progressing to plan. No problems to report

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

1st June 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	E-mail	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	

Report No 15
Period 1st June 2009

1. Ship's Position & Status

Date	1st June 2009		Latitude	52 22.600 ' N
Time	GMT	24:00	Longitude	02 09.300 ' E
Present Activity		High resolution acoustic survey		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	11:45	11:45	Ops	High resolution acoustic survey
11:45	24:00	12:15	Ops	0.1m^2 Hamon grabbing/2m beam trawling (Tranche 2)

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	284:15	284:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5	5:00
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**336:00**	**360:00**

NB/ In previous reports the Contractors downtime, up to 24:00, 29/05/2009, should have been assigned to Ct and not CtV. All times now corrected.

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	10	62	72	8	80	90
Camera stations	0	49	49	0	30	163
Beam trawls	9	63	72	0	30	240
High resolution surveys (km)	77	0	77	NA	N/A	12
Hamon grabs (grab comparison)	0	10	10	0	10	100
Costerus Twin grabs (grab comparison)	0	10	10	0	10	100

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	045° 18	040° 2 m	
08:00	010° 16	030° 2 m	
12:00	030° 16	030° 1 m	
16:00	030° 20	030° 1 m	
20:00	020° 18	020° 1 m	
24:00	010° 14	020° 1 m	

Outlook
NE 4-5, possibly 6

6. Safety & Environmental

Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy

		Archaeologist	Marta Perez-Fernandez
		Total survey	***12***
Total crew	***16***		

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
Tranche 2 ground-truthing stations, followed by collection of high resolution acoustic data from the 2nd targeted survey area.

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	16:00 29/05/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Work progressing to plan. No problems to report

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

2nd June 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
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Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	16		
Period	2nd June 2009		

1. Ship's Position & Status

Date	2nd June 2009		Latitude	52 38.900 ' N
Time	GMT	24:00	Longitude	02 20.400 ' E
Present Activity		0.1m^2 Hamon grabbing/2m beam trawling (Tranche 2)		

2. Summary of Events
Time zone GMT

From	To	Duration	Code	Activity
00:00	08:45	08:45	Ops	0.1m^2 Hamon grabbing/2m beam trawling (Tranche 2)
08:45	19:15	10:30	Ops	High resolution acoustic survey
19:15	24:00	04:45	Ops	0.1m^2 Hamon grabbing/2m beam trawling (Tranche 2)

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	308:15	332:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5	5:00

Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**360:00**	**384:00**

NB/ In previous reports the Contractors downtime, up to 24:00, 29/05/2009, should have been assigned to Ct and not CtV. All times now corrected.

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	9	72	81	0	80	101
Camera stations	0	49	49	0	30	163
Beam trawls	9	72	81	0	30	270
High resolution surveys (km)	73.24	77	150.24	NA	N/A	24
Hamon grabs (grab comparison)	0	10	10	0	10	100
Costerus Twin grabs (grab comparison)	0	10	10	0	10	100

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	010° 17	020° 1-2 m	
08:00	020° 19	020° 1-2 m	
12:00	350° 17	020° 1-2 m	
16:00	350° 12	020° 2 m	
20:00	350° 9	020° 1-2 m	
24:00	350° 9	020° 1-2 m	

Outlook
NW 4-5

6. Safety & Environmental

Safety incidents:	None
Cetacean watch:	None

7. Personnel

Marine Crew	
Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	
Total crew	***16***

Survey Crew	
Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
Tranche 2 ground-truthing stations, followed by collection of high resolution acoustic data from the 3rd and 4th targeted survey areas.

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	16:00 29/05/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments

Work progressing to plan. No problems to report

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

3rd June 2009

Cefas Endeavour			**Cefas**
Mini-M Phone	00 871763998027	**Mobile**	07799773456
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Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	17		
Period	3rd June 2009		

1. Ship's Position & Status

Date	3rd June 2009		Latitude	52 53.800 ' N
Time	GMT	24:00	Longitude	02 21.900 ' E
Present Activity		0.1m^2 High resolution acoustic survey (HI RES 4)		

2. Summary of Events

Time zone	GMT			
From	To	Duration	Code	Activity
00:00	07:00	07:00	Ops	0.1m^2 Hamon grabbing/2m beam trawling (Tranche 2)
07:00	24:00	17:00	Ops	High resolution acoustic survey (HI RES 3 & HI RES 4)

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	332:15	356:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5	5:00
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**384:00**	**408:00**

NB/ In previous reports the Contractors downtime, up to 24:00, 29/05/2009, should have been assigned to Ct and not CtV. All times now corrected.

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	5	81	86	0	80	107
Camera stations	0	49	49	0	30	163
Beam trawls	5	81	86	0	30	286
High resolution surveys (km)	106.76	150.24	257	NA	N/A	41
Hamon grabs (grab comparison)	0	10	10	0	10	100
Costerus Twin grabs (grab comparison)	0	10	10	0	10	100

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	360° 18	020° 2 m	
08:00	010° 15	020° 2-3 m	

12:00	010° 20	020° 2-3 m
16:00	340° 20	000° 3 m
20:00	010° 19	000° 3 m
24:00	360° 20	000° 3 m

Outlook
NW 4-5

6. Safety & Environmental

Safety incidents:	None
Cetacean watch:	None

7. Personnel

Marine Crew		***Survey Crew***	
Master	A Reading	Senior scientist	Keith Cooper
1st Mate	G Ritchie	Survey engineer	Bill Meadows
3rd Mate	A Oakham	Survey engineer	Ken May
Chief Engineer	S Tweedie	Survey engineer	Simon Pearson
+ 12 additional crew		Benthic ecologist	Chris Barrio
		Benthic ecologist	Matt Curtis
		Benthic ecologist	Suzanne Ware
		Benthic ecologist	Bryony Pearce
		Benthic ecologist	Lisa Grubb
		Geologist	Christean Wilson
		Geologist	Julia Crummy
		Archaeologist	Marta Perez-Fernandez
		Total survey	***12***
Total crew	***16***		

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
High resolution acoustic data from the 4th and 5th targeted survey areas.

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	16:00 29/05/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Work progressing to plan. No problems to report

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

4th June 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
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Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	

Report No 18
Period 4th June 2009

1. Ship's Position & Status

Date	4th June 2009		Latitude	52 46.100 ' N
Time	GMT	24:00	Longitude	02 00.100 ' E
Present Activity		$0.1m^2$ High resolution acoustic survey (HI RES 5)		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	07:45	07:45	Ops	High resolution acoustic survey (HI RES 4)
07:45	24:00	16:15	Ops	High resolution acoustic survey (HI RES 5). 1 x 2m beam trawling taken prior to HI RES5 (in order to determine % coverage)

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	356:15	380:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5	5:00
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**408:00**	**432:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	0	86	86	0	80	107
Camera stations	0	49	49	0	30	163
Beam trawls	1	86	87	0	30	290
High resolution surveys (km)	150	257	407	NA	N/A	55
Hamon grabs (grab comparison)	0	10	10	0	10	100
Costerus Twin grabs (grab comparison)	0	10	10	0	10	100

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	350° 20	350° 3 m	
08:00	350° 18	350° 3 m	
12:00	330° 18	350° 2-3 m	
16:00	330° 20	350° 2-3 m	
20:00	340° 18	350° 3 m	
24:00	330° 16	350° 2-3 m	

Outlook
NW 4-5

6. Safety & Environmental

Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Total crew ***16***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
High resolution acoustic data from the 5th and 6th targeted survey areas. Continue with Tranche 2 ground-truth stations (0.1m2 Hamon grabs and 2m beam trawl).

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	16:00 29/05/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Work progressing to plan. No problems to report

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

5th June 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	**E-mail**	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	19		
Period	5th June 2009		

1. Ship's Position & Status

Date	5th June 2009		Latitude	52 49.100 ' N
Time	GMT	24:00	Longitude	01 44.000 ' E
Present Activity		$0.1m^2$ High resolution acoustic survey (HI RES 5)		

2. Summary of Events
Time zone GMT

From	To	Duration	Code	Activity
00:00	14:30	14:30	Ops	High resolution acoustic survey (HI RES 5)
14:30	19:37	05:07	Ops	Tranche 2 ground-truth stations (0.1m2 Hamon grabs and 2m beam trawls)
19:37	24:00	04:23	Ops	High resolution acoustic survey (HI RES 6)

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	380:15	404:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5	5:00
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**432:00**	**456:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**

Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	3	86	89	0	80	111
Camera stations	0	49	49	0	30	163
Beam trawls	3	87	90	0	30	300
High resolution surveys (km)	150	407	557	NA	N/A	75
Hamon grabs (grab comparison)	0	10	10	0	10	100
Costerus Twin grabs (grab comparison)	0	10	10	0	10	100

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	330° 18	350° 2-3 m	
08:00	340° 09	350° 2 m	
12:00	000° 04	350° 1-2 m	
16:00	000° 05	350° 1-2 m	
20:00	135° 12	350° 1-2 m	
24:00	120° 12	350° 1-2 m	

Outlook
NW 4-5

6. Safety & Environmental

Safety incidents:	None
Cetacean watch:	None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	
Total crew	***16***

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
High resolution acoustic data from the 6th and 7th targeted survey areas. Continue with Tranche 2 ground-truth stations (0.1m2 Hamon grabs and 2m beam trawl).

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	16:00 29/05/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Work progressing to plan. No problems to report

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

6th June 2009

Cefas Endeavour

Cefas

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	**E-mail**	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	20		
Period	6th June 2009		

1. Ship's Position & Status

Date	6th June 2009		Latitude	52 41.200 ' N
Time	GMT	24:00	Longitude	01 49.700 ' E
Present Activity		High resolution acoustic survey (HI RES 6)		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	00:43	00:43	Ops	High resolution acoustic survey (HI RES 6)
00:43	19:58	07:15	Ops	Tranche 2 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls, camera)
19:58	24:00	04:02	Ops	High resolution acoustic survey (HI RES 7)

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	404:15	428:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5	5:00
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**456:00**	**480:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	2	89	91	0	80	113
Camera stations	1	49	50	0	30	166
Beam trawls	2	90	92	0	30	307
High resolution surveys (km)	37	557	594	NA	N/A	81
Hamon grabs (grab comparison)	0	10	10	0	10	100
Costerus Twin grabs (grab comparison)	0	10	10	0	10	100

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	120° 15	350° 1 m	
08:00	090° 21	070° 2-3 m	
12:00	100° 21	080° 2 m	
16:00	060° 18	080° 2 m	
20:00	060° 18	080° 2 m	
24:00	070° 24	080° 2 m	

Outlook
NW 4-5

6. Safety & Environmental
Safety incidents: None

Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	
Total crew	***16***

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours

High resolution acoustic data collection from the 7th targeted survey area. Complete Tranche 2 ground-truth stations (0.1m2 Hamon grabs and 2m beam trawl, camera). Begin work on Tranche 3, beginning with archaeological work.

9. Key Dates	**Location**	**Date**
Last Port call	Lowestoft	18th May
Next crew change	TBA	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	16:00 29/05/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments

Work progressing to plan. No problems to report. Tranche 3 plan finalised, work due to begin Sunday pm.

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

7th June 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	E-mail	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	21		
Period	7th June 2009		

1. Ship's Position & Status

Date	7th June 2009		Latitude	52 35.100 ' N
Time	GMT	24:00	Longitude	01 51.600 ' E
Present Activity		High resolution acoustic survey (HI RES 7)		

2. Summary of Events

Time zone	GMT			
From	To	Duration	Code	Activity
00:00	05:20	05:20	Ops	High resolution acoustic survey (HI RES 7)
05:20	15:27	10:07	Ops	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)
15:27	21:57	06:30	Ops	Archaeology
21:57	24:00	02:03	Ops	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	428:15	452:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5	5:00
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**480:00**	**504:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	6	91	97	0	80	121
Camera stations	0	50	50	0	30	166
Beam trawls	6	92	98	0	30	326
High resolution surveys (km)	42	594	636	NA	N/A	100
Costerus Twin grab (Archaeology)	30	0	30	0	30	100
Hamon grabs (grab comparison)	0	10	10	0	10	100
Costerus Twin grab (grab comparison)	0	10	10	0	10	100

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	070° 18	080° 2 m	
08:00	070° 16	080° 1 m	
12:00	120° 18	090° 2 m	
16:00	080° 20	090° 2 m	
20:00	080° 10	090° 1-2 m	
24:00	050° 16	090° 1 m	

Outlook

NW 4-5

6. Safety & Environmental

Safety incidents: None

Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Total crew ***16***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin

Total ***2***

Total persons onboard **30**

8. Next 24 Hours
Continue work on Tranche 3, beginning with archaeological task.

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	10th June (Pilot boat)	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	16:00 29/05/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Work progressing to plan. Marta Perez-Fernandez and Matt Curtis are due to leave the ship, via the Lowestoft Pilot boat, on Wednesday 10th June.

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

8th June 2009

Cefas Endeavour **Cefas**

Mini-M Phone 00 871763998027 **Mobile** 07799773456
Mini-M Fax N/A E-mail cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	23		
Period	9th June 2009		

1. Ship's Position & Status

Date	9th June 2009		Latitude	52 44.800 ' N
Time	GMT	24:00	Longitude	01 19.900 ' E
Present Activity	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)			

2. Summary of Events
Time zone GMT

From	To	Duration	Code	Activity
00:00	18:13	18:13	Ops	Acoustic survey of exposed gravel area (Tranche 3, option 3).
18:13	18:45	00:32	CtV	Down-time to resolve side gantry winch brake problem.
18:45	24:00	5:15	Ops	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	452:15	476:15
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5	5:00
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**504:00**	**528:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	14	97	111	0	80	138
Camera stations	6	50	56	0	30	187
Beam trawls	3	98	101	0	30	337
High resolution surveys (km)	42	594	636	NA	N/A	100
Costerus Twin grab (Archaeology)	30	0	30	0	30	100
Hamon grabs (grab comparison)	0	10	10	0	10	100

Costerus Twin grab (grab comparison)	0	10	10	0	10	100

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	030° 15	090° 1 m	
08:00	030° 09	060° 1 m	
12:00	060° 11	060° 1 m	
16:00	060° 10	060° 1 m	
20:00	060° 13	060° 1 m	
24:00	060° 14	060° 1 m	

Outlook

Variable 2-3, increasing E/NE 4-5

6. Safety & Environmental

Safety incidents: None

Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Total crew ***16***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours

Continue work on Tranche 3, beginning with archaeological task.

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	10th June (Pilot boat)	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	
Last safety muster	16:00 29/05/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining Lub Oil Remaining Water Remaining

11. Party Chief Comments

Work progressing to plan, no problems to report. We expect to complete all work by the morning of Sunday 14th June, and to dock in Lowestoft around 14:00 on the same day.

12. Report submitted by:

Party Chief Keith Cooper Client Representative J Coppock Master A Reading

9th June 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	**E-mail**	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	23		
Period	9th June 2009		

1. Ship's Position & Status

Date	9th June 2009		Latitude	52 44.800 ' N
Time	GMT	24:00	Longitude	01 19.900 ' E
Present Activity	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)			

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	18:13	18:13	Ops	Acoustic survey of exposed gravel area (Tranche 3, option 3).
18:13	18:45	00:32	CtV	Down-time to resolve side gantry winch brake problem.
18:45	24:00	5:15	Ops	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	23:30	476:15	499:45
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	00:30	5	5:30
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**528:00**	**552:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	16	111	127	0	80	158
Camera stations	6	56	62	0	30	206
Beam trawls	9	101	110	0	30	366
High resolution surveys (km)	0	0	636	NA	N/A	100
Costerus Twin grab (Archaeology)	0	0	30	0	30	100
Hamon grabs (grab comparison)	0	0	10	0	10	100
Costerus Twin grab (grab comparison)	0	0	10	0	10	100

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	060° 15	060° 2 m	
08:00	040° 16	060° 2 m	
12:00	330° 25	000° 1 m	
16:00	000° 15	000° 2 m	
20:00	350° 20	000° 3 m	
24:00	330° 14	340° 2-3 m	

Outlook

W/NW 4-5, decreasing variable 2-4

6. Safety & Environmental

Safety incidents:	None
Cetacean watch:	None

7. Personnel

Marine Crew		*Survey Crew*	
Master	A Reading	Senior scientist	Keith Cooper
1st Mate	G Ritchie	Survey engineer	Bill Meadows
3rd Mate	A Oakham	Survey engineer	Ken May
Chief Engineer	S Tweedie	Survey engineer	Simon Pearson
+ 12 additional crew		Benthic ecologist	Chris Barrio

Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Total crew	***16***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
Continue work on Tranche 3, beginning with archaeological task.

9. Key Dates	**Location**	**Date**
Last Port call	Lowestoft	18th May
Next crew change	10th June (Pilot boat)	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	14th June 2009 (~14:00)
Last safety muster	16:00 09/06/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Work progressing to plan, no problems to report. Marta Perez-Fernandez and Matt Curtis left the ship at 11:15 this morning and were taken ashore by the Lowestoft Pilot boat.

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

10th June 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
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Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	23		
Period	10th June 2009		

1. Ship's Position & Status

Date	10th June 2009		Latitude	52 30.900 ' N
Time	GMT	24:00	Longitude	02 00.900 ' E
Present Activity	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)			

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	13:34	13:34	Ops	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)
13:34	15:06	01:32	Ops	Acoustic survey of exposed gravel area (Tranche 3, option 3).
15:06	24:00	8:54	Ops	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)

3. Time Analysis

Activity	Code	Today	Previous	Present
Operational	Ops	24:00	499:45	523:45
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5:30	5:30
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**552:00**	**576:00**

4. Production Summary

Data gathered	Today	Previous	Total	Remaining	Planned	% Complete
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	20	127	147	0	80	184
Camera stations	7	62	69	0	30	230
Beam trawls	7	110	117	0	30	390
High resolution surveys (km)	15	636	651	NA	N/A	100
Costerus Twin grab (Archaeology)	0	0	30	0	30	100
Hamon grabs (grab comparison)	0	0	10	0	10	100
Costerus Twin grab (grab comparison)	0	0	10	0	10	100

NB Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	330° 10	340° 1-3 m	
08:00	Light airs	340° 1-2 m	
12:00	Light airs	030° 0.5 m	
16:00	100° 10	030° 1 m	
20:00	090° 10	060° 1-2 m	
24:00	080° 13	060° 1-2 m	

Outlook

N/NW 3-4, possibly 5, backing N/NW

6. Safety & Environmental

Safety incidents: None

Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	

Total crew ***16***

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin

Total ***2***

Total persons onboard **30**

8. Next 24 Hours

Continue work on Tranche 3

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	10th June (Pilot boat)	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	14th June 2009 (~14:00)

Last safety muster	16:00 09/06/2009
Next safety muster	N/A

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments

Work progressing to plan, no problems to report.

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

11th June 2009

Cefas Endeavour			**Cefas**
Mini-M Phone	00 871763998027	**Mobile**	07799773456
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Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	24		
Period	11h June 2009		

1. Ship's Position & Status

Date	11h June 2009		Latitude	52 16.900 ' N
Time	GMT	24:00	Longitude	01 48.600 ' E
Present Activity	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)			

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	12:32	12:32	Ops	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)
12:32	24:00	11:28	Ops	Acoustic survey of exposed gravel area (Tranche 3, option 3).

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	523:45	547:45
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5:30	5:30
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**576:00**	**600:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	5	147	152	0	80	184
Camera stations	4	69	73	0	30	243
Beam trawls	7	117	124	0	30	413
High resolution surveys (km)	139km	See note 2	1066 km	NA	N/A	100
Costerus Twin grab (Archaeology)	0	0	30	0	30	100
Hamon grabs (grab comparison)	0	0	10	0	10	100
Costerus Twin grab (grab comparison)	0	0	10	0	10	100

NB

1. Planned number of Hamon, camera and beam trawls taken from tender
2. Previous acoustic survey distances were reported in nautical miles. Total distance now corrected to km. Also, previous distances were estimated and included turns. Total distance now includes only run lines.

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	080° 05	060° 1 m	
08:00	350° 09	040° 1 m	

12:00	350° 08	040° 1 m
16:00	350° 10	020° 1 m
20:00	110° 08	020° 1 m
24:00	340° 11	020° 1 m

Outlook
W 2-4

6. Safety & Environmental

Safety incidents:	None
Cetacean watch:	None

7. Personnel

Marine Crew		***Survey Crew***	
Master	A Reading	Senior scientist	Keith Cooper
1st Mate	G Ritchie	Survey engineer	Bill Meadows
3rd Mate	A Oakham	Survey engineer	Ken May
Chief Engineer	S Tweedie	Survey engineer	Simon Pearson
+ 12 additional crew		Benthic ecologist	Chris Barrio
		Benthic ecologist	Matt Curtis
		Benthic ecologist	Suzanne Ware
		Benthic ecologist	Bryony Pearce
		Benthic ecologist	Lisa Grubb
		Geologist	Christean Wilson
		Geologist	Julia Crummy
		Archaeologist	Marta Perez-Fernandez
		Total survey	***12***
Total crew	***16***		

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
Continue work on Tranche 3

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	10th June (Pilot boat)	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	14th June 2009 (~14:00)
Last safety muster	16:00 09/06/2009	
Next safety muster	N/A	

10. Vessel Status
Fuel Remaining Lub Oil Remaining Water Remaining

11. Party Chief Comments
Work progressing to plan, no problems to report.

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

12th June 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	E-mail	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	25		

Period 12th June 2009

1. Ship's Position & Status

Date	12th June 2009		Latitude	52 12.500 ' N
Time	GMT	24:00	Longitude	02 16.700 ' E
Present Activity		Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)		

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	09:45	09:45	Ops	Acoustic survey of exposed gravel area (Tranche 3, option 3).
09:45	24:00	14:15	Ops	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	547:45	571:45
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5:30	5:30
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**600:00**	**624:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	4	152	156	0	80	195
Camera stations	7	73	80	0	30	266
Beam trawls	3	124	127	0	30	423
High resolution surveys (km)	75km	1066km	1141 km	NA	N/A	100
Costerus Twin grab (Archaeology)	0	0	30	0	30	100
Hamon grabs (grab comparison)	0	0	10	0	10	100
Costerus Twin grab (grab comparison)	0	0	10	0	10	100

NB
1. Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	340° 10	020° 1 m	
08:00	330° 06	020° 1 m	
12:00	130° 08	030° <1 m	
16:00	180° 06	slight	
20:00	090° 07	slight	
24:00	110° 11	090° <1 m	

Outlook var 2-4
W 2-4

6. Safety & Environmental

Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Total crew ***16***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours
Continue work on Tranche 3

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	10th June (Pilot boat)	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	14th June 2009 (~14:00)
Last safety muster	16:00 09/06/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining	Lub Oil Remaining	Water Remaining

11. Party Chief Comments
Work progressing to plan, no problems to report.

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

13th June 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	E-mail	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	26		
Period	13th June 2009		

1. Ship's Position & Status

Date	13th June 2009		Latitude	52 34.900 ' N
Time	GMT	24:00	Longitude	01 51.700 ' E
Present Activity	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)			

2. Summary of Events

Time zone	GMT			
From	To	Duration	Code	Activity
00:00	01:45	01:45	Ops	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)
01:45	09:46	08:01	Ops	Acoustic survey of exposed gravel area (Tranche 3, option 3).
09:46	21:16	11:30	Ops	Tranche 3 ground-truth stations (0.1m2 Hamon grabs, 2m beam trawls)
21:16	24:00	02:44	Ops	Acoustic survey of exposed gravel area (Tranche 3, option 3).

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	24:00	571:45	595:45
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	0	41:00	41:00
Contractors Time (Vessel)	CtV	0	5:30	5:30
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**624:00**	**648:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190

Vibrocores	0	0	38	0	30	126
Hamon grabs	6	156	162	0	80	202
Camera stations	3	80	83	0	30	277
Beam trawls	4	127	131	0	30	437
High resolution surveys (km)	88km	1141km	1229 km	NA	N/A	100
Costerus Twin grab (Archaeology)	0	0	30	0	30	100
Hamon grabs (grab comparison)	0	0	10	0	10	100
Costerus Twin grab (grab comparison)	0	0	10	0	10	100

NB
1. Planned number of Hamon, camera and beam trawls taken from tender

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	110° 12	090° 1 m	
08:00	200° 15	130° 1-2 m	
12:00	200° 20	190° 1-2 m	
16:00	180° 13	190° 1 m	
20:00	180° 16	190° 1 m	
24:00	190° 18	090° 1 m	

Outlook var 1-3
W 2-4

6. Safety & Environmental

Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew

Master	A Reading
1st Mate	G Ritchie
3rd Mate	A Oakham
Chief Engineer	S Tweedie
+ 12 additional crew	

Survey Crew

Senior scientist	Keith Cooper
Survey engineer	Bill Meadows
Survey engineer	Ken May
Survey engineer	Simon Pearson
Benthic ecologist	Chris Barrio
Benthic ecologist	Matt Curtis
Benthic ecologist	Suzanne Ware
Benthic ecologist	Bryony Pearce
Benthic ecologist	Lisa Grubb
Geologist	Christean Wilson
Geologist	Julia Crummy
Archaeologist	Marta Perez-Fernandez
Total survey	***12***

Total crew ***16***

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin

Total ***2***

Total persons onboard **30**

8. Next 24 Hours

Continue work on Tranche 3

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	10th June (Pilot boat)	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	14th June 2009 (~14:00)
Last safety muster	16:00 09/06/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining Lub Oil Remaining Water Remaining

11. Party Chief Comments

Work progressing to plan, no problems to report.

12. Report submitted by:

Party Chief	Keith Cooper	Client Representative	J Coppock	Master	A Reading

14th June 2009

Cefas Endeavour **Cefas**

Mini-M Phone	00 871763998027	**Mobile**	07799773456
Mini-M Fax	N/A	**E-mail**	cefas.endeavour@gtships.com

Addressee Organisation	**Attention**	**Telefax**	**e-mail**
MEPF	Euan McNeill		e.mcneill@wessexarch.co.uk

Client	MEPF	**Cefas Ref**	C3340
Project	East Coast Regional Environmental Characterisation Survey	**Email Ref:**	
Report No	27		
Period	14th June 2009		

1. Ship's Position & Status

Date	13th June 2009		Latitude	' N
Time	GMT	N/A	Longitude	' E
Present Activity	Acoustic survey of exposed gravel area (Tranche 3, option 3).			

2. Summary of Events

Time zone GMT

From	To	Duration	Code	Activity
00:00	07:04	07:04	Ops	Acoustic survey of exposed gravel area (Tranche 3, option 3).
07:04	13:45	6:41	Mob	Return to Lowestoft

3. Time Analysis

Activity	**Code**	**Today**	**Previous**	**Present**
Operational	Ops	07:04	595:45	602:49
Standby at sea (weather)	StbyW	0	0	0
Stand-down alongside	StbyO	0	0	0
Mob / Demob	Mob	06:41	41:00	47:41
Contractors Time (Vessel)	CtV	0	5:30	5:30
Contractor's Time (Operations)	Ct	0	5:45	5:45
	Total:	**24:00**	**624:00**	**648:00**

4. Production Summary

Data gathered	**Today**	**Previous**	**Total**	**Remaining**	**Planned**	**% Complete**
Clamshell grabs	0	0	19	0	10	190
Vibrocores	0	0	38	0	30	126
Hamon grabs	0	0	162	0	80	202
Camera stations	0	0	83	0	30	277
Beam trawls	0	0	131	0	30	437
High resolution surveys (km)	40km	1229km	1269 km	NA	N/A	100
Costerus Twin grab (Archaeology)	0	0	30	0	30	100
Hamon grabs (grab comparison)	0	0	10	0	10	100
Costerus Twin grab (grab comparison)	0	0	10	0	10	100

NB
1. Planned number of Hamon, camera and beam trawls taken from tender
2. Previous acoustic survey distances were reported in nautical miles. Total distance now corrected to km. Also, previous distances were estimated and included turns. Total distance now includes only run lines.

5. Weather

Time	Obs Wind	Obs Sea State	Remarks
04:00	110° 12	090° 1 m	
08:00	200° 15	130° 1-2 m	
12:00	200° 20	190° 1-2 m	
16:00	180° 13	190° 1 m	
20:00	180° 16	190° 1 m	
24:00	190° 18	090° 1 m	

Outlook var 2-4
W 2-4

6. Safety & Environmental

Safety incidents: None
Cetacean watch: None

7. Personnel

Marine Crew		***Survey Crew***	
Master	A Reading	Senior scientist	Keith Cooper
1st Mate	G Ritchie	Survey engineer	Bill Meadows
3rd Mate	A Oakham	Survey engineer	Ken May
Chief Engineer	S Tweedie	Survey engineer	Simon Pearson
+ 12 additional crew		Benthic ecologist	Chris Barrio
		Benthic ecologist	Matt Curtis
		Benthic ecologist	Suzanne Ware
		Benthic ecologist	Bryony Pearce
		Benthic ecologist	Lisa Grubb
		Geologist	Christean Wilson
		Geologist	Julia Crummy
		Archaeologist	Marta Perez-Fernandez
		Total survey	***12***
Total crew	***16***		

Others

Client representative	John Coppock
MEPF Student	Rauhan Wan Hussin
Total	***2***
Total persons onboard	**30**

8. Next 24 Hours

Continue work on Tranche 3

9. Key Dates	Location	Date
Last Port call	Lowestoft	18th May
Next crew change	10th June (Pilot boat)	TBA
Expected completion of acquisition		15th June 2009
Next Port call	Lowestoft	14th June 2009 (~14:00)
Last safety muster	16:00 09/06/2009	
Next safety muster	N/A	

10. Vessel Status

Fuel Remaining Lub Oil Remaining Water Remaining

11. Party Chief Comments

Work progressing to plan, no problems to report.

12. Report submitted by:

Party Chief Keith Cooper Client Representative J Coppock Master A Reading

Appendix 5 Personnel

Survey Personnel Leg 1

John Coppock	Client Rep	MEPF	Whole survey
David Limpenny	Scientist-in-Charge	CEFAS	19th May – 24th May
Nigel Lyman	Survey Engineer	CEFAS	19th May – 24th May
Neil Campbell	Senior BGS Technician	BGS	19th May – 24th May
Lee Baines	Geological Technician	BGS	19th May – 24th May
Julia Crummy	Geologist	BGS	Whole survey
Mike Wilson	Geological Technician	BGS	19th May – 24th May
David Baxter	Geological Technician	BGS	19th May – 24th May
Mary Mowat	Geologist	BGS	19th May – 24th May
Marta Perez-Fernandez	Archaeologist	Wessex	19th May – 11th June
Stephanie Arnott	Archaeologist	Wessex	19th May – 24th May
Theo Gaussen	MSc Student	MEPF	19th May – 24th May

Survey Personnel Leg 2

John Coppock	Client Rep	MEPF	Whole survey
Keith Cooper	Scientist-in-Charge	CEFAS	24th May – 14th June
Julia Crummy	Geologist	BGS	Whole Survey
Marta Perez-Fernandez	Archaeologist	Wessex	19th May – 11th June
Bryony Pearce	Benthic ecologist	MESL	24th May – 14th June
Lisa Grubb	Benthic ecologist	MESL	24th May – 14th June
Christian Wilson	Geophysicist	CEFAS	24th May – 14th June
Chris Barrio	Senior benthic ecologist	CEFAS	24th May – 14th June
Suzanne Ware	Benthic ecologist	CEFAS	24th May – 14th June
Matt Curtis	Benthic ecologist	CEFAS	24th May – 11th June
Rauhan Wan Hussin	MSc Student	MEPF	24th May – 14th June
Bill Meadows	Senior technician	CEFAS	24th May – 14th June
Simon Pearson	Technician (training outwith MEPF)		24th May – 14th June
Ken May	Technician (training outwith MEPF)		24th May – 14th June

R/V CEFAS Endeavour Crew

A Reading	Master
B Salter	1st Mate
G Ritchie	2nd Mate

A Oakham	3rd Mate
S Tweedy	Chief Engineer

12 additional members of the crew onboard.

Appendix 6 Equipment Layback Diagram

Vessel offsets are defined from the pitch roll centre of the vessel – the Common Reference Point (CRP) used by the Tower CEMAP software to calculate offsets.

A dimensional survey was carried out at vessel commissioning and during the vessels dry dock period from the 19th to the 21st December 2007 (Table 3). This defines the stern roller point very accurately but stern gantry and side gantry being movable are not part of the fixed vessel offset array. Therefore taped offset measurements were performed and used in the navigation software to calculate gantry positions or post-processing for other pieces of data acquired.

For a full list of offsets please see Appendix 3 (page 54) in the CEND 07 08 Dogger Bank cruise report (Limpenny, 2008) which can be found on the BGS network (cruise folder: *NONBGS2008_CEFAS_CEND_7_08*).

Gantry	X (to starboard)	Y (to bow)	Z (vertical upwards)
Side	10.65	-0.1	0
Stern	0	-36.6	0
GPS Mast Antenna (Centre)	-0.01	-4.01	-21.09
Drop Keel Starboard MBES	0.26	14.49	6.47
Drop Keel Port MBES	-0.25	14.50	6.46
Drop keel offsets are as surveyed positions. No correction has been made to the fully deployed position.			

Table 5 Selected offsets from the Common Reference Point.

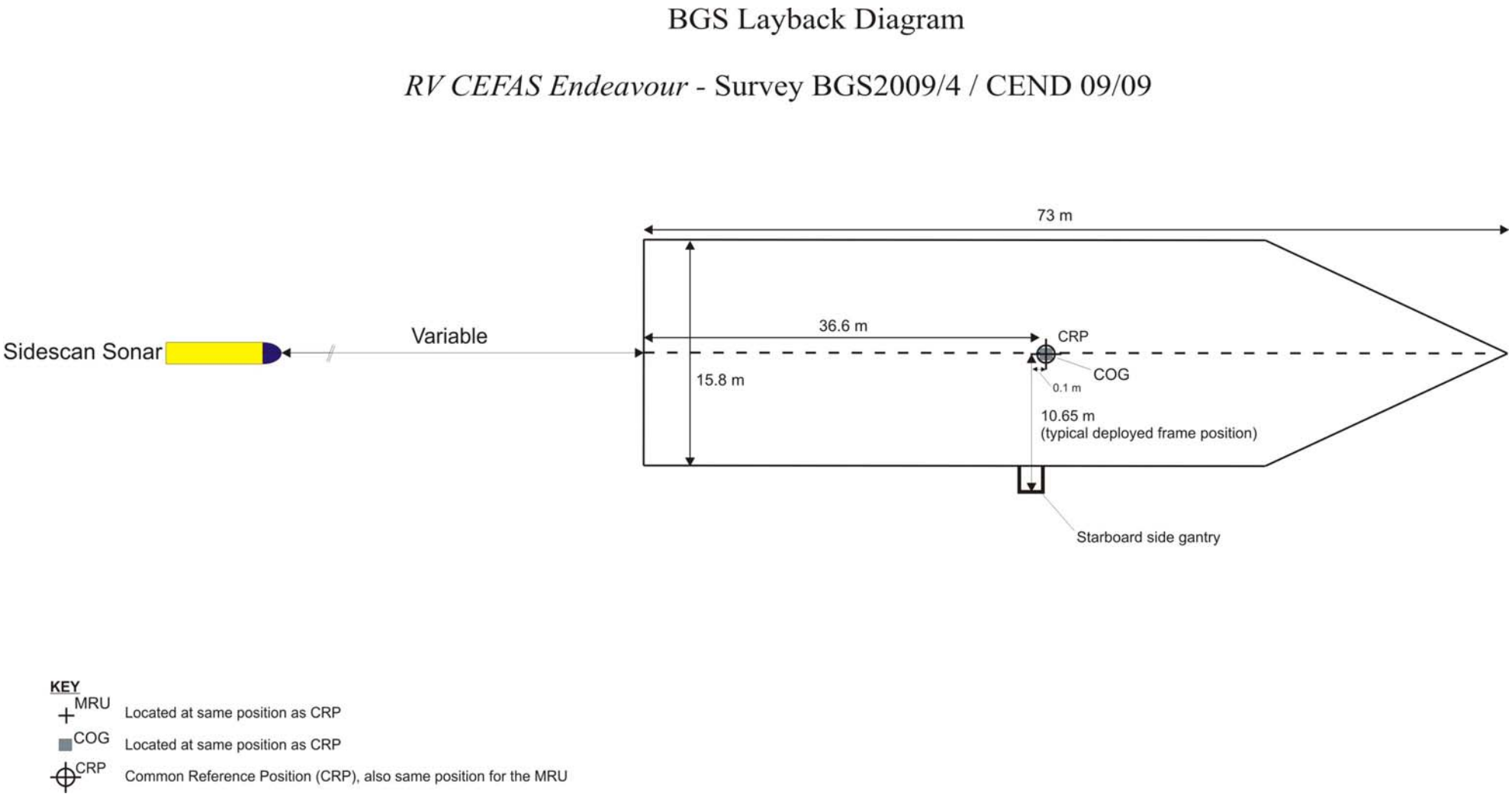
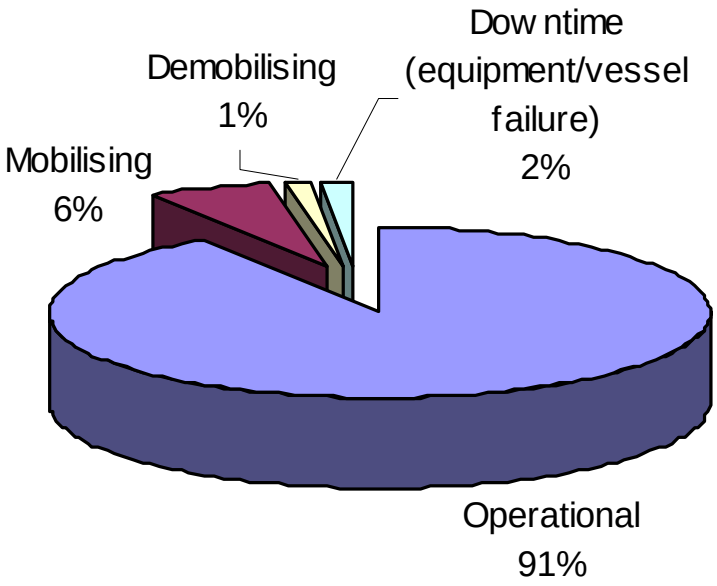


Figure 13 Equipment layback diagram for the *R/V CEFAS Endeavour*.

Appendix 7 Time Utilisation Diagram



Glossary

AGDS	Acoustic Ground Discrimination System
BGS	British Geological Survey
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
MBES	Multibeam Echo-Sounder
SIC	Scientist In Charge
SSS	Sidescan Sonar

References

Most of the references listed below are held in the Library of the British Geological Survey at Keyworth, Nottingham. Copies of the references may be purchased from the Library subject to the current copyright legislation.

LIMPENNY, D. 2008. Dogger Bank SAC Cruise Report. (Lowestoft: CEFAS)

CAMPBELL, N. 2009. BGS Geoscience Resources and Facilities Directorate. Marine Operations. Health and Safety at Sea. Guidance for Geophysics Operations on 'R/V CEFAS Endeavour' – East Coast REC**.**

STEWART, H A, COTTERILL, C J, WILSON, M D, LIMPENNY, D, TIZZARD, L, VANSTAEN, K, DOVE, D, WALLIS, D G, AND CRUMMY, J. 2008. ALSF East Coast Regional Environmental Characterisation Cruise CEND 18/08 / BGS 2008/04. *British Geological Survey Internal Report*, IR/08/074. 86pp.