Final Report (Project Code): C5650

Markham's Triangle rMCZ Survey Report

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Table of Contents

1 Background and Introduction

1.1 Survey Project Team

The Markham's Triangle rMCZ survey was carried out during 30th April - 5th May 2012 on the RV CEFAS Endeavour cruise CEND 08/12. The survey team for the duration of the fieldwork included Cefas marine ecologists and marine surveyors.

1.2 Site Description

Markham's Triangle rMCZ is located 137km from the Humberside coastline (Figure 1). Water depth across the site ranges from 30-50m. ***(For a detailed site description see NetGain Final Report and Recommendations for Marine Conservation Zones 2011).***

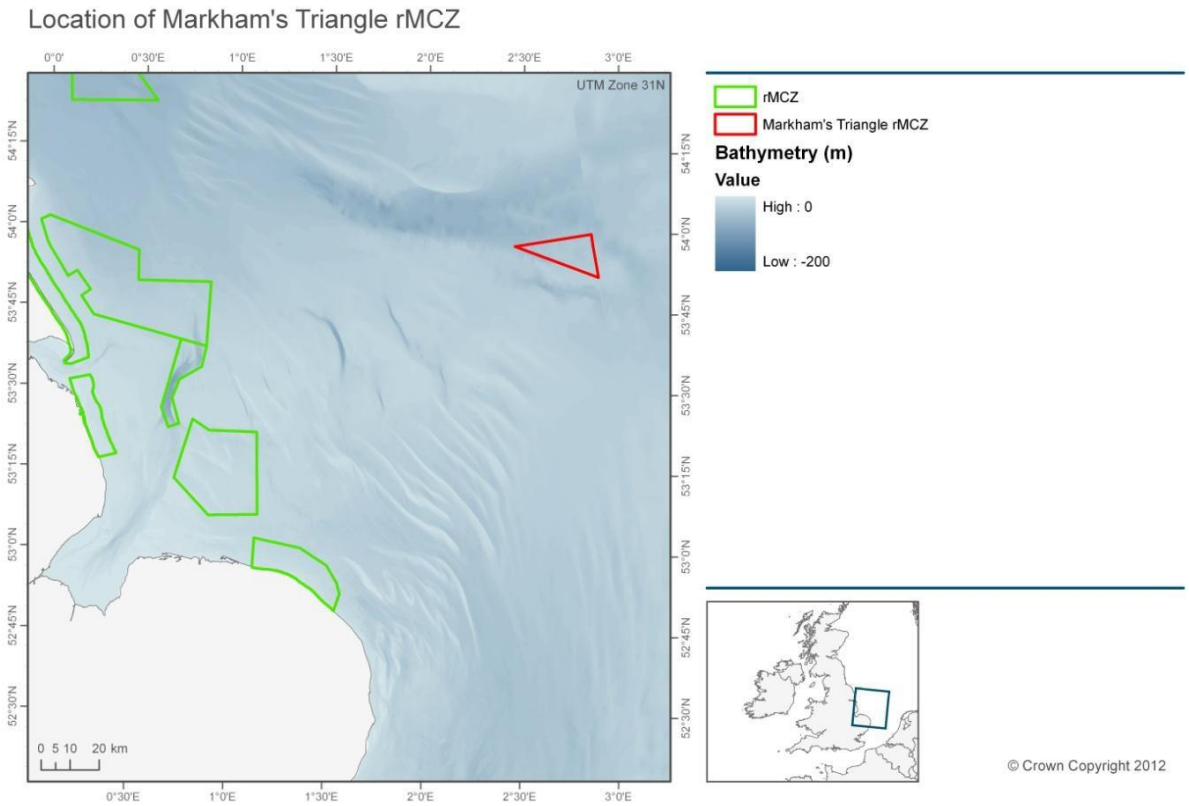


Figure 1. Location of Markham's Triangle rMCZ, in the context of other rMCZs in the area. [Bathymetry is from the Defra Digital Elevation Model (Astrium, 2011)].

1.3 Geological and Biological Context

A number of broadscale habitat features have been proposed for designation within the Markham's Triangle rMCZ (Table 1).

Table 1 Features proposed for designation within Markham's Triangle rMCZ.

Feature Type	Feature Name
Broad Scale Habitat (BSH)	A5.1 Subtidal coarse sediment
	A5.2 Subtidal sand
Features of Conservation Interest (FOCI)	
Habitats	N/A
Species	N/A
Geomorphological Feature	N/A

A number of additional features were listed as being present within the Markham's Triangle rMCZ but these were not included in the recommendations for designation of this site (Table 2).

Table 2 Features not proposed for designation within Markham's Triangle rMCZ.

Feature Type	Feature Name
Broad Scale Habitat (BSH)	A4.2 Moderate energy circalittoral rock
	A5.4 Subtidal mixed sediment
Features of Conservation Interest (FOCI)	
Habitats	Subtidal sands and gravels
Species	European Eel *(Anguilla anguilla)*

1.4 Existing data and information utilised to inform survey planning

No relevant existing data were identified to assist with the planning of the Markham's Triangle rMCZ survey. Therefore, it was proposed that acoustic data (multibeam bathymetry and backscatter) would be acquired across the entire survey area to achieve a spatial coverage of approximately 75%.

The groundtruthing survey adopted a systematic grid design for the purpose of validating the presence and extent of the predicted Broad Scale Habitats (BSH) proposed for designation.

Additional groundtruthing stations were positioned where the acoustic survey data indicated the presence of potential features of interest or broadscale habitats outside the extents predicted by the predictive habitat map.

2 Survey Design and Methods

2.1 Survey planning and design

2.1.1 Acoustic survey

The multibeam survey was designed to allow approximately 75% coverage of the site. This allowed optimum coverage of the survey area whilst efficiently utilising the survey time available.

2.1.2 Groundtruthing

Selection and positioning of ground-truthing stations was informed by a combination of the predicted broadscale habitats derived from the Site Assessment Document (SAD) habitat map and acoustic data acquired during the survey. Grab sampling stations were positioned within the sedimentary habitats using a triangular lattice grid overlaid on the SAD habitat map. Stations within the predicted subtidal coarse sediments were at a grid spacing of 2.5 km and those within the predicted sand sediments were at a grid spacing of 1.5 km. Additional stations were positioned where the acoustic data indicated the potential presence of features of interest or broadscale habitats outside the areas predicted by the SAD habitat map.

2.2 Sample collection and processing methods

2.2.1 Sedimentary Broad Scale Habitats

Sedimentary habitats were groundtruthed using a combination of grab and underwater camera. The grab system comprised a 0.1 m^2 mini Hamon grab fitted with a video camera (Figure 2), the combined gear being known as a HamCam. This allowed an image of the undisturbed seabed surface to be obtained for each grab sample. On recovery, the grab was emptied into a large plastic bin and a representative sub-sample of sediment (approx. 0.5 litres) taken for Particle Size Analysis (PSA). The sample was stored in a labelled plastic container and frozen ready for transfer to a laboratory ashore.

The remaining sample was photographed and the volume of sediment measured and recorded. Benthic fauna were collected by washing the sample with sea-water over a 1mm sieve. The retained

>1mm fraction was transferred to a labelled container and preserved in 4% buffered formaldehyde for later analysis ashore.

Figure 2. Mini Hamon grab with video camera (HamCam).

The camera sledge system comprised a video camera with capability to also capture still images (Figure 3). Illumination was provided by two Cefas high intensity LED striplights and a flash unit. The camera was fitted with a four-spot laser-scaling device to provide a reference scale in the video image. Set-up and operation followed the MESH 'Recommended Operating Guidelines (ROG) for underwater video and photographic imaging techniques'. Video was recorded simultaneously to a Sony GV-HD700 DV tape recorded and a computer hard drive. A video overlay was used to provide station metadata, time and GPS position (of the vessel) in the recorded video image.

Camera tows lasted a minimum of 10 minutes, with the sledge being towed at ~ 0.5 knots (~0.25ms^{-1}) across a 50 m 'bullring' centred on the sampling station. Stills images were captured at regular one-minute intervals and opportunistically if specific features of interest were encountered. The sledge was controlled by a winch operator with sight of the video monitor. No record was made of the amount of tow cable deployed, so a standard 'lay back' calculation cannot be applied to estimate the distance of the sledge behind the vessel. Within the predicted sedimentary habitats, the selection of stations where the camera sledge would be used in addition to the grab was informed by the sediment type present in the grab sample (i.e., where the grab sample confirmed the presence of a given broadscale habitat the camera was deployed to allow characterisation of the surface sediment types and epifaunal communities). The number of camera deployments per BSH varied depending on the uniformity of the habitat and its spatial extent.

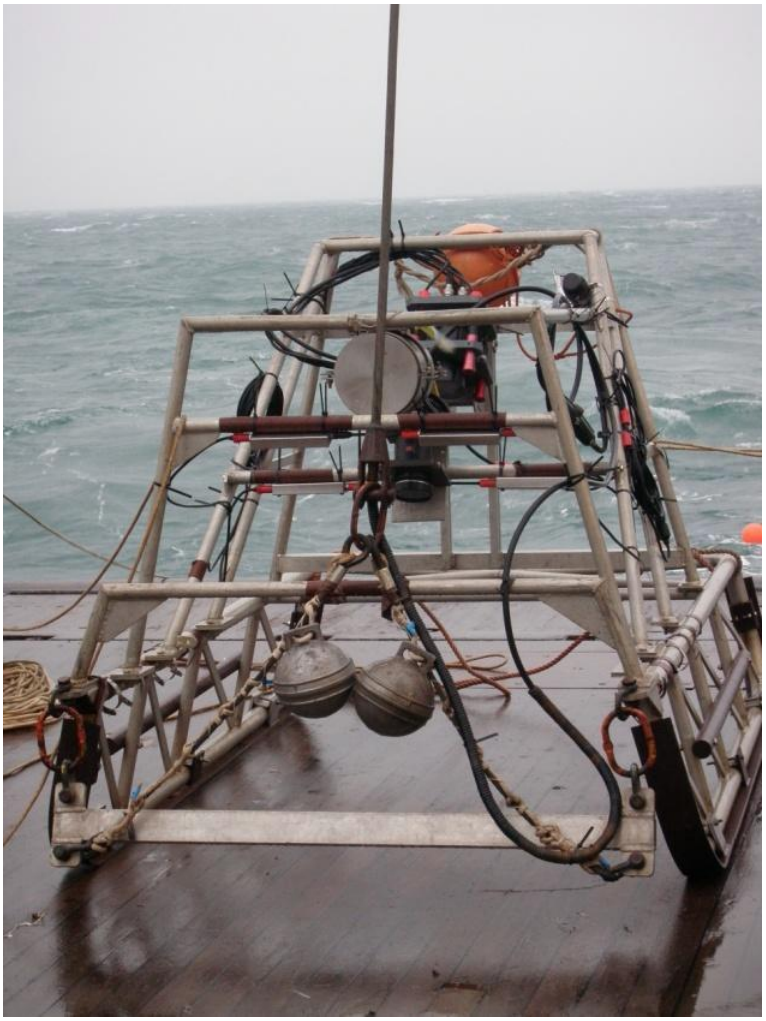


Figure 3. Camera sledge with video and still imaging system.

2.2.2 Circalittoral Rock Broad Scale Habitats

Areas of predicted circalittoral rock BSH were initially explored using the HamCam, hovered over the seabed to identify if any upstanding bedrock was present. This initial visual assessment did not identify any areas of exposed bedrock thus allowing the camera sledge to be deployed for the purpose of assessing the surface sediments and associated epifaunal communities.

3 Survey Narrative

Survey work began at the Markham's Triangle rMCZ on 30th April 2012 at 00:30 hrs. A CTD was deployed to obtain the Sound Velocity Profile (SVP) for calibration of the multibeam. The multibeam survey then commenced at 06:30. Following completion of the first tranche of acoustic survey (at 08:15 on 01/05/12) the area was groundtruthed using a combination of HamCam sampling and video and still imagery. Eighteen stations were targeted, 17 being sampled by Hamon grab, and nine by camera sledge.

The second tranche of the acoustic survey commenced at 02:40 on 02/05/12 and continued until 02:00 on 03/05/12. A portion of the tranche 2 survey area was not surveyed during this time due to the presence of the Chiswick Field Well which restricted safe access to the area (particularly during hours of darkness). Therefore, acoustic survey of this remaining area of tranche 2 was reassigned to the hours of daylight. The tranche 2 survey area was then groundtruthed during which time a total of 17 stations were targeted; all were sampled by Hamon grab and nine by camera sledge.

The third tranche of acoustic survey commenced at 17:30 on 03/05/12. On completion of the first portion of tranche 3 acoustic survey the area was groundtruthed during which time a total of 14 stations were targeted, 13 with Hamon grabs and four with the camera sledge. The remaining acoustic surveys in tranche 2 and tranche 3 were then completed (4th – 5th May) after which the vessel began transit to the next rMCZ survey area, sampling one further ground-truth station (F2) with both grab and sledge in an area of fine sediment identified in the east of the site.

4 Preliminary Results

4.1 Acoustic Maps

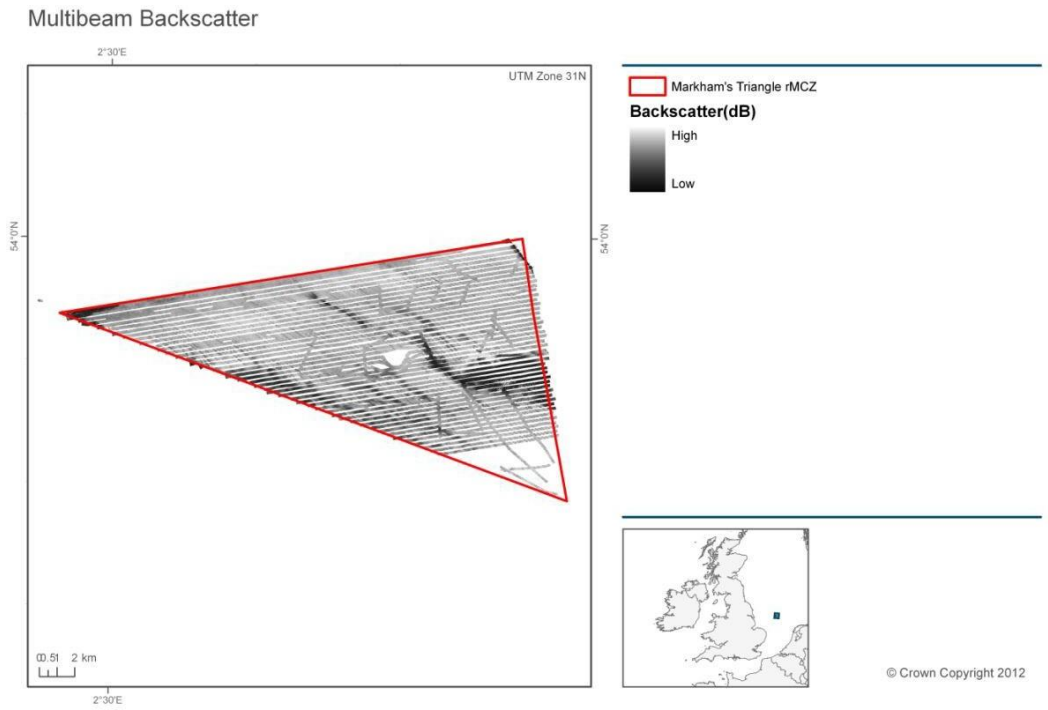


Figure 4. Multibeam backscatter.

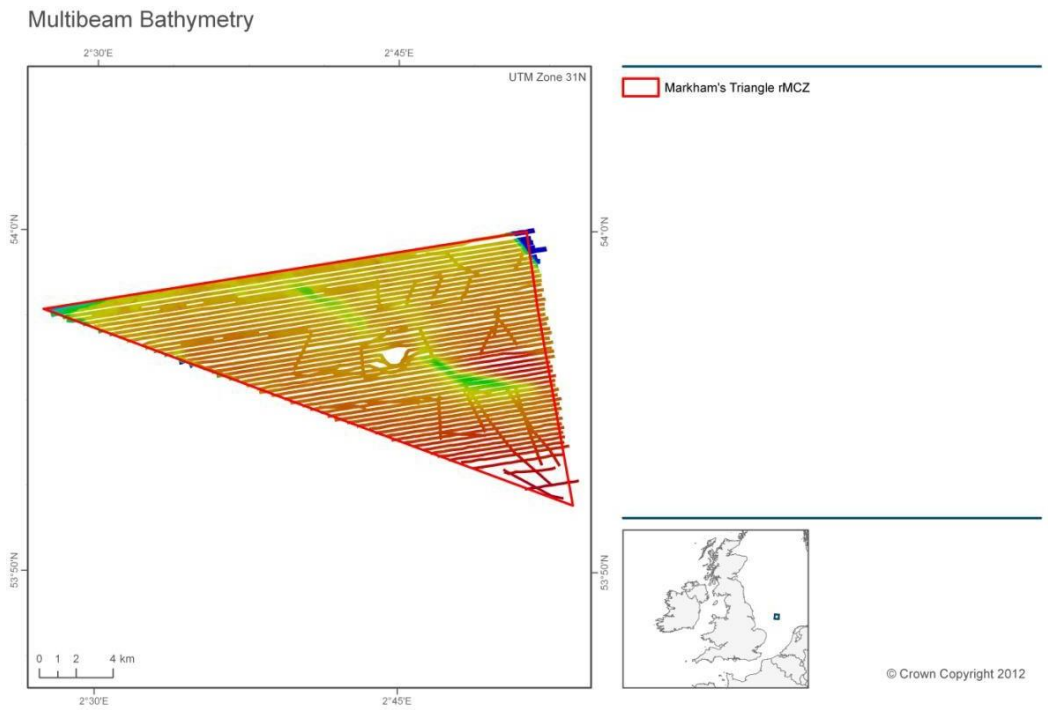
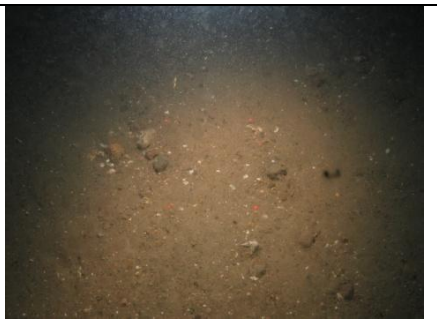


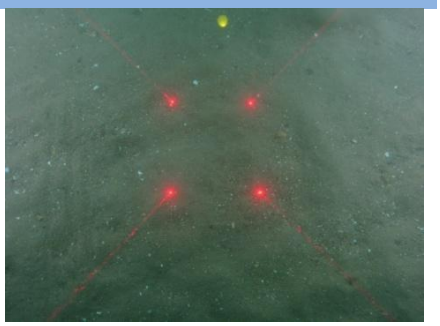
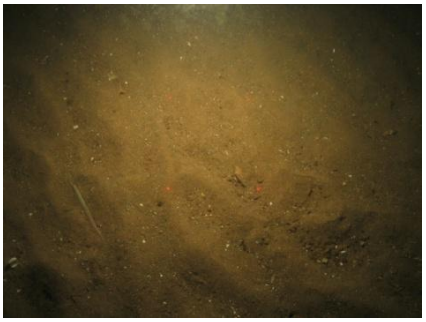
Figure 5. Multibeam bathymetry.

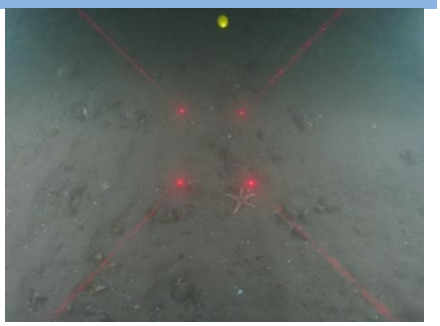
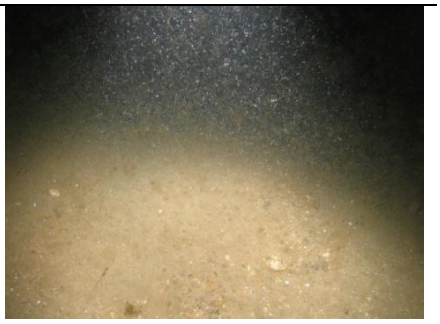
4.2 Seabed Imagery

A preliminary summary of the seabed substrate and epifaunal communities observed in video and still images is given below for each of the predicted BSH's on the SAD habitat map.

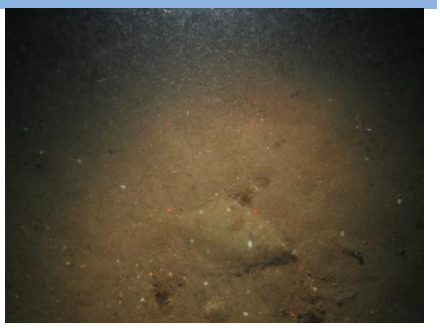
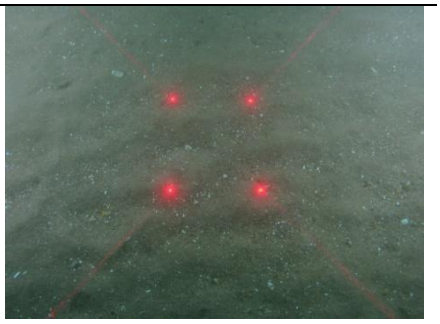
4.2.1 Stations in predicted coarse sediment.

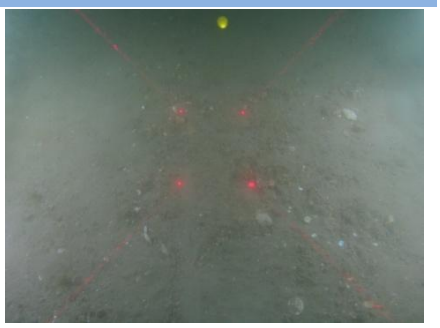
Stn Code	BSH Habitat/Faunal Summary	Still Image
MT 03	**Rippled coarse sand** (*Asterias rubens, Callionymus lyra, Pagurus bernhardus*)	
MT 05	**Slightly gravelly sand with ripples** (*Asterias rubens*, Ammodytidae)	
MT 07	**Rippled coarse sand** (*Asterias rubens*)	
MT 10	**Rippled sand**	

Stn Code	BSH Habitat/Faunal Summary	Still Image
MT 12	**Slightly gravelly sand with burrows** (*Asterias rubens, Callionymus lyra*)	
MT 14	**Rippled sand** (*Asterias rubens*)	
MT 17	**Uniform muddy sand** (*Asterias rubens*)	
MT 20	**Slightly gravelly rippled sand with occasional pebble** (*Pagurus bernhardus, Asterias rubens, Alcyonium digitatum*)	
MT 21	**Rippled coarse sand** (Paguridae, *Asterias rubens,* Ammodytidae)	

Stn Code	BSH Habitat/Faunal Summary	Still Image
MT 22	**Gravelly sand with pebble and cobble** (*Alcyonium digitatum, Asterias rubens, Chelidonichthys lucernus*)	
MT 24	**Slightly gravelly sand** (*Pagurus bernhardus, Alcyonium digitatum*)	
MT 26	**Slightly gravelly sand**	
MT 28	**Slightly gravelly sand** (*Asterias rubens*)	
F2	**Muddy sand** (*Astropecten irregularis*)	

4.2.2 Stations in predicted sand sediment.

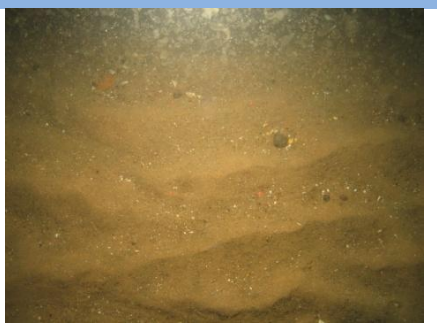
Stn Code	BSH Habitat/Faunal Summary	Still Image
MT 31	**Gravelly sand** (*Asterias rubens, Callionymus lyra, Pleuronectes platessa*)	
MT 34	**Rippled sand** (*Asterias rubens*)	
MT 36	**Slightly gravelly sand with occasional pebble** (*Asterias rubens, Ophiura albida*, *Alcyonium digitatum, Serpulidae*)	
MT 37	**Slightly gravelly sand** (*Asterias rubens*)	
MT 39	**Slightly gravelly sand** (*Asterias rubens*)	

Stn Code	BSH Habitat/Faunal Summary	Still Image
MT 44	**Gravelly sand** (*Asterias rubens, Callionymus lyra*)	

4.2.3 *Stations in predicted mixed sediment.*

Stn Code	BSH Habitat/Faunal Summary	Still Image
MT 47	**Slightly rippled mud** (*Pagurus bernhardus*)	

4.2.4 *Stations in predicted circalittoral rock.*

Stn Code	BSH Habitat/Faunal Summary	Still Image
MT 45	**Rippled coarse sand** (Ammodytidae, *Callionymus lyra*, Ophiuridae)	

4.3 Grab samples and sediment types

Preliminary, onboard visual observations of the spatial distribution of sediment types (EUNIS level 3) for each grab sample were also summarised (Figure 6). It should be emphasised that the EUNIS classifications presented in Figure 6 may change as a result of the outcomes of laboratory processing and interpretation.

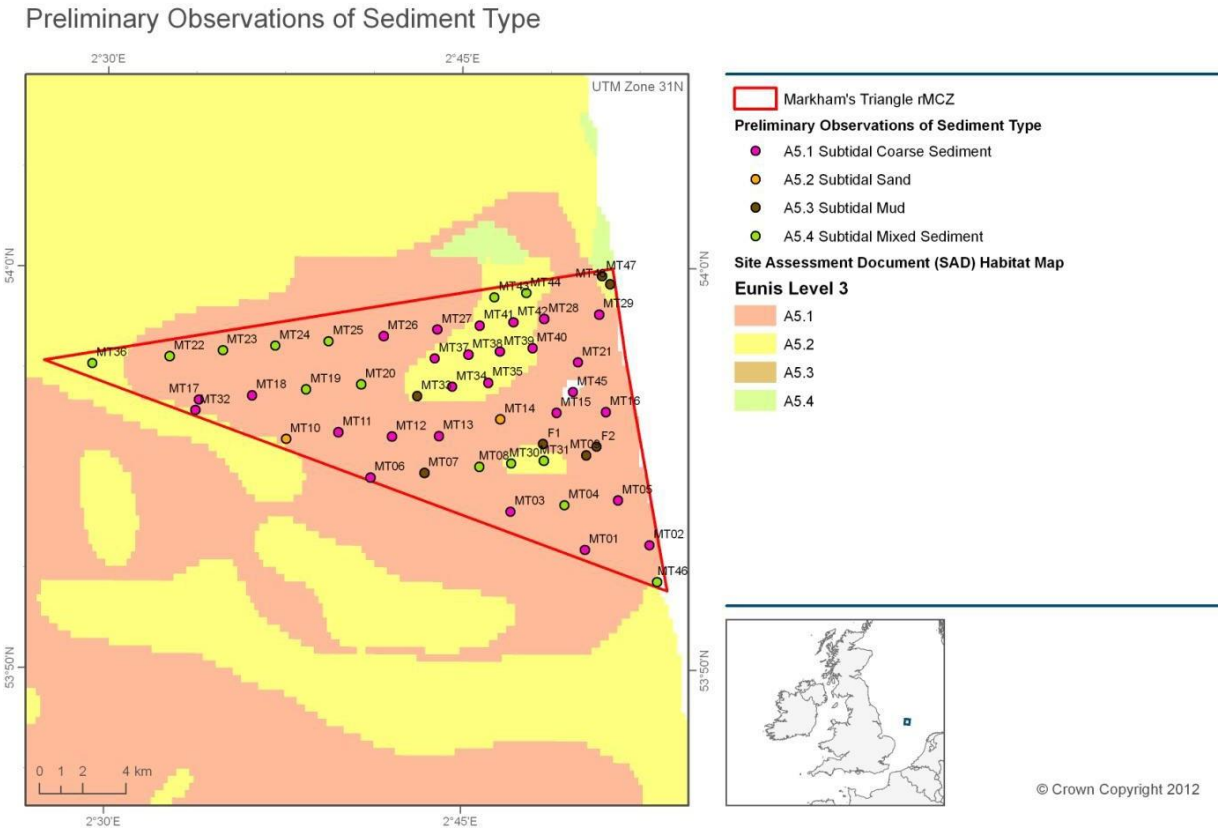


Figure 6. Preliminary sediment descriptions from Hamon grab samples.

4.3 Preliminary observations of Features of Conservation Interest (FOCI)

No records of species FOCI were identified from historic records or during the present survey (CEND8/12) from within the Markham's Triangle rMCZ. However, species FOCI may be identified to be present once the samples are processed.

5 Annexes

5.1 RV Cefas Endeavour

Port of registry	Lowestoft
Length OA	73.00 m (excluding stern roller)
Length extreme	73.916 m
Breadth (MLD)	15.80 m
Depth (MLD)	8.20 m
Design draft	5.00 m
Deep draught	5.50 m
LBP	66.50 m
Gross tonnage	2983 tonnes
Net register tonnage	894 tonnes
Net lightship	2436 tonnes
Deadweight @ 5.00 m	784 tonnes
Deadweight @ 5.50 m	1244 tonnes
Displacement @ 5.00 m	3210 tonnes
Displacement @ 5.50 m	3680 tonnes
Builder	Ferguson Shipbuilders Limited, Port Glasgow
Commissioned	2003
Communications	In port BT Tel. Cellphone Voice/Fax/Data Radio TELEX Inmarsat C Fleet 77 (Inmarsat F) and VSAT (eutelsat) internet access
Endurance	42 days
Complement	En-suite accommodation for 16 crew and 19 scientists with dedicated hospital facility
Propulsion System	AC/DC Diesel Electric 3 x diesel electric AC generators, individually raft mounted 2 x tandom electric DC motors Single screw
Power generation	3240 Kw
Power propulsion	2230 Kw
Thrusters	Bow thruster (flush mounted azimuthing) Stern thruster (tunnel)
Trial speed	14.4 knots
Bollard pull	29 tonnes
Call sign	VQHF3
Official number	906938
MMSI	235005270

Lloyds/IMO number	9251107
Side Gantry	7.5 tonne articulated side A-frame
Stern Gantry	25 tonne stern A-frame
Winches	3 x cranes 35 tM, heave compensated 2 x trawl winches 2 x drum winches, (1 double) Double barrel survey winch with motion compensation and slip rings Double barrel survey winch with slip rings Double barrel towing winch with slip rings Side-scan sonar winch with slip rings 3 x Gilson winches (one fitted to stern A-frame)
Transducers/Sea tube	Drop keel to deploy transducers outside the hull boundary layer in addition to hull mounted transducers 1.2 m diameter sea tube/moon-pool
Acoustic equipment	Kongsberg Simrad: HiPAP 500 positioning sonar EK60, 38/120 kHz scientific sounder EA 600, 50/200 kHz scientific sounder Scanmar net mensuration system SH80 high frequency omni- directional sonar EM3002 swathe bathymetry sounder Hull mounted Scanmar fishing computer transducers
Boats	2 x 8m rigid work and rescue boats with suite of navigational equipment deployed on heave-compensated davits
Laboratories	8 networked laboratories designed for optimum flexibility of purpose 4 serviced deck locations for containerised laboratories
Special features	Dynamic positioning system Intering anti-roll system Local Area Network with scientific data management system Ship-wide general information system CCTV
Class	LRS 100A1+LMC UMS SCM CCS ICC IP ES(2) DP(CM) ICE class 2

5.2 Camera Sledge

Flash model: Kongsberg 11-242
Underwater lights – Cefas high power LED strip lights
Video and stills camera settings variable depending on underwater visibility and ambient light levels.

5.3 Positioning Software-Tower

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.

5.4 Multibeam Bathymetry

Model: Kongsberg EM2040
Frequency: 300kHz; swathe width variable running in hi res equidistant mode
Latency correction not determined – 1pps synchronised time system utilised on vessel.

5.5 Metadata

Gear Codes: CTD = Conductivity Temperature & Depth profiler. MB= multibeam. HC = HamCam. CS = Camera Sledge.

Cruise Code	Date	Stn No.	Station Code	Gear	Latitude	Longitude
CEND 8/12	30/04/2012	2	MBCAL_S	MB	53.59000	2.14000
CEND 8/12	30/04/2012	2	MBCAL_E	MB	54.00000	2.15000
CEND 8/12	30/04/2012	3	MTCTD2	CTD	53.96000	2.44000
CEND 8/12	30/04/2012	4	MTMB	MB	53.96033	2.46000
CEND 8/12	30/04/2012	5	MT36	HC	53.95983	2.49006
CEND 8/12	30/04/2012	6	MTMB_S	MB	53.98300	2.86600
CEND 8/12	30/04/2012	6	MTMB_E	MB	53.95200	2.49900
CEND 8/12	01/05/2012	7	MT29	HC	53.98095	2.84661
CEND 8/12	01/05/2012	8	MTMB	MB	53.99348	2.85449
CEND 8/12	01/05/2012	9	MT48	HC	53.99348	2.85449
CEND 8/12	02/05/2012	10	MT47	HC	53.99677	2.84858
CEND 8/12	01/05/2012	11	MT47_S	CS	53.99715	2.84908
CEND 8/12	01/05/2012	11	MT47_E	CS	53.99707	2.84883
CEND 8/12	01/05/2012	12	MTMB_S	MB	53.98800	2.74300
CEND 8/12	01/05/2012	12	MTMB_E	MB	54.00000	2.86200
CEND 8/12	01/05/2012	13	MTMB_S	MB	53.98800	2.76500
CEND 8/12	01/05/2012	13	MTMB_E	MB	53.98600	2.74200
CEND 8/12	01/05/2012	14	MT43	HC	53.98800	2.77300
CEND 8/12	01/05/2012	15	MT43	HC	53.98851	2.77321
CEND 8/12	01/05/2012	16	MTMB_S	MB	53.98900	2.79020
CEND 8/12	01/05/2012	16	MTMB_E	MB	53.98800	2.77300
CEND 8/12	01/05/2012	17	MT44	HC	53.98975	2.79533
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CEND 8/12	01/05/2012	22	MTMB_E	MB	53.97800	2.80900
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CEND 8/12	01/05/2012	27	MTMB_E	MB	53.96700	2.77800
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CEND 8/12	01/05/2012	38	MTMB_E	MB	53.97300	2.73200
CEND 8/12	01/05/2012	39	MT26	HC	53.97169	2.69502
CEND 8/12	01/05/2012	40	MT26_S	CS	53.97228	2.69419
CEND 8/12	01/05/2012	40	MT26_E	CS	53.97227	2.69426
CEND 8/12	01/05/2012	41	MTMB_S	MB	53.96800	2.65000
CEND 8/12	01/05/2012	41	MTMB_E	MB	53.97000	2.69500
CEND 8/12	01/05/2012	42	MT25	HC	53.96947	2.65634
CEND 8/12	01/05/2012	43	MTMB_S	MB	53.96500	2.61400
CEND 8/12	01/05/2012	43	MTMB_E	MB	53.96800	2.65400
CEND 8/12	01/05/2012	44	MT24	HC	53.96750	2.61869
CEND 8/12	01/05/2012	45	MT24_S	CS	53.96639	2.62497
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CEND 8/12	02/05/2012	47	MT23	HC	53.96552	2.58173
CEND 8/12	02/05/2012	48	MTMB_S	MB	53.96126	2.55159
CEND 8/12	02/05/2012	48	MTMB_E	MB	53.96363	2.57315
CEND 8/12	02/05/2012	49	MT22	HC	53.96292	2.54443
CEND 8/12	02/05/2012	50	MT22_S	CS	53.96294	2.54445
CEND 8/12	02/05/2012	50	MT22_E	CS	53.96312	2.54312
CEND 8/12	02/05/2012	51	MTMB_S	MB	53.95180	2.49540
CEND 8/12	02/05/2012	51	MTMB_E	MB	53.96257	2.53619
CEND 8/12	02/05/2012	52	MT36_S	CS	53.95941	2.49126
CEND 8/12	02/05/2012	52	MT36_E	CS	53.95984	2.49005
CEND 8/12	02/05/2012	53	MTMB_S	MB	53.94600	2.54500
CEND 8/12	02/05/2012	53	MTMB_E	MB	53.93900	2.55500
CEND 8/12	02/05/2012	55	MTMB_S	MB	53.94100	2.87900
CEND 8/12	02/05/2012	55	MTMB	MB	53.93700	2.56700
CEND 8/12	03/05/2012	56	MT16	HC	53.94259	2.85376
CEND 8/12	03/05/2012	57	MTMB	MB	53.96100	2.83100
CEND 8/12	03/05/2012	57	MTMB	MB	53.94400	2.84800
CEND 8/12	03/05/2012	58	MT21	HC	53.96099	2.83177
CEND 8/12	03/05/2012	59	MT21_S	CS	53.96083	2.83063
CEND 8/12	03/05/2012	59	MT21_E	CS	53.96189	2.83075
CEND 8/12	03/05/2012	60	MTMB	MB	53.94800	2.82800
CEND 8/12	03/05/2012	60	MTMB	MB	53.96200	2.83000
CEND 8/12	03/05/2012	61	MT45	HC	53.94870	2.82830
CEND 8/12	03/05/2012	62	MT45_S	CS	53.94958	2.82859
CEND 8/12	03/05/2012	62	MT45_E	CS	53.95045	2.82898
CEND 8/12	03/05/2012	63	MTMB	MB	53.93900	2.81700
CEND 8/12	03/05/2012	63	MTMB	MB	53.95000	2.83900
CEND 8/12	03/05/2012	64	MT15	HC	53.94001	2.81683
CEND 8/12	03/05/2012	65	MTMB	MB	53.93880	2.80280
CEND 8/12	03/05/2012	65	MTMB	MB	53.93700	2.77700
CEND 8/12	03/05/2012	66	MT14	HC	53.93732	2.77729
CEND 8/12	03/05/2012	67	MT14_S	CS	53.93782	2.77736
CEND 8/12	03/05/2012	67	MT14_E	CS	53.93818	2.77753
CEND 8/12	03/05/2012	68	MTMB	MB	53.95200	2.76800
CEND 8/12	03/05/2012	68	MTMB	MB	53.93800	2.77700
CEND 8/12	03/05/2012	69	MT35	HC	53.95250	2.76885
CEND 8/12	03/05/2012	70	MTMB	MB	53.95000	2.74300
CEND 8/12	03/05/2012	70	MTMB	MB	53.95234	2.75680
CEND 8/12	03/05/2012	71	MT34	HC	53.95077	2.74341
CEND 8/12	03/05/2012	72	MT34_S	CS	53.95080	2.74326
CEND 8/12	03/05/2012	72	MT34_E	CS	53.95145	2.74369
CEND 8/12	05/03/2012	73	MTMB	MB	53.94400	2.71900

Cruise Code	Date	Stn No.	Station Code	Gear	Latitude	Longitude
CEND 8/12	05/03/2012	73	MTMB	MB	53.95100	2.74300
CEND 8/12	03/05/2012	74	MT33	HC	53.94680	2.71880
CEND 8/12	03/05/2012	75	MTMB	MB	53.93000	2.73400
CEND 8/12	03/05/2012	75	MTMB	MB	53.94300	2.71900
CEND 8/12	01/05/2012	76	MT13	HC	53.93034	2.73432
CEND 8/12	03/05/2012	77	MTMB	MB	53.93100	2.69659
CEND 8/12	03/05/2012	77	MTMB	MB	53.93000	2.71800
CEND 8/12	03/05/2012	78	MT12_S	HC	53.93043	2.73462
CEND 8/12	03/05/2012	79	MT12_E	CS	53.93402	2.70178
CEND 8/12	03/05/2012	80	MTMB	MB	53.93100	2.66200
CEND 8/12	03/05/2012	80	MTMB	MB	53.93400	2.70200
CEND 8/12	03/05/2012	81	MT11	HC	53.93169	2.66329
CEND 8/12	03/05/2012	82	MTMB	MB	53.91450	2.67800
CEND 8/12	03/05/2012	82	MTMB	MB	53.93170	2.66330
CEND 8/12	03/05/2012	83	MT20	HC	53.95161	2.67918
CEND 8/12	03/05/2012	84	MT20_S	CS	53.95142	2.67843
CEND 8/12	03/05/2012	84	MT20_E	CS	53.95199	2.68014
CEND 8/12	03/05/2012	85	MTMB	MB	53.94800	2.64100
CEND 8/12	03/05/2012	85	MTMB	MB	53.95200	2.67400
CEND 8/12	03/05/2012	86	MT19	HC	53.94946	2.64066
CEND 8/12	03/05/2012	87	MTMB	MB	53.94700	2.60400
CEND 8/12	03/05/2012	87	MTMB	MB	53.95000	2.63400
CEND 8/12	03/05/2012	89	MT18_S	CS	53.94680	2.60161
CEND 8/12	03/05/2012	89	MT18_E	CS	53.94680	2.60174
CEND 8/12	03/05/2012	90	MTMB	MB	53.94400	2.56900
CEND 8/12	03/05/2012	90	MTMB	MB	53.94600	2.59700
CEND 8/12	03/05/2012	91	MT17_S	CS	53.94496	2.56634
CEND 8/12	03/05/2012	91	MT17_E	CS	53.94482	2.56526
CEND 8/12	03/05/2012	92	MT17	HC	53.94497	2.56506
CEND 8/12	03/05/2012	93	MT32	HC	53.94061	2.56282
CEND 8/12	03/05/2012	94	MTMB	MB	53.92700	2.61700
CEND 8/12	03/05/2012	94	MTMB	MB	53.93700	2.56800
CEND 8/12	03/05/2012	95	MT10	HC	53.92878	2.62663
CEND 8/12	03/05/2012	96	MT10_S	CS	53.92872	2.62653
CEND 8/12	03/05/2012	96	MT10_E	CS	53.92932	2.62595
CEND 8/12	03/05/2012	97	CTD	CTD	53.92470	2.58350
CEND 8/12	03/05/2012	98	MTMB_S	MB	53.92733	2.69080
CEND 8/12	03/05/2012	98	MTMB_E	MB	53.91768	2.63650
CEND 8/12	04/05/2012	99	MT06	HC	53.91303	2.68606
CEND 8/12	04/05/2012	100	MTO6 - MTO7_S	MB	53.91400	2.72900
CEND 8/12	04/05/2012	100	MTO6 - MTO7_E	MB	53.91200	2.68500
CEND 8/12	04/05/2012	101	MT07	HC	53.91496	2.72411
CEND 8/12	04/05/2012	102	MT07_S	CS	53.91430	2.72409
CEND 8/12	04/05/2012	102	MT07_E	CS	53.91515	2.72402
CEND 8/12	04/05/2012	103	MTO7 - MTO8_S	MB	53.91600	2.76700
CEND 8/12	04/05/2012	103	MTO7 - MTO8_E	MB	53.91500	2.72300
CEND 8/12	04/05/2012	104	MT08	HC	53.91766	2.76261
CEND 8/12	04/05/2012	105	MTO8 - MT30_S	MB	53.91800	2.78400
CEND 8/12	04/05/2012	105	MTO8 - MT30_E	MB	53.91800	2.70700
CEND 8/12	04/05/2012	106	MT30	HC	53.91891	2.78501
CEND 8/12	04/05/2012	107	MT30 - MTO3_S	MB	53.89600	2.74800
CEND 8/12	04/05/2012	107	MT30 - MTO3_E	MB	53.91800	2.78500
CEND 8/12	04/05/2012	108	MT03	HC	53.89900	2.78458
CEND 8/12	04/05/2012	109	MT03_S	CS	53.89898	2.78440
CEND 8/12	04/05/2012	109	MT03_E	CS	53.89959	2.78370
CEND 8/12	04/05/2012	110	MTO3 - MTO4_S	MB	53.90000	2.82200
CEND 8/12	04/05/2012	110	MTO3 - MTO4_E	MB	53.90100	2.78700
CEND 8/12	04/05/2012	111	MT04	HC	53.90174	2.82250

Cruise Code	Date	Stn No.	Station Code	Gear	Latitude	Longitude
CEND 8/12	04/05/2012	112	MTO4 - MT31_S	MB	53.91900	2.80800
CEND 8/12	04/05/2012	112	MTO4 - MT31_E	MB	53.90100	2.82200
CEND 8/12	04/05/2012	113	MT31	HC	53.92014	2.80803
CEND 8/12	04/05/2012	114	MT31_S	CS	53.91987	2.80808
CEND 8/12	04/05/2012	114	MT31_E	CS	53.92054	2.80711
CEND 8/12	04/05/2012	115	MT31 - MTO9_S	MB	53.91100	2.82600
CEND 8/12	04/05/2012	115	MT31 - MTO9_E	MB	53.92100	2.80600
CEND 8/12	04/05/2012	116	MT09	HC	53.92248	2.83783
CEND 8/12	04/05/2012	117	MTO9 - MTO5_S	MB	53.90200	2.86100
CEND 8/12	04/05/2012	117	MTO9 - MTO5_E	MB	53.92200	2.83800
CEND 8/12	04/05/2012	118	MT05	HC	53.90374	2.86032
CEND 8/12	04/05/2012	119	MT05_S	CS	53.90335	2.86066
CEND 8/12	04/05/2012	119	MT05_E	CS	53.90397	2.85983
CEND 8/12	04/05/2012	120	MTO5 - MTO2_S	MB	53.88500	2.88300
CEND 8/12	04/05/2012	120	MTO5 - MTO2_E	MB	53.90300	2.86000
CEND 8/12	04/05/2012	121	MT02	HC	53.88513	2.88231
CEND 8/12	04/05/2012	122	MTO2 - MTO1_S	MB	53.88200	2.83800
CEND 8/12	04/05/2012	122	MTO2 - MTO1_E	MB	53.88400	2.88000
CEND 8/12	04/05/2012	123	MT01	HC	53.88315	2.83706
CEND 8/12	04/05/2012	124	MTMB_S	MB	53.86900	2.88700
CEND 8/12	04/05/2012	124	MTMB_E	MB	53.88300	2.83700
CEND 8/12	04/05/2012	125	MT46	HC	53.86993	2.88778
CEND 8/12	04/05/2012	126	MTMB_S	MB	53.92700	2.80500
CEND 8/12	04/05/2012	126	MTMB_E	MB	53.87500	2.87700
CEND 8/12	04/05/2012	127	MTF1	HC	53.92711	2.80740
CEND 8/12	04/05/2012	129	MTC107_S	MB	53.89400	2.76100
CEND 8/12	04/05/2012	129	MTC107_E	MB	53.87400	2.85500
CEND 8/12	05/05/2012	130	MTF2	CS	53.92600	2.84500
CEND 8/12	05/05/2012	131	MTF2	HC	53.92600	2.84500

5.6 Daily Progress Reports

DAILY LOG
STATUS REPORT
Markhams Triangle rMCZ
RV Cefas Endeavour – JNCC – DPR No. 1 – Sunday 29th April 2012

Vessel: RV Cefas Endeavour GSM : 07799 773456	Project: MCZ Site Verification CEND 8/12 Satellite Voice Bridge: 00 870 (or 00871) 763998027
Daily Progress Report No. 1 Date: 29th April. 2012	Location at 24:00: Silver Pit (53.560N, 2.100E)

To Company:	Person:	E-mail:
Cefas	[redacted]	
Cefas		
JNCC		
JNCC		
JNCC		
JNCC		
JNCC		

Safety

	Today	To Date
Accidents/Incidents		
Near Misses		
Safety Drills/Induction	1	1
Additional comments:	Inductions (12:30, 29/04/12) Muster and Fire Extinguisher Drill (16:00, 29/04/12)	

Summary of operations 0000-2400

Time UTC (start)	Time UTC (end)	Type	Comments
13:30	24:30	Transit	Transit from Lowestoft to Markham's Triangle rMCZ

Overall Progress

Type	Today (hh:mm)	Accum (hh:mm)	Remarks
Mob/Demob			
Offshore Calibrations			
Total Operation Survey (TOSu)			
Total Operation Sampling (TOSa)			
Equipment/Downtime			
Ship/Plant Downtime			
Waiting On Weather			
Transit	11:00	11:00	Transit from Lowestoft to Markham's Triangle rMCZ
Standby Port			
Others			
Total:	11:00	11:00	

DAILY SLOG
STATUS REPORT

Overall Progress Geophysical Data Acquisition MBES/Sidescan

Segment/Area/Line	Today (Lkm)	Accum. (Lkm)	Current estimated total (Lkm)	Remarks
Acoustic: Multibeam				
Gear type				
Acoustic: Sidescan Sonar				
Gear type				

Overall Progress Groundtruthing Samples

Action					Remarks

Weather forecast for the next 24 hours

Wind: E or NE 5 or 6, occasional 7
Sea State: Moderate/Rough

Planned operation for the next 24 hours (00:00 to 24:00 on 30th April 2012)

Begin first block of multibeam survey at Markhams Triangle rMCZ.

Agreed Changes to Scope/Survey operation priorities

CEFAS/JNCC Comments

CEFAS SIC..[redacted]..... JNCC Rep:

DAILY LOG
STATUS REPORT
Markhams Triangle rMCZ
RV Cefas Endeavour – JNCC – DPR No. 2 – Sunday 30th April 2012

Vessel: RV Cefas Endeavour GSM : 07799 773456	Project: MCZ Site Verification CEND 8/12 Satellite Voice Bridge: 00 870 (or 00871) 763998027
Daily Progress Report No. 2	Location at 24:00: 53.991, 2.872
Date: 30/04/12	

To Company:	Person:	E-mail:
Cefas	[redacted]	
Cefas		
JNCC		
JNCC		
JNCC		
JNCC		
JNCC		

Safety

	Today	To Date
Accidents/Incidents		
Near Misses		
Safety Drills/Induction		1
Additional comments:		

Summary of operations 0000-2400

Time UTC (start)	Time UTC (end)	Type	Comments
00:00	00:30	Transit	Transit to CTD site
00:30	00:40	CTD	CTD to provide svp for MB calibration
00:40	01:00	Transit	Transit to MB calibration site
01:00	03:49	MB Calibration	
03:49	06:00	Transit	Transit to Markhams Triangle rMCZ
06:00	06:15	CTD	CTD 1 at Markhams Triangle rMCZ
06:15	06:25	Transit	Transit to start of first MB line
06:25	07:15	MB	Line aborted, problem with Nav data
07:15	10:00	MB Fix	Problem with MB navigation data feed investigated
10:00	10:30	Transit	Transit to grab station
10:30	10:40	HC	Hamon grabbing whilst MB problem fixed
10:40	11:40	Transit	Transit back to re-run first MB line
11:40	24:00	MB	Continuation of Block 1 of MB in Markhams Triangle rMCZ

DAILY SLOG
STATUS REPORT

Overall Progress

Type	Today (hh:mm)	Accum (hh:mm)	Remarks
Mob/Demob			
Offshore Calibrations	02:49	02:49	
Total Operation Survey (TOSu)	13:45	13:45	
Total Operation Sampling (TOSa)	00:10	00:10	
Equipment/Downtime	02:45	02:45	
Ship/Plant Downtime			
Waiting On Weather			
Transit	04:40	15:40	
Standby Port			
Others			
Total:	24:00	35:00	

Overall Progress Geophysical Data Acquisition MBES/Sidescan

Segment/Area/Line	Today (Lkm)	Accum. (Lkm)	Current estimated total (Lkm)	Remarks
Acoustic: Multibeam				
EM2040	143	143		
Acoustic: Sidescan Sonar				
Gear type				

Overall Progress Groundtruthing Samples

Action					Remarks

Weather forecast for the next 24 hours

Wind: E or NE 5 or 6, decreasing to 3 or 4 later
Sea State: Slight/Moderate

Planned operation for the next 24 hours (00:00 to 24:00 on 1st May 2012)

Continue MB at Block 1 of Markhams Triangle rMCZ, Groundtruth Block 1 following completion of MB

Agreed Changes to Scope/Survey operation priorities

Due to the majority of the survey area being shallower than anticipated a 50% MB survey has been adopted. This will still allow the survey objectives to be met effectively whilst using the time available efficiently.

CEFAS/JNCC Comments

CEFAS SIC. [redacted] JNCC Rep:

DAILY LOG
STATUS REPORT
Markhams Triangle rMCZ
RV Cefas Endeavour – JNCC – DPR No. 3 – Tuesday 1st May 2012

Vessel: RV Cefas Endeavour GSM : 07799 773456	Project: MCZ Site Verification CEND 8/12 Satellite Voice Bridge: 00 870 (or 00871) 763998027
Daily Progress Report No. 3 Date: 01/05/12	Location at 24:00: 53.968, 2.621

To Company:	Person:	E-mail:
Cefas	[redacted]	
Cefas		
JNCC		
JNCC		
JNCC		
JNCC		
JNCC		

Safety

	Today	To Date
Accidents/Incidents		
Near Misses		
Safety Drills/Induction		1
Additional comments:		

Summary of operations 0000-2400

Time UTC (start)	Time UTC (end)	Type	Comments
00:00	08:30	MB Survey	Continuation of Block 1 of MB
08:30	24:00	GT Survey	GT of Block 1 stations using combination of HG and CS

Overall Progress

Type	Today (hh:mm)	Accum (hh:mm)	Remarks
Mob/Demob			
Offshore Calibrations		02:49	
Total Operation Survey (TOSu)	08:30	22:15	
Total Operation Sampling (TOSa)	15:30	15:40	
Equipment/Downtime		02:45	
Ship/Plant Downtime			
Waiting On Weather			
Transit		15:40	
Standby Port			
Others			
Total:	24:00	59:00	

DAILY SLOG
STATUS REPORT

Overall Progress Geophysical Data Acquisition MBES/Sidescan

Segment/Area/Line	Today (Lkm)	Accum. (Lkm)	Current estimated total (Lkm)	Remarks
Acoustic: Multibeam				
EM2040	75	218		
Acoustic: Sidescan Sonar				
Gear type				

Overall Progress Groundtruthing Samples

Action	HC	CS			Remarks
Groundtruthing	17	9			

Weather forecast for the next 24 hours

Wind: NE 4 or 5, becoming variable 3
Sea State: Slight/Moderate

Planned operation for the next 24 hours (00:00 to 24:00 on 30th April 2012)

Finish Block 1 GT, Continue with MB of Block 2.

Agreed Changes to Scope/Survey operation priorities

CEFAS/JNCC Comments

CEFAS SIC. [redacted] ....

JNCC Rep:

DAILY LOG
STATUS REPORT
Markhams Triangle rMCZ
RV Cefas Endeavour – JNCC – DPR No. 4 – Wednesday 2nd May 2012

Vessel: RV Cefas Endeavour GSM : 07799 773456	Project: MCZ Site Verification CEND 8/12 Satellite Voice Bridge: 00 870 (or 00871) 763998027
Daily Progress Report No. 4 Date: 02/05/12	Location at 24:00: Markham's Triangle (53.935, 2.597).

To Company:	Person:	E-mail:
Cefas	[redacted]	
Cefas		
JNCC		
JNCC		
JNCC		
JNCC		
JNCC		

Safety

	Today	To Date
Accidents/Incidents		
Near Misses		
Safety Drills/Induction		1
Additional comments:		

Summary of operations 0000-2400

Time UTC (start)	Time UTC (end)	Type	Comments
00:00	02:40	GT Survey	
02:40	24:00	MB Survey	

Overall Progress

Type	Today (hh:mm)	Accum (hh:mm)	Remarks
Mob/Demob			
Offshore Calibrations		02:49	
Total Operation Survey (TOSu)	21:20	43:35	
Total Operation Sampling (TOSa)	02:40	18:20	
Equipment/Downtime		02:45	
Ship/Plant Downtime			
Waiting On Weather			
Transit		15:40	
Standby Port			
Others			
Total:	24:00	83:00	

DAILY SLOG
STATUS REPORT

Overall Progress Geophysical Data Acquisition MBES/Sidescan

Segment/Area/Line	Today (Lkm)	Accum. (Lkm)	Current estimated total (Lkm)	Remarks
Acoustic: Multibeam				
EM2040	175	393		
Acoustic: Sidescan Sonar				
Gear type				

Overall Progress Groundtruthing Samples

Action	HC	CS			Remarks
Groundtruthing	3	2			

Weather forecast for the next 24 hours

Wind: NE 4 or 5, occasionally 6 at first.
Sea State: Moderate.

Planned operation for the next 24 hours (00:00 to 24:00 on 30th April 2012)

Finish Tranche 2 MB Survey, Begin GT survey of tranche 2.

Agreed Changes to Scope/Survey operation priorities

CEFAS/JNCC Comments

CEFAS SIC.. [redacted].... JNCC Rep:

DAILY LOG
STATUS REPORT
Markhams Triangle rMCZ
RV Cefas Endeavour – JNCC – DPR No. 5 – Thursday 3rd May 2012

Vessel: RV Cefas Endeavour GSM : 07799 773456	Project: MCZ Site Verification CEND 8/12 Satellite Voice Bridge: 00 870 (or 00871) 763998027
Daily Progress Report No. 5 Date: 03/05/12	Location at 24:00: Markham's Triangle (53.929, 2.730)

To Company:	Person:	E-mail:
Cefas	[redacted]	
Cefas		
JNCC		
JNCC		
JNCC		
JNCC		
JNCC		

Safety

	Today	To Date
Accidents/Incidents		
Near Misses		
Safety Drills/Induction		1
Additional comments:		

Summary of operations 0000-2400

Time UTC (start)	Time UTC (end)	Type	Comments
00:00	01:30	MB Survey	
01:30	17:30	GT Survey	
17:30	24:00	MB Survey	

Overall Progress

Type	Today (hh:mm)	Accum (hh:mm)	Remarks
Mob/Demob			
Offshore Calibrations		02:49	
Total Operation Survey (TOSu)	08:00	51:35	
Total Operation Sampling (TOSa)	16:00	34:20	
Equipment/Downtime		02:45	
Ship/Plant Downtime			
Waiting On Weather			
Transit		15:40	
Standby Port			
Others			
Total:	24:00	107:09	

DAILY SLOG
STATUS REPORT

Overall Progress Geophysical Data Acquisition MBES/Sidescan

Segment/Area/Line	Today (Lkm)	Accum. (Lkm)	Current estimated total (Lkm)	Remarks
Acoustic: Multibeam				
EM2040	70	463		
Acoustic: Sidescan Sonar				
Gear type				

Overall Progress Groundtruthing Samples

Action	HC	CS			Remarks
Groundtruthing	18	9			

Weather forecast for the next 24 hours

Wind: Variable 4, becoming 5 or 6 later.
Sea State: Slight becoming moderate.

Planned operation for the next 24 hours (00:00 to 24:00 on 30th April 2012)

Complete first portion of Tranche 3 MB Survey, Begin GT survey of tranche 3.

Agreed Changes to Scope/Survey operation priorities

CEFAS/JNCC Comments

CEFAS SIC. [redacted] JNCC Rep:

DAILY LOG
STATUS REPORT
Markhams Triangle rMCZ
RV Cefas Endeavour – JNCC – DPR No. 6 – Friday 4th May 2012

Vessel: RV Cefas Endeavour GSM : 07799 773456	Project: MCZ Site Verification CEND 8/12 Satellite Voice Bridge: 00 870 (or 00871) 763998027
Daily Progress Report No. 6 Date: 04/05/12	Location at 24:00: Markham's Triangle ()

To Company:	Person:	E-mail:
Cefas	[redacted]	
Cefas		
JNCC		
JNCC		
JNCC		
JNCC		
JNCC		

Safety

	Today	To Date
Accidents/Incidents		
Near Misses		
Safety Drills/Induction		1
Additional comments:		

Summary of operations 0000-2400

Time UTC (start)	Time UTC (end)	Type	Comments
00:00	02:00	MB Survey	
02:00	12:30	GT Survey	
12:30	24:00	MB Survey	

Overall Progress

Type	Today (hh:mm)	Accum (hh:mm)	Remarks
Mob/Demob			
Offshore Calibrations		02:49	
Total Operation Survey (TOSu)	13:30	65:05	
Total Operation Sampling (TOSa)	10:30	54:50	
Equipment/Downtime		02:45	
Ship/Plant Downtime			
Waiting On Weather			
Transit		15:40	
Standby Port			
Others			
Total:	24:00	131:09	

DAILY SLOG
STATUS REPORT

Overall Progress Geophysical Data Acquisition MBES/Sidescan

Segment/Area/Line	Today (Lkm)	Accum. (Lkm)	Current estimated total (Lkm)	Remarks
Acoustic: Multibeam				
EM2040	125	588		
Acoustic: Sidescan Sonar				
Gear type				

Overall Progress Groundtruthing Samples

Action	HC	CS			Remarks
Groundtruthing	13	4			

Weather forecast for the next 24 hours

Wind: N or NE 5 or 6, decreasing 4 at times
Sea State: Slight/Moderate, becoming Moderate/Rough

Planned operation for the next 24 hours (00:00 to 24:00 on 30th April 2012)

Finish MB Survey of Tranche 3. Complete additional GT stations to target features of interest identified by acoustic survey. Transit to Fulmar rMCZ survey area.

Agreed Changes to Scope/Survey operation priorities

CEFAS/JNCC Comments

CEFAS SIC. [redacted] ... JNCC Rep:

DAILY LOG
STATUS REPORT
Markhams Triangle rMCZ
RV Cefas Endeavour – JNCC – DPR No. 7 – Saturday 5th May 2012

Vessel: RV Cefas Endeavour GSM : 07799 773456	Project: MCZ Site Verification CEND 8/12 Satellite Voice Bridge: 00 870 (or 00871) 763998027
Daily Progress Report No. 7 Date: 05/05/12	Location at 24:00: On transit to Fulmar rMCZ

To Company:	Person:	E-mail:
Cefas	[redacted]	
Cefas		
JNCC		
JNCC		
JNCC		
JNCC		
JNCC		

Safety

	Today	To Date
Accidents/Incidents		
Near Misses		
Safety Drills/Induction		1
Additional comments:		

Summary of operations 0000-2400

Time UTC (start)	Time UTC (end)	Type	Comments
00:00	15:10	MB Survey	
15:10	15:50	GT Survey	
15:50	24:00	Transit to Fulmar	

Overall Progress

Type	Today (hh:mm)	Accum (hh:mm)	Remarks
Mob/Demob			
Offshore Calibrations		02:49	
Total Operation Survey (TOSu)	15:10	80:15	
Total Operation Sampling (TOSa)	00:40	55:30	
Equipment/Downtime		02:45	
Ship/Plant Downtime			
Waiting On Weather			
Transit	08:10	23:50	
Standby Port			
Others			
Total:	24:00	155:09	

DAILY SLOG
STATUS REPORT

Overall Progress Geophysical Data Acquisition MBES/Sidescan

Segment/Area/Line	Today (Lkm)	Accum. (Lkm)	Current estimated total (Lkm)	Remarks
Acoustic: Multibeam				
EM2040	162	750		
Acoustic: Sidescan Sonar				
Gear type				

Overall Progress Groundtruthing Samples

Action	HC	CS			Remarks
Groundtruthing	1	1			

Weather forecast for the next 24 hours

Wind: N becoming variable 3 or 4.
Sea State: Slight/Moderate.

Planned operation for the next 24 hours (00:00 to 24:00 on 30th April 2012)

Transit to Fulmar rMCZ, begin survey.

Agreed Changes to Scope/Survey operation priorities

CEFAS/JNCC Comments

CEFAS SIC. [redacted] JNCC Rep:

About us

Cefas is a multi-disciplinary scientific research and consultancy centre providing a comprehensive range of services in fisheries management, environmental monitoring and assessment, and aquaculture to a large number of clients worldwide.

We have more than 500 staff based in 2 laboratories, our own ocean-going research vessel, and over 100 years of fisheries experience.

We have a long and successful track record in delivering high-quality services to clients in a confidential and impartial manner.
(www.cefas.defra.gov.uk)

Cefas Technology Limited (CTL) is a wholly owned subsidiary of Cefas specialising in the application of Cefas technology to specific customer needs in a cost-effective and focussed manner.

CTL systems and services are developed by teams that are experienced in fisheries, environmental management and aquaculture, and in working closely with clients to ensure that their needs are fully met.
(www.cefastechnology.co.uk)

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Customer focus

With our unique facilities and our breadth of expertise in environmental and fisheries management, we can rapidly put together a multi-disciplinary team of experienced specialists, fully supported by our comprehensive in-house resources.

Our existing customers are drawn from a broad spectrum with wide ranging interests. Clients include:

- international and UK government departments
- the European Commission
- the World Bank
- Food and Agriculture Organisation of the United Nations (FAO)
- oil, water, chemical, pharmaceutical, agro-chemical, aggregate and marine industries
- non-governmental and environmental organisations
- regulators and enforcement agencies
- local authorities and other public bodies

We also work successfully in partnership with other organisations, operate in international consortia and have several joint ventures commercialising our intellectual property

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