

FINAL

DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS.

2005 RESEARCH VESSEL PROGRAMME

PROGRAMME: *RV CEFAS ENDEAVOUR*: CRUISE 12

STAFF:

Part A : D Limpenny (SIC)
 S Ware
 K Cooper
 S Vize
 W Meadows
 N Lyman
 P Whomersley
 K Vanstaen
 S Boyd
 D Carlin

Part B : D Limpenny (SIC)
 R Coggan
 W Meadows
 A Meadows
 P Whomersley
 J Eggleton
 S Ware
 S Boyd
 C Limpenny
 K Vanstaen
 N Simpson (MES)
 K Howell (JNCC)
 P Leonard (Defra)

Part C: D Limpenny (SIC)
 R Coggan
 S Birchenough
 W Meadows
 A Meadows
 C Mason
 H Bates
 P Whomersley
 J Eggleton
 K Vanstaen
 S Ware
 J Robinson (MES)
 M Dunkley (EH)

DURATION:

Part A: 20th July – 25th July

Part B: 26th July – 31st July

Part C: 1st Aug – 6th Aug

Changeovers at sea off Lowestoft (A/B) then Sovereign Harbour (B/C).

LOCALITY:

North Sea/English Channel

AIMS:

Part A:

1. To carry out trials of acoustic and photographic survey equipment.
2. To conduct multidisciplinary surveys of cobble substrates and areas of the seabed suspected to hold aggregations of *Sabellaria spinulosa* (C2474).
3. To carry out post-remediation survey work at aggregate extraction site Area 408, close to the Coal Pit (AE0916).

Part B:

1. To sample benthos and sediments for time-series studies at EARS sites in the Eastern English Channel using the Hamon grab, and undertake UWTV sledge work at a selection of those sites (AE0916).
2. To collect groundtruthing samples using Hamon grab (with camera fitted), UWTV sledge and drop camera and 2m Beam trawls, from up to 150 sites in the Eastern English Channel (C2282).
3. To collect acoustic (multibeam, sidescan sonar, AGDS) data from within the boundaries of the groundtruthing survey (C2282).

Part C:

1. To continue the collection of groundtruthing samples using Hamon grab (with camera fitted), UWTV sledge and drop camera and 2m Beam trawls from up to 150 sites in the Eastern English Channel.
2. To continue to collect acoustic (multibeam, sidescan sonar, AGDS) data from within the boundaries of the groundtruthing survey.
3. To complete the collection of a grid of Hamon grab samples, multibeam and UWTV data from a grid of Channel Benthos II stations eastwards from south of the Isle of Wight, for the purposes of ME3112.

REPORT:

Part A:

CEFAS Endeavour sailed from Lowestoft at 10:00hrs on 20th July. During the day, a number of acoustic and photographic survey systems were set up and tested prior to the commencement of survey operations. This was deemed necessary due to the short turnaround time that the Endeavour is subjected to on a routine basis. Continuous short turnarounds restrict the time that SIGS have to prepare and test the wide range of equipment required for these multidisciplinary cruises and consequently some contracts should be prepared to provide ship time for this essential activity. It is also the case that some systems (e.g. multibeam bathymetry, underwater TV) require testing to be undertaken at sea rather than alongside. An alternative option would be to provide SIGS with an annual “gear trials” cruise which would allow them to carry out gear preparation and testing, outside of the main scientific cruise programme.

A multibeam bathymetry survey was conducted between midnight and 07:00hrs on 21st July at the Saturn Reef *Sabellaria* site (C2474). During the morning, sidescan sonar lines using the dual frequency Benthos system were run over the Saturn Reef site. Grabbing using the HamCam was carried out at a reference box (Area 408 southern reference) to the west of the Saturn Reef site whilst the sidescan sonar data was processed and mosaiced. Further sidescan lines were run over Saturn Reef during the afternoon using the CHIRP sidescan system. HamCam samples were then collected during the evening from sites within the bounds of the sidescan sonar survey. *Endeavour* then sailed to Area 408 where an experimental gravel seeding operation had been completed by an industrial aggregate dredger the previous day (AE0916). A tide gauge was deployed at first light on 22nd July ahead of a planned multibeam survey. Poor weather conditions prevented an “at sea” transfer of CEFAS staff (Keith Cooper) from the aggregate dredger to *Endeavour*.

HamCams were collected from the remaining two Area 408 reference site, followed by an acoustic (multibeam, sidescan, QTC) survey of the treatment and control boxes. HamCams were collected from the treatment box and the remaining “fill in” multibeams were run over the site. HamCams were collected from the control box, and the tide gauge was then recovered. Due to a heavy swell, video images were collected from the control and treatment boxes using the HamCam. The vessel then returned to Saturn Reef to conduct an overnight multibeam survey. Following the collection of two 2m Beam trawls over acoustically distinct areas, camera tows were conducted over areas suspected of harbouring *Sabellaria* “reef”. The vessel then returned to Area 408 to conduct camera sledge tows over the treatment and reference boxes under more favourable weather conditions.

Endeavour sailed west to aggregate extraction Area 441 where sidescan, multibeam and grabbing surveys were undertaken throughout the evening over potential cobble “reef” habitat. During the 24th July, sidescan, multibeam, QTC, HamCam, video/stills and 2m Beam trawl surveys were carried out over the Area 107 aggregate extraction site to investigate the occurrence of *Sabellaria* in the area. The following morning, a

sidescan, multibeam and QTC survey was conducted over a site off North Norfolk (G3) followed by camera sledge tows over sites of interest. Endeavour then sailed to Lowestoft for the planned crew change. Bad weather prevented a transfer via small boat, and the changeover eventually took place alongside the CEFAS quay at 00:30 on 26th July. CEFAS were pleased to welcome on-board colleagues from Marine Environmental Surveys and the Joint Nature Conservation Council as part of a concerted effort by CEFAS to encourage “joined-up” research in the field of aggregate extraction.

Part B:

Endeavour sailed on the same tide and arrived at a Channel Benthos II site east of Dover early the following morning (ME3112). Camera tows and multibeam were collected at this site, and three others to the east of Dungeness. Work then started on the main cruise objective (C2282), which was to collect groundtruthing samples from up to 150 sites in the Eastern English Channel in order to validate acoustic data collected in May/June 2005. All 150 sites were sampled with the HamCam and approximately 40 were sampled with a 2m Jennings type Beam trawl. During the overnight periods, stills and video imagery were collected from 40 sites using either the towed video sledge or the drop camera frame, depending on the topography and nature of the site being surveyed. Multibeam bathymetry and QTC data were collected on the transits between each sampling station. A CTD probe was attached to the HamCam and the data was recorded from each deployment. During this survey, benthos and sediment samples were also collected for a time-series study at 10 EARS sites in the Eastern English Channel using the HamCam, and UWTV sledge (AE0916). Five stations from the Channel Benthos II project, which also fell within and close to the wider C2282 sampling grid, were sampled using the UWTV sledge, multibeam bathymetry, HamCam and Shipek Grab. On 31st August, sampling was suspended whilst a crew change took place at 18:00hrs via small boat, at Sovereign Harbour. At this point, Mark Dunkley from English Heritage joined the vessel at the invitation of CEFAS, in order to gain a better perspective on potential synergies between environmental and heritage research programmes.

Part C:

Sampling on the main grid resumed immediately after the crew change and continued on a 24hr basis until late evening on 3rd August. The following day the underwater TV sledge was deployed over a number of sites to the south and west of the Isle of Wight. This work completed the objectives planned under ME3112. *Endeavour* then steamed to the site of the wreck of the *Holland*, a WWI experimental submarine which sank off the Sovereign Shoals. A short multibeam survey was undertaken to confirm the location and condition of the wreck. The final five sites from the MEPPF survey were worked up during the early hours of the morning on the 5th Aug. Endeavour then sailed for Lowestoft, docking at 22:30hrs on 5th August.

All metadata collected during the cruise was entered on the CEFAS bespoke *Digilog* database.

English Heritage perspective (Mark Dunkley):

English Heritage has been aware for some time that marine projects combining integrated survey and multi-agency collaboration will be a requirement for holistic

marine spatial planning initiatives. Although only engaged for the third part of the cruise, it is apparent that both the geophysical survey and benthic sampling components of the EEC habitat mapping project can facilitate archaeological interpretation. Multibeam and sidescan data can be analysed for artefact-based sites (e.g wrecks) and correlated with the positions of known sites (such as that undertaken for the *Holland V* during this part of the cruise), while the bathymetric and sub-bottom data can be analysed against models for the palaeo-Channel proposed by the BGS (see Hamblin et al, 1992). Such interpretation can serve to contribute to the East Channel Region REA, for example. In addition, English Heritage has considered the opportunity to examine benthic samples for evidence of past environmental change or human occupation. A few EEC samples (from Part C of the cruise) contained coal and clinker (interpreted as evidence of shipping routes to potentially feed into EH's *England's Shipping* project) while others contained fragments of peat with birch(?) wood inclusions. Peat deposits offshore are indicators of sea-level stability and often contain organogenic material that can be mapped by the National Monuments Record maintained by EH. It may be of interest that a fragment of fossilised mammalian bone was recovered from one benthic sample off the South Owers aggregate licence area.

However, the amount of archaeological material recovered within the benthic samples collected during Part C of the cruise was not sufficient to require an archaeologist to be present during such surveys as long as Standard Operating Procedures are developed to facilitate the recovery of non-faunal material (such as EH's education & awareness programme associated with the ALSF-funded *Protocol for the Reporting of Finds of Archaeological Interest*). However, targeted grab surveys (such as EH's *Seabed in Prehistory* project) are realising the systematic recovery of prehistoric archaeological material offshore. English Heritage has also had the opportunity to consider how biological analysis can be incorporated into EH funded projects insofar as funding allows.

In sum, it is evident that a multi-agency approach (combining geology, ecology and archaeology) to the acquisition and analysis of geophysical and biological data is achievable, and often necessary for cost effective, fully integrated habitat mapping.

David Limpenny
6th August 2005

INITIALLED:

DISTRIBUTION:

Basic list +
All scientific cruise personnel
M Waddock
S Malcolm
L Murray
D Morris

H Rees
C Vivian
J Rees
P Leonard
S Mackinson
P Eastwood
J Dann
J Ellis
S Rogers
C Houghton
R Smith

Figure 1. Proposed route of *CEFAS Endeavour* during the research cruise Endeavour 12/05.

