DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS

2005 RESEARCH VESSEL PROGRAMME/REPORT

PROGRAMME/REPORT : RV CEFAS ENDEAVOUR: CRUISE 9/05

CRUISE REPORT

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DURATION:

Part 1: 29th May-5th June
Part 2: 5th June-14th June
Changeover at sea off Lowestoft

LOCALITY:

North Sea/English Channel/Bristol Channel

AIMS:

1. To undertake a baseline survey at aggregate extraction area 408, using a range of techniques, prior to restoration action being undertaken later in the year.

2. To survey dredged material disposal sites at the Blyth, Souter Point (Tyne), Tees Bay, Inner Gabbard and Inner Gabbard East (outer Thames estuary), Roughs Tower (off Harwich), Nab Tower and Needles (Isle of Wight), Rame Head (off Plymouth) and Swansea Bay for benthos and for trace metal and organic contaminants in sediments, using grabbing, coring and acoustic methods.

3. To sample representative NMMP locations using grabbing, coring, acoustic and trawl methods for trace metal and organic contaminants, litter and the epi-, macro-, meio-, and micro fauna.

4. To sample the benthos and sediments for time-series studies using the Hamon grab, in the vicinity of aggregate extraction sites off the Isle of Wight, Lowestoft and in the Eastern English Channel.

5. To sample horse-mussels from the Humber/Wash area for later analyses of contaminants in flesh.

6. To carry out a short sidescan sonar survey at an aggregate extraction site in the outer Wash.

REPORT:

Part A

R.V. Cefas Endeavour left Lowestoft at 13:00 on Sunday 29th May 2005 and sailed to aggregate extraction Area 408 in the Coal Pit offshore of the River Humber. En-route an opportunity was taken to test a newly acquired high resolution sidescan system at Saturn Reef, an area where the reef worm *Sabellaria* was known to be present (this was confirmed using underwater TV). Unfortunately a fault with the sidescan system, which became apparent at this location, prevented its further use and subsequent surveys were undertaken using the backup system. However multibeam bathymetric data showing possible outcrops of *Sabellaria* reef was successfully obtained from this site (Figure 1).

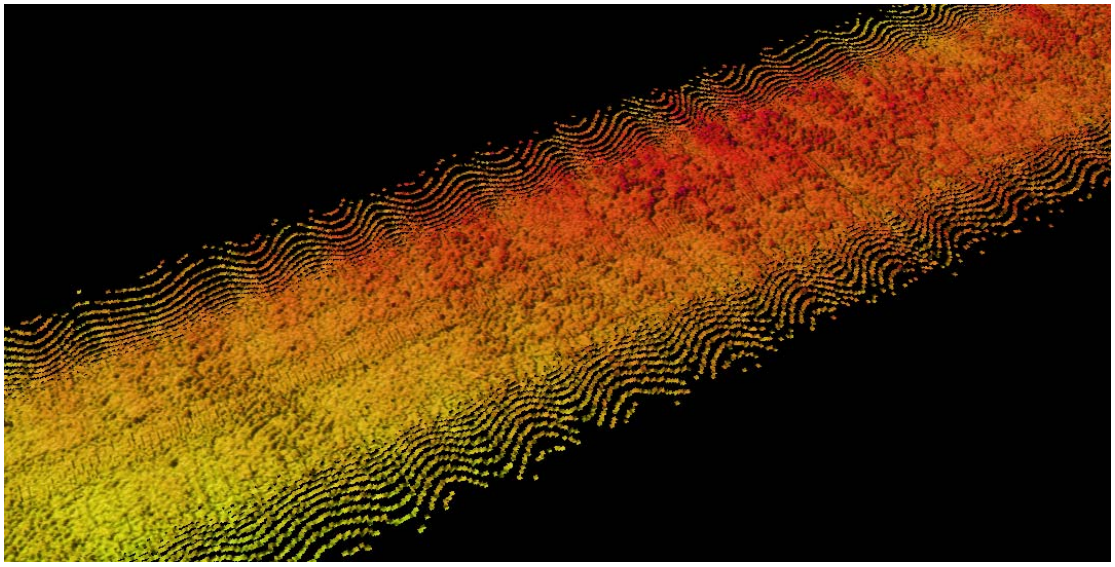

Figure 1 Multibeam bathymetry from Saturn Reef

On arrival at Area 408 on Monday an acoustic survey was undertaken within zone 2 as part of a study to investigation potential remediation techniques at marine aggregate extraction sites. The mosaiced sidescan sonar results were then used to choose two physically similar areas of seabed, one of which will be seeded with gravel in order to investigate the feasibility potential techniques to restore the seabed following cessation of aggregate dredging activities. The other area will serve as a control against which changes at the treatment site will be judged. In addition, a further area was chosen as a reference site. Baseline grab samples and underwater TV were collected from within all three areas. These sites will be resurveyed at intervals following deposition of the material within the treatment box.

Overnight the ship steamed, first to NMMP 345 and later NMMP 285 for routine collection of NMMP samples. In addition to the normal sampling, an additional two 2m beam trawl tows were collected for assessment of marine litter. The ship then sailed to the River Tyne where surveys were carried out in the vicinity of the Blyth and Souter Point dredge material disposal sites (see Figure 2), the historic Tyne Sewage Sludge dumping ground and NMMP 285. Whilst at Souter Point the new SPI camera was successfully deployed for the first time. This device allows images to be taken of cross sectional profiles of the seabed. On completion of work off the River Tyne the ship steamed south to an area off the River Tees where samples were collected for later analysis of contaminants at the Tees dredge material disposal ground and also at NMMP 295. *Cefas Endeavour* then sailed, overnight, to a site off the River Humber where *Modiolus modiolus* were collected for later contaminant analysis followed by sampling at NMMP 376. En-route to these NMMP site sidescan sonar surveys were undertaken in the vicinity of aggregate extraction area 107. The first of these lines was run over a characteristic set of dredge tracks, the erosion of which has been monitored over a number of years. The second line targeted the site of a *Sabellaria* reef and, as with Saturn reef, an underwater camera tow was carried out in order to groundtruth the acoustic data collected.

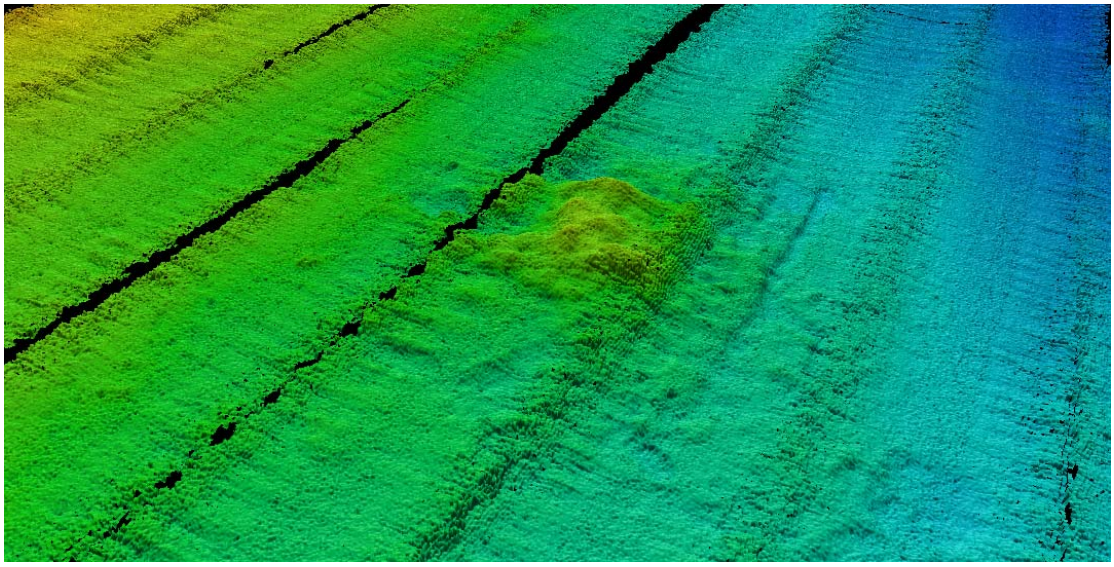

Figure 2 Souter Point dredge material disposal site

Cefas Endeavour then sailed, via NMMP 386, to a site off North Norfolk for collection of *Modiolus modiolus*. On completion the ship sailed to the Cross Sands Environmental Assessment Stations (EARS), a transect running through the accumulation of aggregate extraction licences off Gt Yarmouth. On completion the ship sailed, via NMMP 475, to an area off Harwich were surveys were carried out at the Inner Gabbard dredge material disposal site. *Cefas Endeavour* then returned to Lowestoft on the afternoon of the 5th to carry out a transfer of scientific personnel via small boat.

Part B

Following the changeover the ship returned to the Inner Gabbard and the following morning a grab sampling survey was completed. South of Harwich samples were collected from the Thames transect (historic sewage sludge disposal ground) for later analysis of metals. Work in the Thames estuary was completed with the sampling of NMMP 466. The ship then sailed into the English Channel and overnight on Tuesday 7th June multibeam data was collected from an area off Dungeness (see Figure 3). Sampling at NMMP 484 took place the following morning.

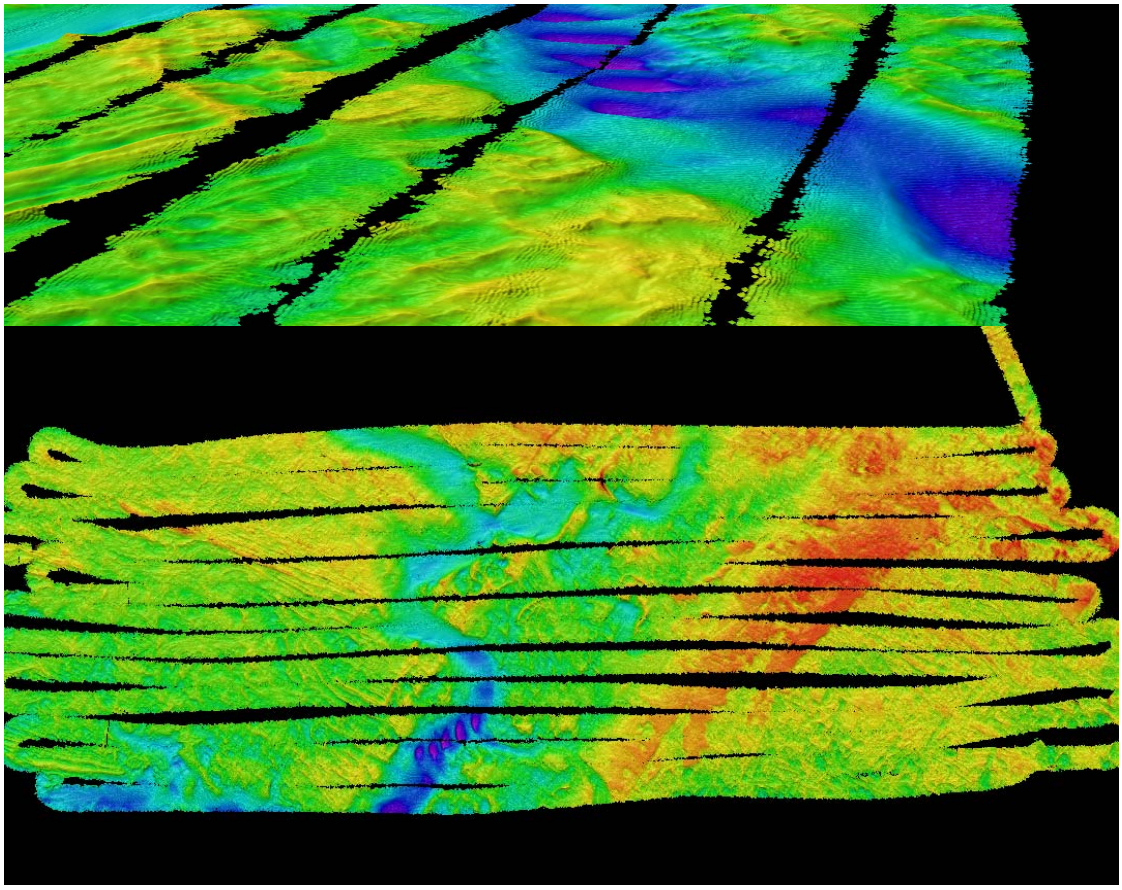

Figure 3 Multibeam bathymetric from Dungeness

The following day the ship steamed to the east of the Isle of Wight to undertake a grab survey comprising EARS stations in the vicinity of the accumulation of aggregate extraction licences to the east of the Isle of Wight and also further stations sampled to look at environmental conditions surrounding the Nab Tower disposal site. Overnight a multibeam survey was carried out over the Nab tower disposal site. Unfortunately a CTD deployed the previous evening at this site was unable to be recovered the following day. Although the marker buoy was lit it may have been run down by another vessel.

On completion of the East of the Isle of Wight survey the ship steamed to a site off the Needles on the western tip of the Isle of Wight. Here a number of grab samples were collected for later contaminant and infaunal analysis. The next destination was a disposal site at Swanage Bay where both multibeam and grab samples were collected. *Cefas Endeavour* then proceeded to NMMP 536 in Lyme Bay where a variety of samples were collected for later analysis of infauna, PSA and various chemical determinants. In the afternoon the ship sailed to a disposal site off Rame Head to the West of Plymouth Sound. A number of grab samples were collected here for later analysis of benthos and contaminants. A number of multibeam lines were also run in the vicinity of the disposal site. The ship then sailed around Land's End into the Bristol Channel and headed towards NMMP 605 (Celtic Deep). In the afternoon the ship undertook sampling at a disposal site off Milford Haven before steaming to Swansea to dock at 22:00 (Tuesday 13th June 2005).

In addition to the work detailed above progress was made in a number of other areas designed to improve efficiency and quality of fieldwork undertaken during cruises. These include:

1. ***New labelling system***
All sample labels are now printed directly from the Cruise Planner database onto chemical resistant plastic labels. This has removed the potential for labelling mistakes resulting from human error and created significant amounts of time for other activities, some of which have historically been undertaken back in the laboratory.

2. Output of Sampling positions
Sample positions are now outputted from the Cruise Planner database in a format that can be directly input to the ship's onboard hydrographic survey software 'TOWER'. In the past all positions have had to be manually entered, a task which has taken up significant amounts of time.

3. Standard Operating Procedures
SOPs have been successfully produced for operating the TOWER system. These documents have empowered all personnel to use this system and has helped to ensure that we are no longer dependant on one or two individuals.

4. Data Entry on Deck
A successful test was performed using a tablet PC as a data entry tool – the ruggedised system located on deck was connected via Bluetooth radio link, then By IEE802 Wireless access to another PC housed inside. Data were successfully entered and downloaded using this system.

5. Kongsberg's SIS operating software
The EM3000 multibeam was used in conjunction with Kongsberg's SIS operating software. The system gave a real-time display of sonar swathe coverage and allowed bridge staff to assess the best line to move the vessel as the survey was being performed.

Keith Cooper

June 2005