

DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS.

2002 RESEARCH VESSEL PROGRAMME

PROGRAMME: RV *CIROLANA*: CRUISE 4/02

STAFF:

K Cooper (SIC 26.07-03.08.02)
D Limpenny (SIC 26.07.02 – 26.07.02)
B Meadows
S Boyd
R Kilbride
A Hewer
P Whomersley
H Bates (until 1st Aug)
R Irish
N Lyman (until 1st Aug)
A Nichols (joined on 1st Aug)

DURATION:

26th July - 3rd August 2002

LOCALITY:

North Sea & English Channel

AIMS:

1. To sample National Marine Monitoring Programme station (NMMP 345), using the multicorer, for meiofauna and sediment particle size analysis.
2. To conduct sampling at a marine aggregate extraction site at Coal Pit/Sole Pit (Area 408) using trawl, underwater TV and acoustic techniques for time series studies to establish the time required for recovery of the sea bed fauna.
3. To conduct surveys at a recently relinquished aggregate extraction site off Harwich (Area 222) using grab, underwater TV, trawls and acoustic techniques for time-series studies to establish the time required for recovery of the sea bed fauna.

4. To conduct surveys at the Hastings Shingle Bank (Areas X & Y) using grab, underwater TV, trawls and acoustic techniques for time-series studies to establish the time required for recovery of the sea bed fauna.
5. To conduct a habitat mapping survey at a current licence site dredged by static suction hopper dredgers on the Owers Bank off Shoreham. The survey will employ various tools including grabs, underwater TV and acoustic techniques with a view to assessing the utility of this approach for the assessment of aggregate extraction activities.
6. To carry out a broadscale habitat mapping survey between the Varne (off Dungeness) and Hastings using various acoustic techniques.

NARRATIVE

Cirolana sailed from Lowestoft at 10:30 on Friday 26th July 2002. The first destination was an aggregate extraction area (Area 107) off North Norfolk where two lines of sidescan sonar data were collected as part of a temporal study to look at the persistence of dredge tracks (Additional aim 1). Overnight *Cirolana* sailed to NMMP 345 where a number of multicore samples for meiofaunal analysis were collected using a Bowers and Connelly Multiple Mini-corer (Aim 1).

Cirolana arrived at Area 408 (Coal Pit/Sole Pit) early on the morning of the 27th July. Epifauna samples were collected, using a Jennings 2m beam trawl, within the site and at 2 reference boxes in the near vicinity. Underwater stills and video images were taken, using a new digital video (DV) 'drop-camera', at these sites. Sidescan sonar and bathymetric surveys were also completed undertaken in this area. On completion of the work at this site (Aim 2) the ship sailed overnight to Lowestoft where spares required for the sidescan system were picked up by *Cirolana*'s searider. The ship then sailed to aggregate extraction area, Area 222 (off Harwich), arriving around midday on the 28th July 2002.

At Area 222 macrobenthic samples were collected, using a 0.1m² Hamon grab with attached camera, within the site and at two reference sites. During the evening the site was surveyed using sidescan sonar. Overnight, a QTC (acoustic ground discrimination system) and bathymetric survey was run to assess the physical condition of the seabed at the site. This survey was partially completed due to time constraints. Work at Area 222 (Aim 3) was completed around 16:00 on 29th July and *Cirolana* sailed to Hastings.

Work at Hastings (Aim 4) began around 04:00 on 30th July with the collection of trawl samples from within a relinquished part of an extraction site at Hastings Area Y and at a reference site to the south. A sidescan sonar survey was then run over the Shingle Bank. Following the sidescan survey a number of 0.1m² Hamon grab samples were collected from within Hastings Area X and at a reference site to the northeast. These areas were also targeted using the 'drop-camera' and a 2m-beam trawl. Overnight, an intensive QTC survey was carried out over the central part

middle portion of the Shingle Bank. The following morning further 2m beam trawl samples were collected from within Area X. *Cirolana* then returned to Area Y where 0.1m² Hamon grab samples and images of the seabed were collected using the 'drop-camera' frame. This work was completed around mid-afternoon and the ship then sailed to an aggregate extraction site on the Owers Bank off Shoreham.

On arrival at the site, a sidescan survey was carried out. During the night a QTC survey was run over the site in a north-south direction between the sidescan lines. In addition QTC lines were run from east to west. The following morning, a changeover of scientific staff was carried out, via small boat, at Brighton marina. Nigel Lyman and Helen Bates left the ship and Adam Nicholls joined. *Cirolana* then returned to the extraction site where a number of 0.1m² Hamon grab and 'drop-camera' samples were obtained. This completed the work at Shoreham (Aim 5).

The Hastings sidescan record collected on the 30th July was used to identify acoustically distinct regions. A spatial survey designed to characterise the benthic communities across the site, using a 0.1m² Hamon grab, was then planned based on these results. A broadscale survey of the habitats in the vicinity of the Hastings Shingle Bank commenced on the afternoon of 1st August. Overnight further QTC lines were surveyed to increase the spatial coverage of QTC data at the site. The following morning the remainder of the spatial survey and a number of additional Hamon grabs for groundtruth of the QTC survey were collected. The broadscale and groundtruth surveys were completed by 15:00. *Cirolana* then proceeded to run two sidescan lines between Hastings and Dungeness in the afternoon and evening of 2nd August 2002 (Aim 6). On completion of these lines at 21:00 a number of 'drop-camera' tows were also carried out to aid in the interpretation of the sidescan and QTC surveys. The ship left the Hastings area just after midnight and arrived at Area 222 at 09:00 the following morning (3rd August 2002). Four trawl samples were repeated in the dredge zone in order to obtain larger samples. The remaining bathymetric survey lines, begun on the 28th March, were also completed. *Cirolana* left Area 222 at 14:30 and docked in Lowestoft at 18:30.

RESULTS:

Full reporting of results for all surveys will only become available following laboratory analysis of samples and processing of acoustic and photographic records. All cruise aims were successfully realised. One additional aim of collecting sidescan data at Area 107 was also completed. Dredge tracks were first observed in this area in 1995 and the same tracks are still present 7 years later. The meiofaunal samples collected at NMMP 345 form part of a long-term monitoring programme providing information on environmental quality status around the England and Wales coastline.

Sediments and samples of the benthic macrofauna from areas where dredging has ceased ('Area 408, Area 222, Hastings Area X and Area Y') were successfully sampled using a 0.1m² Hamon Grab. The sampling strategy was designed after reference to information recorded on board dredgers ('black box' data) on the location and intensity of dredging activity. The design consisted of two treatment groups varying in the level of dredging intensity and three reference areas located away from

the impacts of extraction activity. Data arising from this design will ultimately provide a comparative evaluation of the effects of dredging intensity on the biological and physical recovery of extraction sites on cessation of dredging and will contribute to a time-series of information.

The beam trawl samples from within the site at Area 408 showed an abundance of *Alyconidium diaphanum* and Nudibranchs (Sea slugs). These animals were not observed in the trawl samples collected from this site in 2001. The sidescan survey carried out at Hastings has extended knowledge on the distribution of sediments and habitats in the region. 'Drop-camera' images confirmed the presence of sand-filled furrows within the intensively dredged area. The ships position, when carrying out these drop camera tows, was overlain on the sidescan mosaic in a Geographic Information System (GIS) allowing a real-time view of vessel position in relation to the sidescan features.

Habitat mapping techniques developed in a previous DEFRA funded research contract (A0908) were successfully applied at Hastings and Shoreham in the vicinity of current and historic aggregate extraction activity. Acoustic techniques proved effective in discriminating areas impacted by this anthropogenic activity.

K M Cooper
D S Limpenny
03.08.02

INITIALLED:

(SEEN IN DRAFT).

CAPTAIN:

SENIOR FISHING SKIPPER:

INITIALLED:

DISTRIBUTION:

Basic list +
M Waldock
L A Murray
D Morris
S Malcolm
C Vivian

H Rees
D Limpenny
K Cooper
B Meadows
S Boyd
R Kilbride
A Hewer
P Whomersley
H Bates
N Lyman
A Nichols
J Rees
A Reeve
M Schratzberger
P Leonard (DEFRA)
R Emmerson (DEFRA)
G Boyes (DEFRA)
A Murray (Crown Estates Commission)
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