MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1996 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 7

STAFF:

H L Rees (SIC)
A J Kenny
D S Limpenny
B Fogg
M Pendle
J Greening
C Whalley) 10-16 May only
S Boyd)

DURATION:

Left Lowestoft 1400 hrs GMT 10 May 1996
Docked Lowestoft 0545 hrs GMT 29 May 1996

LOCALITY:

North Sea, English Channel, Bristol Channel/Celtic Sea

AIMS:

1. To conduct further sampling at an experimentally dredged area off the Norfolk coast, using grab, side-scan sonar and underwater camera in order to establish the time required for recovery of the sea bed fauna.

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

3. To sample the meiofauna at selected waste disposal sites.

4. To sample the sediments and benthos off the Tyne for time-series studies using grab, core and beam trawl.

5. To obtain further samples of the benthos on the Dogger Bank, along with zooplankton samples, for contaminant analyses.

6. To sample offshore locations in the North Sea, English Channel and Irish Sea for the long-term monitoring of temporal trends in the benthos and sediments.

7. To sample the benthos of gravels off the Humber and Lowestoft using the Hamon grab.

8. To sample fish stomachs for feeding studies at selected aggregate extraction sites.

9. To conduct a survey at the Hastings Shingle Bank aggregate extraction site using side-scan sonar and Hamon grab.

10. To sample sediments at the Plymouth and Liverpool Bay sewage-sludge disposal sites for later analyses of trace metal concentrations.

11. To sample the sediments and benthos off Milford Haven following the *Sea Empress* oil spill.

12. To conduct trials of a re-inforced 2-metre beam trawl at representative west coast sites.

13. To sample the benthos of commercial gravel deposits at representative west coast sites as part of an assessment of natural regional variability.

14. To collect beam trawl samples at representative locations for the analysis of litter content.

15. To collect samples of fish from Liverpool Bay for contaminant analyses.

16. To conduct a survey at the Barrow-in-Furness dredged material disposal site using grab and side-scan sonar.

17. To sample the benthos of gravels at an aggregate extraction site off the Isle of Wight.

18. To conduct a tracer survey of sediments at Area 107 (a sand extraction area in the Wash) using a Shipek grab.

NARRATIVE:

On leaving Lowestoft, a sample of horse-mussels was collected off the Norfolk coast (aim 2) prior to working the following day on a gravel area north of Cromer which had previously been experimentally dredged (aim 1). Samples of the benthos and sediments were collected by Hamon grab, and a side-scan sonar survey conducted. Following collection of a 3-metre beam trawl sample nearby for fish stomach analysis (aim 8), Corystes sailed to an NMP site south of the Dogger Bank for Day grab samples of the macrofauna and sediments, and multicore samples of the meiofauna (aims 6 and 3, respectively).

Between 11-13 May, a series of 3-metre beam trawls and zooplankton (TTN) hauls for the later analysis of contaminants in epifauna and zooplankton were collected in the vicinity of the Dogger Bank (aim 5). A sample of the epifauna north of the Dogger Bank was also collected using a re-inforced 2-metre beam trawl (aim 12). Corystes then sailed to the Tyne Mouth, allowing the Chief Engineer to depart early on 14 May. Day grab, multicore and beam trawl samples were then collected at long-term monitoring sites off the Tyne, including one at the sewage-sludge disposal site (aims 3 and 4). Multicore stations were worked along a transect through the Tees dredgings disposal site (aim 3), and Corystes then sailed to the Humber area.

On 15 May, samples of *Modiolus* were collected by rock dredge in the Humber/Wash area (aim 2) followed by sampling of gravelly sediments by Hamon grab east of the Silver Pit (aim 7). After further Hamon grab sampling near Cross Sand off Lowestoft (aim 7), Corystes sailed to Great Yarmouth where members of the ship's crew and scientists were transferred by pilot boat. Beam trawl stations off Lowestoft were then worked for fish stomachs (aim 8) after which Corystes sailed south and west to Plymouth, where sediment samples were collected by Day grab at the sewage-sludge disposal site (aim 10).

On 18 May, sampling commenced on a grid of stations off the Bristol Channel, where sediments were collected by Day grab for later hydrocarbon and benthos analysis in connection with the *Sea Empress* oil spill off Milford Haven (aim 11). Day grab samples were also collected at an NMP site near the Celtic Deep (aim 6). Sampling continued into the morning of 19 May, but was abandoned due to worsening weather; work re-commenced late that night and, along with 3-metre beam trawl sampling for dab and plaice livers (extra aim) and multicore sampling at a dredgings disposal site in Swansea Bay (aim 3), continued until the evening of 21 May.

Corystes then docked at Pembroke Dock at 0600 hrs on 22 May to take on extra freshwater due to leakage in the system, sailing at 0900 hrs in heavy weather to St Brides Bay and sheltering there for the rest of the day. The grid of Day grab and trawl stations was completed on 23 May (excepting 2 stations in mid-Cardigan Bay). Sampling commenced at a proposed dredgings disposal site off Milford Haven, but work had to be abandoned due to worsening weather, and Corystes again sailed for St Brides Bay to pick up Day grab samples of the benthos at a location sampled in February 1996, and then to shelter overnight from strong SW winds.

On 24 May, Corystes sailed for Hastings where, on the following day, the underwater camera sledge was deployed away from an aggregate extraction site (aim 9). Corystes then sailed to the Wash, commencing Shipek grab sampling on a grid of stations for the later determination of concentrations of fluorescent tracer which had been discharged some 3 months previously from a commercial dredger at an aggregate extraction site ('Area 107': aim 18). This survey was completed by midday on 27 May, and the underwater camera sledge was then deployed across the NW concession area of 107 (extra aim). Further tows were made across the NE concession area, and in the vicinity of Race Bank, on 28 May. At a location near to the Norfolk coast, a comparison was then made between the performance of a standard Lowestoft 2-metre beam trawl, and a re-inforced version with similar dimensions and added chain mat (aim 12). Further Hamon grab sampling was undertaken off Lowestoft that night (aim 7), and Corystes docked at Lowestoft the following morning at 0545 hrs.

RESULTS:

Sampling effort is summarised in Figure 1/1A.

Eight aims were successfully achieved, and a further 5 achieved in part; 3 extra aims were also incorporated during the course of the cruise. Those not addressed were largely off the west coast, where the extra demands of sampling associated with the *Sea Empress* oil spill meant that work in the Irish Sea was not feasible in the time available. This work will be addressed during future AEP2 cruises.

Side-scan sonar traces at a site experimentally dredged off Norfolk in 1992 showed that dredge tracks were no longer identifiable, due to natural weathering (aim 1). Trawl sampling in the vicinity of the Dogger Bank (aim 5) yielded supplementary samples of a variety of epibenthic species which, along with the zooplankton samples collected, will allow completion of a DoE-sponsored project concerning the fate of trace metal contaminants in this area.

On 13 May, a Panamanian-registered small cargo vessel was observed cleaning its tanks some 50 miles east of the Tyne, creating a vivid yellow slick. Communication with the vessel revealed that the material was palm oil. It appeared to be technically in breach of MARPOL regulations governing sea discharges of such a substance, given its slow speed at the time of observation. A sample from the slick was taken, and an incident report will be filed separately.

Samples of both the meiofauna and macrofauna were successfully obtained off the Tyne estuary, at three long-term monitoring stations designed to assess the consequences of offshore sea disposal activities in this area (aim 4). Beam trawl samples at the Tyne sewage-sludge disposal site again showed evidence of significant physical contamination by sewage-derived artefacts. Samples of the meiofauna taken here, and at the Tees and Swansea Bay dredgings disposal sites (aims 3 and 4), will contribute to a CSG-funded assessment of the utility of this component of the fauna for pollution monitoring.

Sampling at a gravel site east of the Silver Pit and off Lowestoft (aim 7) with both a large and small Hamon grab demonstrated that the latter worked with acceptable efficiency, despite occasional failed samples. Minor design modifications will be made as a result of this work.

A grid of some 61 stations was successfully worked in the Bristol Channel and offshore, in connection with the *Sea Empress* oil spill in February, 1996. Day grab samples were collected for later hydrocarbon and benthos analysis. This included additional stations to cover localities which, from modelling predictions (P Gurbutt), might be expected to have been exposed to significant concentrations of oil at the sea bed. Following communication from R Law, extra stations were also worked at localities reported to have shown evidence of oiling by local fishermen. The results from the survey as a whole must await the outcome of laboratory analysis. However, it may be noted that only two samples showed any visible evidence of contamination (in the form of a sheen on the water overlying the sediment collected by Day grab). Samples of livers from 63 dabs and 35 plaice were collected at 6 offshore stations for later determination of possible biological responses to oil contamination (J Thain). The work complemented surveys of the same species inshore, conducted recently from a charter vessel. Occasional samples of offshore bivalves were also collected and frozen for the same purpose.

Underwater video footage at the Hastings Shingle Bank aggregate extraction site appeared to indicate an 'overburden' of sand immediately to the east of one of the major dredging sub-areas. However, the effect did not appear to extend beyond the boundary of the dredging area as a whole, ie as defined on Admiralty charts.

A total of 126 Shipek grab stations were collected on a grid of stations extending to the north and south of the northern concession sites within area 107, from which large amounts of sand are being extracted for sea defence work off the Lincolnshire coast (aim 18). Samples will be analysed for the concentrations of a fluorescent tracer deposited in February, 1996, as part of

a contract to assess the physical and biological consequences of dredging activities. Underwater video footage appeared to identify a net coarsening of sediments within the dredged area, which may be explained by the screening out of such material during the dredging process. Video images in the vicinity of Race Bank, to the east of the dredging area, revealed a diverse gravelly fauna with significant numbers of horse-mussels and occasional edible crabs sighted.

Comparative data on the efficiency of sampling for the epifauna using 2-metre beam trawls were gathered off the Norfolk coast (aim 12; there was insufficient opportunity to conduct such work off the west coast). The range of species collected by both was comparable, although greater quantities were retained by the re-inforced trawl. The requirement for future modifications to the chain mat and net of the latter were identified.

H L Rees
29 May 1996

SEEN IN DRAFT: M J WILLCOCK (Master)
R F GRAHAM (Senior Fishing Mate)

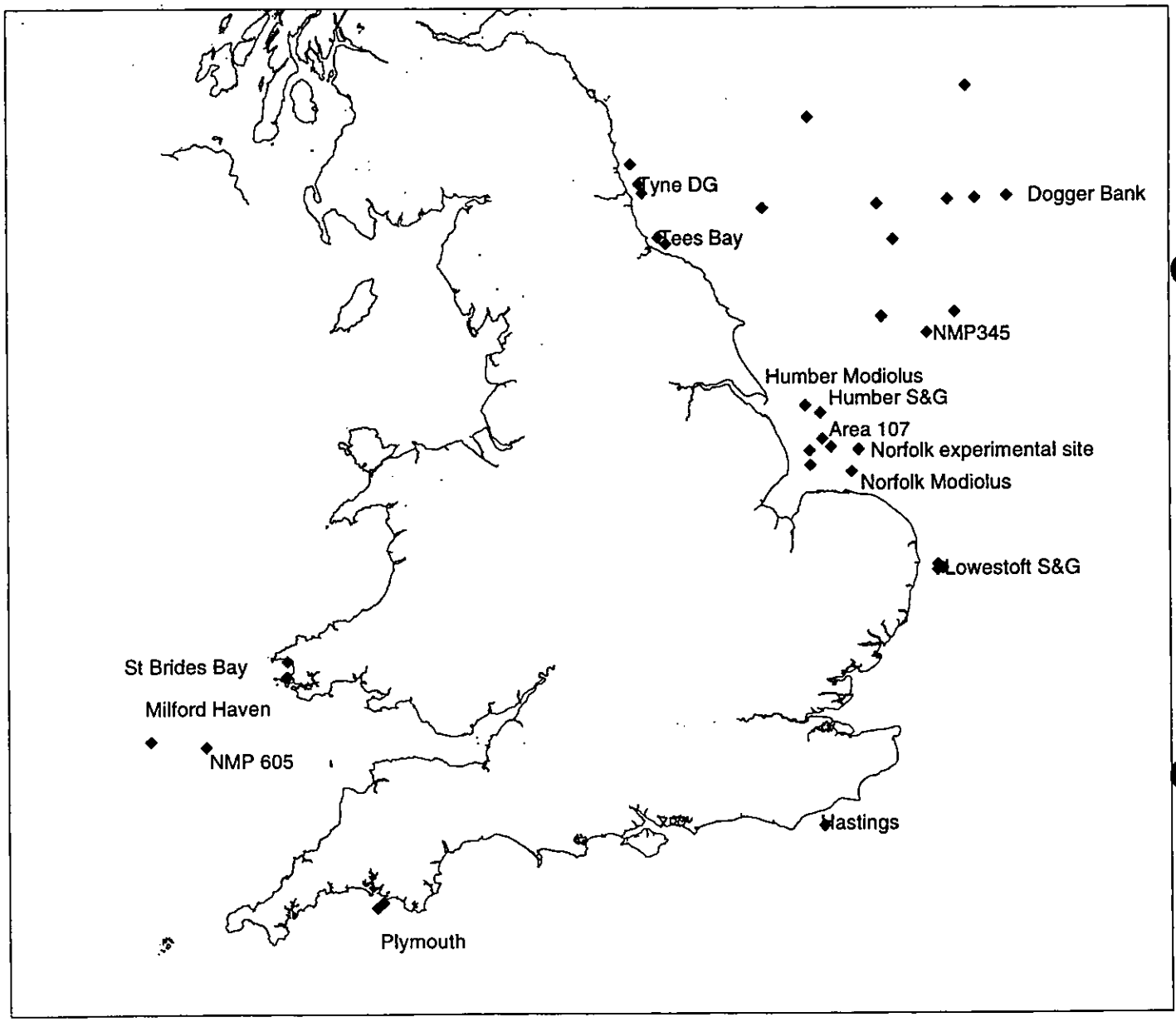
INITIALLED: JTeP

DISTRIBUTION:

Basic list +
J A Campbell
L A Murray
S M Rowlatt
A Franklin
P Gurbutt
R Law
J Thain
A J Kenny
D S Limpenny
B Fogg
M A Pendle
J Greening
S Boyd
C Whalley
A J Murray (Crown Estates Commission)

Figure 1.

Corystes 7/96 Cruise area.



See Figure 1A for Milford Haven grid

Figure 1A

Corystes 7/96. Milford Haven grid showing location of samples taken for hydrocarbon in sediments(+) and benthos (o)