

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

1992 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 14

STAFF:

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M A LAMBERT
A J KENNY

DURATION:

Left Lowestoft 0915h, 10 December
Arrived Lowestoft 0500h, 20 December
All times are Greenwich Mean Time

LOCALITY:

North Sea/English Channel/Southwest Approaches

AIMS :

1. To conduct a post-dredging survey at an experimental site off Norfolk, using Hamon grab, scallop dredge, side-scan sonar and underwater camera sledge.
2. To sample the sediments and benthos at NSTF sites in the south-eastern North Sea, along with sediments in the Elbe, by grab, core and trawl.
3. To sample the sediments and benthos at NMP/NSTF sites in the English Channel using grab and trawl.
4. To conduct surveys of sediments and litter at the Isle of Wight, Exeter and Plymouth sewage-sludge disposal sites using grab and beam trawl.

ADDITIONS:

1. To collect meiofauna samples from gravel substrates off Norfolk.
2. To collect flatfish from the German Bight for contaminant analyses.
3. To test and 'ground-truth' the Roxann sediment discrimination system.

NARRATIVE:

A simplified cruise track is shown in Figure 1. On 10 December, RV Corystes sailed to a location off Norfolk which had previously been experimentally dredged for aggregate by a commercial vessel in April, 1992. A series of 25 Hamon grabs were collected at this and adjacent reference sites, for samples of the benthos and sediments. Meiofauna sub-samples were also retained for R Hamond (additional aim 1). A side-scan sonar survey of the dredged area was conducted, along with underwater sledge tows to obtain video and still images of dredging effects at the sea bed. Five Anchor dredges were collected at a reference

site, to further test its performance against the Hamon grab. Finally, two scallop dredge tows were made through the Treatment site for sampling of the epifauna.

Weather conditions dictated a southward course to NMP station 48 ('South Varne') in the Dover Strait, where grab samples of sediments (for later contaminant analyses) and the benthic fauna were obtained. A 2-metre beam trawl sample of the epifauna was also collected. The same sampling procedure was followed at, respectively, NMP 49 ('Selsey Bill'), NMP 53 ('Central Channel'), NMP 58 ('Southwest Approaches') and NMP 57 ('South of Eddystone').

On 15 December, 3 trawl samples were collected for the epifauna and litter in the vicinity of the Plymouth sewage-sludge disposal site. A series of 27 grab samples of sediments for contaminant analyses was then obtained, as a contribution to a temporal series designed to assess contaminant trends. Grab and trawl sampling was also conducted at the Lyme Bay sewage-sludge disposal site, *en route* to the Nab Tower sewage-sludge/dredgings disposal site. Here, a scallop dredge was deployed to assess litter content, followed by 27 Shipek grab samples for contaminant analyses of sediments, as part of a monitoring programme for assessing temporal trends.

Grab and trawl samples were collected at a series of NSTF sites off the Dutch and German coast, followed by sampling at a station in the Elbe estuary. RV *Corystes* then sailed west, sampling at inshore NSTF sites. A 2-metre Agassiz trawl was deployed in the German Bight, in addition to a 2-metre beam trawl, in an attempt to obtain flatfish for contaminant analyses (additional aim 2). On arrival at the Cross Sands area off the English coast, a sediment survey combining Day grab sampling and the Roxann sediment discrimination system was conducted on the evening of 19 December (additional aim 3). RV *Corystes* docked at Lowestoft at 0500h on 20 December, 1992.

RESULTS:

With the exception of a Kasten core station in the German Bight which had to be abandoned due to adverse weather conditions, all aims (including three additions) were successfully achieved. Full results will only become available on completion of laboratory analyses of samples.

Good water clarity allowed effective use of the underwater camera sledge at the Norfolk experimental site. This work, along with enhanced image analysis from the new EG and G side-scan sonar, provided clear evidence for the persistence of dredge tracks, following experimental dredging in April, 1992. Improvements over the previous side-scan sonar system were striking, though further attention will need to be given (during gear trials in 1993) to the possible effects of cable length on image quality, especially at high frequencies, and on finer control of the lightweight 'fish' while towing.

Day grab sampling of sediments for contaminant analyses was successful at all sites, but at NMP 49 ('Selsey Bill') the coarse sediments at the adjusted location were unsuited for reliable sampling of the benthic infauna. However, a beam trawl tow over this ground was successful.

Quantities of litter observed at the Plymouth, Lyme Bay and Nab sewage sludge disposal sites were substantially lower than those present at both the Tyne and Barrow Deep sites, where observations have been made on previous cruises. The presence of litter was also recorded at several NSTF and NMP sites but, with the exception of NMP 57, content was minimal. More detailed results will be reported later.

Weather conditions permitted processing of beam trawl samples of the epifauna throughout the cruise period, and preliminary results are shown in Figure 2a. In total, some 150 taxa were identified. Higher diversity is evident in samples taken over the more heterogeneous substrates occupying generally deeper-water in the Channel, compared with the SE North Sea. Two samples (one Agassiz trawl just west of the Weser estuary, and a beam trawl off the Ems estuary), were notable for the presence of dead or moribund tube-worms and sea urchins (*Echinocardium cordatum*), respectively, and an accompanying rank smell. However, other retained species, including fish, showed no signs of 'ill-health'. An interesting feature of a trawl sample off the Dutch coast (NSTF 23) was the abundance of the encrusting bryozoan *Electra pilosa* in its erect form. The only known record for the occurrence of this form around the UK coast is from a 1985 MAFF sample in the outer Thames estuary, adjacent to the sewage-sludge disposal site.

A wider picture of spatial variation in trawl taxon number is shown in Figure 2b, combining results from May (Corystes 6/92) and December. Lower numbers tend to occur in shallower-water areas near to certain highly urbanised or industrialised estuaries, though these are not markedly reduced over adjacent offshore locations. Sampling at NMP sites along the western UK coast in 1993 will further extend the scope for comparative assessment of this component of the benthos. All grab samples of the benthic infauna from these sites await laboratory analysis.

The performance of the Roxann sediment discrimination system was also assessed at all sites during the cruise, along with an additional survey in the vicinity of a heavily exploited aggregate dredging area. A separate report has been prepared for Electronics Group (A Kenny,

D Limpenny). A new version of Microplot/Roxann (v5.13) was installed for this cruise, which provided the first field results to be 'ground-truthed'. Initial results show a degree of consistency in the ability of Roxann to determine sediment type. However, the system requires further testing on other sediment types not sampled, and further fine-tuning with the ship's echo sounder.

H L Rees
4 March 1993

SEEN IN DRAFT: J R French (Master)
P MacKay (Fishing Skipper)

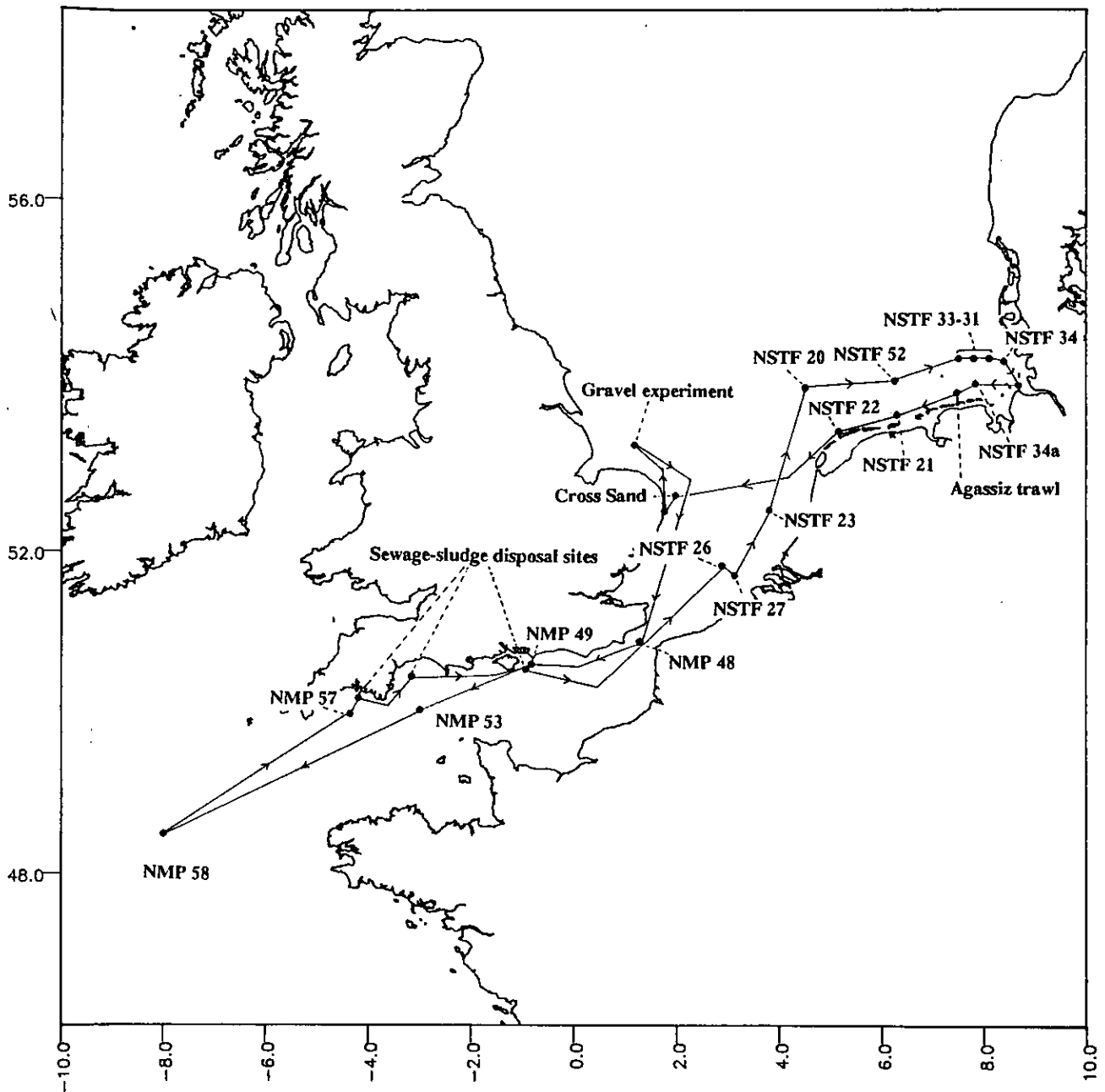
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FIGURE 1

CORYSTES 14/92 : STATION POSITIONS



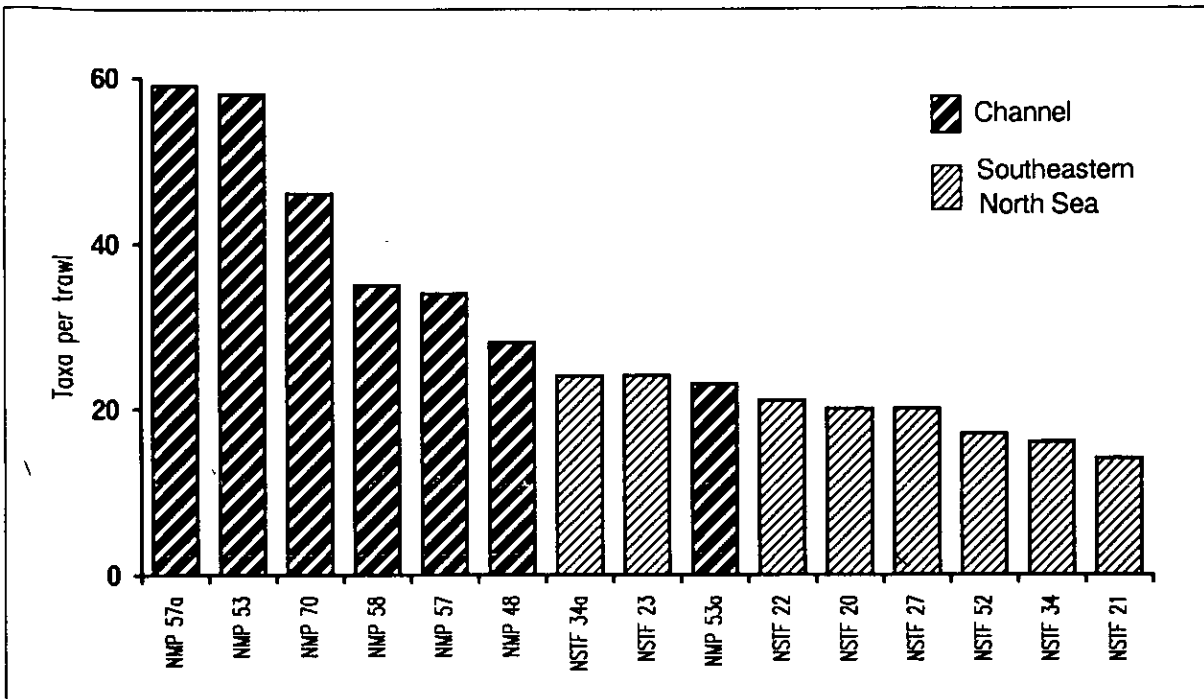


FIGURE 2a. Epifauna in 2-metre beam trawl tows at NMP and NSTF sites sampled on *Corystes* 14/92

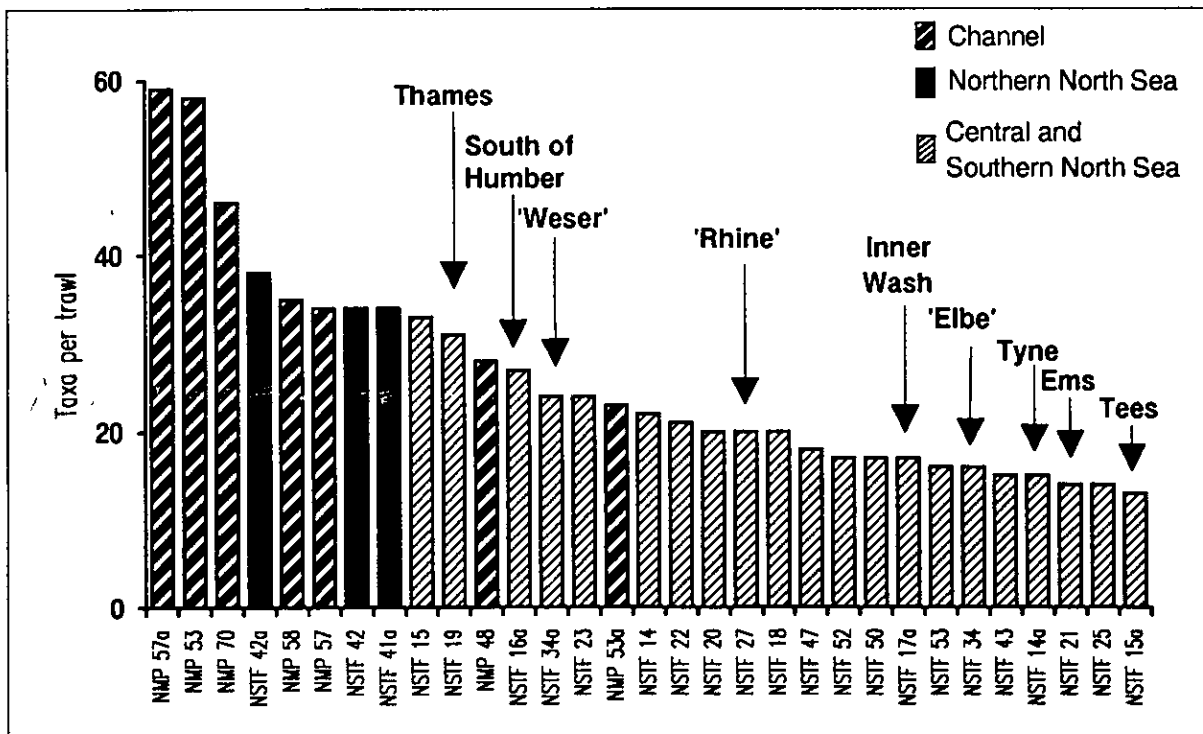


FIGURE 2b. Combined results for the epifauna from 2-metre beam trawl tows taken on *Corystes* 6/92 and *Corystes* 14/92