CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE, LOWESTOFT LABORATORY, LOWESTOFT, SUFFOLK NR33 OHT

2007 RESEARCH VESSEL PROGRAMME

REPORT: RV CEFAS ENDEAVOUR: SURVEY 14/07

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DURATION: 10 July 2007 - 18 July 2007

LOCATION: Western English Channel and Celtic Sea

AIMS:

This is the second in a series of cruises over the next four years in the South-Western Approaches, in support of MF101. The results of this work will aim to describe the effects of fishing and the environment on production and food web structures. The specific objective of this cruise was:

To sample infaunal and epifaunal invertebrates and fish at a series of sites subject to different levels of trawling disturbance for production studies.

ADDITIONAL AIMS:

a. To sample the microbial community at a series of stations in the South-Western Approaches to provide data on the distribution patterns of bacterial and archaeal communities within different depths of the sediment in relation to abiotic and biotic parameters.

b. To collect gastrointestinal tracts and blood samples from crustaceans and teleosts to help determine the transition pathways of *Brucella*

NARRATIVE:

CEFAS ENDEAVOUR sailed from Portland at 21:00 GMT on 10 July and steamed westwards to the first study area for the survey, a shell gravel habitat at South Eddystone (E1). Sampling started at 05:00 the following day, with seven replicate deployments made with the mini Hamon grab. Further samples were collected with a 2m-beam trawl (two hauls), large Hamon grab (5 deployments) and 4m-beam trawl (one tow) at the same site. Sampling continued until 20:30, with a further two sampling stations (E2 and E3) being completed and benthic samples collected from the 2-m beam, and the large and mini Hamon grab. One successful 4-m beam tow was also deployed at E2, but darkness prevented completion of a final 4m-beam tow at E3. With daylight fading CEFAS ENDEAVOUR steamed overnight to the fourth South Eddystone station (E5).

Work at this site was due to start at 05:00 on 12 July, however, at 04:45 CEFAS ENDEAVOUR suffered a failure of the propulsion system when powering up to two engines, and didn't regain full control again until after 07:00. When power had been restored, sampling commenced with the large Hamon grab (five replicates). Further samples were collected with a 2m-beam trawl (two hauls), mini Hamon Grab (7 replicates) and 4m-beam trawl (one tow). With sampling at E5 complete, CEFAS ENDEAVOUR steamed northwest to E3 to complete the remaining 4m-beam tow. With all sampling at South Eddystone completed by 13:00, CEFAS ENDEAVOUR steamed northwest to the second benthic ecology site (South Scilly) arriving at station S1 at 18:25. Work at station S1 was completed by 22:00 and CEFAS ENDEAVOUR steamed overnight to station S4.

Sampling at the second South Scilly site commenced at 04:45 on 13 July with a 4m-beam tow, followed by two successful 2m-beam tows. An attempt was made to deploy the Nioz corer at 07:49, but with weather worsening to a force 6 to 8 gale, coring was abandoned on safety grounds after one successful deployment, and CEFAS ENDEAVOUR steamed to S3, reaching the 4m-beam tow line at 09:21. Between 09:21 and 11:51 all 2m- and 4m-beam tows were completed on site, but with weather still poor, it was decided to abandon the remaining Nioz corer deployments and head for station S2. All beam trawl work was completed at S2 by 16:48, and CEFAS ENDEAVOUR steamed northwards to the third benthic ecology site (North Seven Stones) overnight.

Sampling commenced with the 4m-beam trawl at N4 at 04:02 on 14 July. All trawl and grab samples were successfully obtained by 08:08 and CEFAS ENDEAVOUR steamed to the second station at this site (N1) to begin work with the large Hamon grab. However, although all 2m- and 4m-beam trawl samples were successfully collected here, no successful large Hamon grab samples were obtained and after eleven invalid attempts sampling was abandoned. Sampling with the mini Hamon grab also proved to be challenging, with only four small samples being obtained after eleven attempts. At 14:52 it was decided to move to the next station, and CEFAS ENDEAVOUR steamed to the third North Seven Stones site (N2). Again, all 2m- and 4m-beam trawl samples were successfully collected, along with

those from the mini Hamon grab. However, the large Hamon grab proved to be unsuitable for the ground type and no valid samples were obtained after seven attempts. Sampling at N2 was completed at 20:19 and CEFAS ENDEAVOUR steamed overnight to N3.

Work commenced at the final North Seven Stones site (N3) at 04.08 on 15 July, with all beam trawl tows and grab sampling completed by 08:19h. CEFAS ENDEAVOUR then steamed west to the final benthic ecology site at Haig Fras, reaching station H2 at 11:50. Between 11:50 and 15:55, two 2-metre beam tows and one 4-metre beam trawl were successfully completed and epifauna and fish data collected. A further five NIOZ replicates were also collected and the cores sieved to obtain benthic infauna. The first three cores were also sub-sampled for chlorophyll a and porosity and meiofaunal samples were taken from the first 4 cores. Microbial samples were also extracted from all replicates.

CEFAS ENDEAVOUR then steamed west to H1, where two successful 2-metre beam trawl samples were obtained. The Nioz corer was then deployed at 17:34 and returned one valid sample. On the second attempt, however, the coring wire parted as the corer was being lifted off the seabed, and the Nioz corer dropped back to the sea floor. All further work on station was abandoned for the evening while attempts were made to recover it with the grapnel hooks overnight, but with no success. CEFAS ENDEAVOUR remained on station H1 until 04:32. She then steamed 1km northwest to begin sampling at the H1 4-metre beam station. With the successful completion of the tow it was decided to steam to the third and fourth Haig Fras sites (H4 and H3) and begin work at the 4m-beam stations, to allow time for the crew to replace the damaged coring wire during steaming. All 4m-beam tows were successfully completed at 08:10 and with the new core wire installed, two 2m-beam tows and seven mini Hamon grab replicates were also obtained before returning to H4 and H1 in turn to finish the sampling programme on the Haig Fras mud grounds. With work at Haig Fras completed at 16:51, CEFAS ENDEAVOUR returned to the South Scilly region to complete the Hamon grab work that was abandoned due to bad weather earlier in the cruise, arriving at station S3 at 22:14. By 23:34 seven valid mini Hamon grab samples and an additional five large Hamon grab samples had been retrieved and CEFAS ENDEAVOUR steamed overnight to S4.

Work at station S4 began at 04:40 on 17 July, with seven successful mini Hamon grab samples being obtained by 05:34. However, with time working against us, it was decided to abandon sampling with the large Hamon grab at this site and steam to the final South Scilly station (S2), to complete the mini Hamon grid. Again the large Hamon grab stations were abandoned to allow time to steam to Portland.

With most of the primary aims of the cruise achieved (allowing for bad weather and gear loss) and progress made with the two additional aims, CEFAS ENDEAVOUR then set sail for Portland at 09:00, docking at 00:03 on 18 July.

RESULTS:

PRIMARY AIM: Benthic and trawl survey of a series of sites subject to different levels of trawling disturbance for production studies

At four locations (South Eddystone, South Scilly, North Seven Stones and North Haig Fras) subject to differing levels of fishing impact, samples were successfully collected for the analyses of benthic infauna, epifauna and fish. Each site was representative of a slightly different habitat. The 2m- and 4m-beam stations were all relatively diverse with queen scallop *Aequipecten opercularis,* echinoderms *Luidia sarsi and Echinus esculentus,* the hermit crab *Pagurus prideauxi* and various spider crabs (e.g. *Inachus, Macropodia,* and *Ebalia*) all abundant. Unusual species recorded included the aphroditid worm *Hermione hystrix* and the amphipod *Epimeria* sp.

Seven Nioz core samples were also collected for analyses of meiofauna, sediment particle size and chlorophyll a.

ADDITIONAL AIMS:

a. Microbial community analyses

Samples for microbial community analyses were taken from the NIOZ cores using minicores (20 ml sterile syringes). All samples will be analysed at the Cefas laboratory in Lowestoft. The samples will provide data on the distribution patterns of bacterial and archaeal communities within different depths of the sediment in relation to abiotic and biotic parameters including temperature, sediment porosity, chlorophyll concentration, water depth, macro- and meiofauna to gain a wider understanding of microbial biogeography horizontally and vertically.

b. Transmission pathways of strains of *Brucella* - for C. Dawson, VSL, Weybridge

The gastrointestinal tracts and blood samples from a variety of teleosts (gadoids, flatfish, gurnards) and whole invertebrates (crustaceans and cephalopods) were frozen for subsequent laboratory analyses to elucidate possible transmission pathways of strains of *Brucella* that may affect marine mammals.

SIGHTINGS:

A Sunfish (*Mola mola*) was sighted from the vessel on the evening of 15 July at position 50 º36.987'N 07 º 24.986'W

I would like to thank the officers, scientists and crew for their hard work during the course of the survey.

T Maxwell
18 July 2007

SEEN IN DRAFT

R McCurry (Master)
A Simpson (Senior Fishing Mate)

INITIALLED:

S Jennings

DISTRIBUTION:

Basic list
Staff on Survey
Simon Jennings
Bill Camplin
Cornwall SFC
Isles of Scilly SFC
C. Dawson (VSL, Weybridge)

Figure 1: Map of sampling locations for surveys 14/07