

R1/6

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FRV *Clupea*

Cruise 0804C

## **REPORT**

12-28 May 2004

**Loading Port:** Fraserburgh

**Unloading Port:** Fraserburgh

**Working Port:** Aberdeen, Fraserburgh, Leith and Invergordon

## **Personnel**

J Mckie	17-28 May	(In charge 17-28 May)
P Hayes	12-23 May	(In charge 12-17 May)
D Moore	21-28 May	
C Shand	12-28 May	
D Walker	12-23 May	
A McIntosh	12-17 May	
G Packer	12-17 May	
P Stainer	12-17 May and 23-28 May	

## **Fishing Gear**

BT 158

## **Sampling Gear**

TV Sledge, TV drop frame, grabs, sieve table and Agassiz trawl.  
Liquid nitrogen will be carried.

## **Project Codes**

AE02n 17 days

## **Objectives**

1. To undertake Agassiz (objective abandoned), underwater television (UWT), grab and RoxAnn (objective abandoned) surveys of the Guillam Bank and Sutors dredged material disposal sites to assess the condition of the seabed, identify the predominant benthic epifauna species and the distribution of man-made debris.
2. To undertake Agassiz (restricted to Firth of Forth), underwater television (UWT), grab and RoxAnn surveys of the Aberdeen, Montrose, Firth of Forth and Eyemouth dredged material disposal sites.
3. To collect fish and biota samples for biological effects measurements using bottom trawl at Guillam Bank, Aberdeen, St Andrews Bay, Largo Bay and Firth of Forth disposal sites. Sample preparation and preservation will be undertaken onboard *Clupea*.

4. The biological effects samples for objective 3 will be measured for EROD, PAH and PCB's, PAH metabolites and TBT. Particle size and organic carbon will also be undertaken.
5. Sediment samples for Objectives 1, 2 and 6 will be analysed for heavy metals (limited) PCB's (limited), PAH's and TBT back in Aberdeen. Particle size and organic carbon will also be undertaken.
6. To undertake Agassiz (dropped), grab, RoxAnn and UWT surveys at potential fish waste disposal sites in the vicinity of Eyemouth.
7. To collect 200 whiting over 20 cm from the Inner Moray Firth for the Population Biology Group. (Additional objective)
8. To collect 120 KGs of sediment from the Firth of Forth for Quasimeme. (Additional objective)

## **Narrative**

Scientific equipment was loaded and set up on 7 May and scientific staff joined the vessel at 1045 on 12 May and completed setting up the scientific equipment. *Clupea* departed from Fraserburgh at 1430 to sail to the Moray Firth and anchored in Burghead Bay overnight. The following day the vessel sailed to commence the trawl survey in the general vicinity of Guillam Bank, on completion of the survey the vessel departed for Fraserburgh. On 14 May the *Clupea* sailed for the Aberdeen dredged material disposal site. On completion of the survey the vessel set sail for St Andrews Bay and anchored overnight. Following completion of the trawl survey on 15 May, the vessel sailed for the Firth of Forth and completed the Narrow Deep trawl survey before anchoring off Leith. On 16 May the vessel sailed for the Largo Bay trawl site to complete the work for Objective 3. Approximately 100 KGs of sediment was also collected for Quasimeme at the Narrow Deep site. The grab and RoxAnn surveys were completed at Oxcars on 17 May, a RoxAnn survey was also completed at Blae Rock, before the vessel docked in Rosyth at 1400 to embark J Mckie and disembark A McIntosh, G Packer and P Stainer. At 1530 *Clupea* departed Rosyth and set sail for the Eyemouth dredged material disposal site - anchoring in Clodingham Bay overnight. At 0800 on 18 May the vessel left the anchorage and sailed to the Eyemouth site to start work on Objective 2, starting the RoxAnn survey at 0820. On completion of the work at the sea disposal site, the vessel proceeded to the proposed shellfish waste disposal site off Eyemouth. A reduced survey (due to seabed conditions) was completed at 1800 and the vessel set sail for Scoughall Road anchorage (Dunbar) arriving at 2015. On 19 May the vessel left the anchorage and set sail for the Narrow Deeps dredged material disposal site in the Firth of Forth arriving at 1030 to commence the UWT. This was abandoned after one run due to bad visibility. A detailed RoxAnn survey was then undertaken covering an extended area roughly twice the size of the dredged material disposal site. On completion of the RoxAnn survey the vessel proceeded to Largo Bay to undertake a limited grab survey, which was completed before the vessel returned to the Narrow Deep site to commence the UTV survey at 1550. One transect was completed through the middle of the site before the vessel sailed for the Musselburgh Road anchorage arriving at 1835. On route the Agassiz trawl was prepared for the next day and the UWT camera sledge was safely stowed. The vessel left the anchorage at 0800 hrs and sailed for Narrow Deep to undertake a limited Agassiz trawl survey, before completing the UWT survey and grab sampling. The vessel left the survey area to make passage to Leith docking there at 1545 where she remained for 24 hours.

On 21 May *Clupea* set sail from Leith at 1815 and arrived at the Pittenweem anchorage at 2020. The following morning *Clupea* left the anchorage and made passage to St Andrews Bay to undertake a limited grab survey before sailing to the Montrose disposal site arriving at 1200. On completion of the grab survey, it was not possible to use the UWT because of poor visibility; the vessel set sail for the Aberdeen dumpsite arriving on station at 1700. The UWT survey was aborted due to poor visibility and the grab survey commenced at 1735 and was terminated at 1845 to allow the vessel to sail to Aberdeen for the evening. Paul Stainer rejoined in Aberdeen on the morning of 23 May and the vessel set sail to complete the grab and UWT surveys off Aberdeen. Douglas Walker and Peter Hayes left the vessel by pilot cutter at 1410. The vessel returned to the site to complete the grab survey, and in doing so all the work scheduled under Objective 2, before setting sail for Fraserburgh docking at 2010.

The vessel sailed from Fraserburgh on 24 May for the Moray Firth to undertake the programme of work outlined in Objective 1. *Clupea* arrived at Guillam Bank at 1440 and started UWT operations immediately. On completion of the day's work *Clupea* anchored at Guillam Bank for the evening at 1930. On 25 May the vessel sailed to start the grab survey and completed all the scheduled stations by 1500 before returning to the UWT survey. *Clupea* again anchored over night at Guillam Bank. The next morning *Clupea* sailed to undertake a grab survey along the trawl tows in the vicinity of Guillam Bank and on completion of this work the vessel sailed for the Sutors dumpsite. On completion of the grab and UWT surveys the vessel returned to Guillam Bank to complete the UWT survey and in doing so all the work outlined in Objective 1. On the evening of 26 May the vessel sailed to Invergordon. *Clupea* sailed from Invergordon on the morning of 27 May at 0800 to trawl for whiting off Buckie to complete Objective 7 and on completion of trawling operations the ship set sail for Fraserburgh - docking at 1700. On 28 May, scientific staff helped to unload the vessel and after cleaning the laboratories they departed for Aberdeen at 1000.

The scientific staff would like to thank the crew of the *Clupea* for the level of co-operation and commitment they showed throughout the cruise.

## Results

- 1a) At Guillam Bank an extensive grab survey (41 stations) was completed. The sediment collected will be analysed in Aberdeen for heavy metals and organic contaminants. It is hoped that the results will confirm the extent of the impact that previous sea disposal operations have had on the seabed. During the UWT survey, nine transects were completed, but few obvious pieces of manmade debris was logged, apart from some to the south west of the survey area. Digital photographs were taken of each grab sample and this data will be included in the survey report. It is hoped that this information will allow us to more clearly describe the impact that previous disposal operations has had on the seabed. Such was the quality of the UWT footage and the success of the grabbing and fishing surveys that it was decided not to deploy the Agassiz trawl. RoxAnn data was not captured because of the success of previous more extensive surveys undertaken over the area.
- 1b) At the Sutors site, seven grabs samples were collected and one UWT transect was completed. Initial interpretation of the UWT footage confirms that the seabed is not significantly impacted with manmade debris and there were little signs of previous sea disposal operations having an impact on the area. Digital photographs were taken of each grab sample and this data will be added to the cruise report. It is hoped that this information will allow us to better describe the impact that previous disposal operations have had on the seabed. Such was the quality of the UWT footage and the success of the grabbing survey, it was decided not to deploy the

Agassiz trawl. RoxAnn data was not captured because of the success of previous more extensive surveys undertaken over the area.

2. All of the work scheduled under this objective was completed.
- 2a) At the Eyemouth dredged material disposal site, seven grab samples (requiring numerous attempts) were collected, six UWT transects were completed along with a detailed RoxAnn survey. Preliminary analysis of the data confirms that few areas of the seabed within and adjacent to the site have been impacted by previous sea disposal operations. Dredging and sea disposal operations were ongoing during the survey and no obvious long-term impacts on water quality were observed following a dumping event. A UWT run across a recent dumping track showed that the seabed was not significantly impacted. Little evidence of manmade debris was observed during the UWT runs and the RoxAnn survey data (ground truthed by grab sampling) showed that the site is predominately silty sand with occasional stones, cobbles and boulders. The southern portion of the site the seabed is more littered with stones, cobbles and the occasional boulder (harder).
- 2b) Six grab samples were collected from the trawl tracks at Largo Bay, three from Narrow Deep, St Andrews, Aberdeen and nine from the Guillam Bank trawl survey tracks.
- 2c) A detailed RoxAnn survey was completed at Blae Rock; the survey data will be used to plan the scheduled sediment plume monitoring trials in September 2004. Three UWT transects were completed and these confirmed that previous dumping operations were having a limited impact on the seabed. A number of macrobenthic species were observed throughout the site, similar to those observed off site. Little debris was observed during the UWT transects, although areas where it was thought that dredged material had accumulated on the seabed were noted. 13 grab samples were collected for chemical analysis and to ground truth the RoxAnn data. The Agassiz trawl was not deployed.
- 2d) A single UWT transect through the Narrow Deep site confirmed that the majority of previous dumping operations were confined to the west of the site in waters greater than 25-30 m. A number of items of debris were noted and documented during the transect, thought to be associated with previous sea disposal operations. Five Agassiz trawl runs were completed to ascertain the abundance of macrobenthos and a nephrop sample was retained for PAH analysis. 16 grab samples were collected for visual observations, chemical and particle size analysis and to ground truth the RoxAnn survey data.
- 2e) 14 grab samples were collected at the Oxcars site for visual observations, chemical and particle size analysis and to ground truth the RoxAnn survey data. The UWT sledge and Agassiz trawl were not deployed. The sediment collected from the grab shows that areas of this site are clearly impacted by previous sea disposal operations.
- 2f) A comprehensive grab survey (approximately 35 successful deployments) was completed at Aberdeen and 2 UWT transects were also undertaken along with an extensive RoxAnn survey. The Agassiz trawl was not deployed. Visual observations made during the grab and UWT surveys confirmed that spoil was visible on the seabed in the southeastern part of the site. Large amounts of spoil, perhaps from the recent sea disposal operations, was observed in samples collected both within and outwith the site in this area. Discussions will be held with colleagues in the laboratory to gain a better understanding of current movements on the site, but, it is

thought that dredged material is naturally driven to the south eastern portion of the site. Intermittent strong tides and currents occasionally hampered grab and UWT surveys, particularly over the centre of the site.

3. Sufficient numbers of fish were collected for biological effects measurements using the Bt 158; the details are shown in the table below.

Location	No of Trawls	Nos Plaice	Nos Flounder
Guillam Bank	4	20	Nil
Aberdeen	1	20	Nil
St Andrews	3	5	15
Narrow Deeps	3	20	Nil
Largo Bay	3	4	5

4. The biological samples were pre-treated and stored under liquid nitrogen before being returned to Aberdeen for analysis.
5. All sediment samples were catalogued and deep frozen before being transported back to Aberdeen for analysis.
6. A total of 5 grab stations were attempted at the potential Eyemouth shellfish waste site and no samples were collected due to the nature of the seabed, (rocky with boulder fields). The RoxAnn survey confirmed these observations, the UWT survey was not undertaken due to the nature of the seabed. This limited survey confirms that this area off Eyemouth would be suitable for shellfish waste sea disposal operations in the future providing they are restricted to a confined area as defined by this survey.
7. A total of five trawls were undertaken during the cruise in the Moray Firth. Unfortunately no whiting were caught in the required category (greater than 20 cm).
8. Approximately 100 KGs of sediment was collected from the Narrow Deep area in the Firth of Forth and returned to Aberdeen for further analysis.

James C Mckie  
23 July 2004

Seen in Draft: A Nicol, OIC *Clupea*

## Circulation List: Cruise Programmes and Reports

### CLUPEA VESSEL

Programmes - Mr J A Morrison for approval. Reports - Mr J A Morrison for approval.

Issue two copies of Record of Haul and Station Numbers pro-forma with Scientist-in-Charge's copy of *Scotia* and *Clupea* programmes.

Two xerox copies of track chart for reports to be sent to Dr L Rickards.

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### PROGRAMMES ONLY

#### Lab staff

Mr J T M Hunter  
Mr T Reid  
Mr P J Copland  
Mr J Dunn  
Mr A Beaton  
J Petrie  
Security

#### Non-lab staff

~~Island Cmdr Faroes (Faroes only)~~  
~~Flag Officer, Denmark (Danish part of N Sea only)~~  
~~Coastguard~~  
~~G Lees~~

### PROGRAMMES AND REPORTS

#### Lab staff

Mr J A Morrison  
Capt R Denholm  
Mr R S T Ferro ) Fish Man team  
Mr C Hall ) progs only  
Dr R M Stagg  
Dr C Moffat  
Mr M R Heath  
Mr A Macdonald  
D Lichtman (+ additional copy of track chart  
of reports only)  
Mrs E Morrison  
CO/OIC of Vessel (*Scotia*) (to be faxed)  
Library (2)  
File

#### Non-lab staff

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Dr J G Gordon  
G Kane  
R de Clerck  
Mr B Stewart  
Capt J Cannan (*Scotia* and *Clupea* only)  
Controller Coastal Ops - A Stewart  
Dr P Grieg-Smith  
Mr H C Boyar  
Dr R J A Atkinson  
Mr H i Jákupsstovu  
Mr C Bullimore (To be faxed: 01923 846392)

### Laboratory Personnel on Vessel

J Mckie	C Shand
P Hayes	A McIntosh
D Moore	G Packer
D Walker	P Stainer

### Fishery Officers at