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FRV *Clupea*

Cruise 0505C

REPORT

1-20 April 2005

Loading Port: Fraserburgh
Unloading Port: Fraserburgh
Working Port: Stornoway, Kyle of Lochalsh and Campbeltown

Personnel

J Mckie	10-20 April (In charge, 10-20 April)
P Hayes	1-13 April (In charge, 1-9 April)
D Moore	13-20 April
C Shand	1-20 April
M McKenzie	1-10 April
A McIntosh	1- 6 April
E Dalgarno	10-13 April
G Packer	10-13 April
G Rodger	13-16 April

Fishing Gear

BT 158

Sampling Gear

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

Project Codes

AE02n (10108) 20 days

Objectives

1. To collect fish and biota samples for biological effects measurements using bottom trawl at the Stornoway dredged material disposal site. Sample preparation and preservation will be undertaken onboard *Clupea*.

2. To undertake Agassiz (dropped) underwater television (UWT), grab and RoxAnn surveys of the Skye and Lochinver dredged material disposal sites to assess the condition of the seabed, identify the predominant benthic epifauna species, and the distribution of man-made debris.

3. To undertake Agassiz (dropped), underwater television (UWT), grab and RoxAnn surveys at two potential sea disposal sites and one existing site off Islay.

4. To undertake Agassiz, grab, RoxAnn and underwater television (UWT) surveys at potential fish waste disposal sites in the vicinity of Skye and Kirkcudbright.

5. To undertake water, and sediment sampling for the National Marine Monitoring Programme and, to collect water samples as part of the Scottish Coastal Eutrophication Assessment Survey at the Clyde and Solway Firth stations.

6. To undertake Agassiz, grab, RoxAnn and underwater television (UWT) surveys at potential dredged material disposal sites in the vicinity of Whitehills. (Contingency)

7. To undertake grab and underwater television (UWT) surveys at Guillam Bank to complete work started in 2004. (Contingency)

8. The biological effects samples for objective 1 will be measured for EROD, PAH and PCB's, PAH metabolites and Vtg.

9. Sediment samples for Objectives 2, 3, 4, 6 and 7 will be analysed for heavy metals (limited), PCB's (limited), PAH's and TBT. Particle size and total organic carbon will also be undertaken.

10. To collect radio caesium water samples from Cape Wrath and Sandside Bay in the Pentland Firth.

Narrative

Scientific equipment was loaded and set up on the 21 March and scientific staff joined the cruise at 0845 on 1 April at Fraserburgh Harbour. However, the intended early departure for Stornoway was delayed. This was due to the arrival of a replacement cooling pump for the TV winch that had failed in the early evening of 31 March 2005. After the pump had been fitted, the SIC delayed departure until 2300 in order to catch the tide in the Pentland Firth. *Clupea* anchored in Loch Erisort (south of Stornoway Harbour) at 1900 on 2 April. Next morning trawling started at 0900 at the Stornoway disposal site. The initial trawl, close to the harbour approaches and disposal site, recovered a considerable quantity of dumped fishing gear including nets, wires, old creels and tyres. The rubbish tangled in the trawl gear was stored on the *Clupea* however, in order to fully recover the trawl gear the cod end was opened and the contents of the trawl lost. A further four trawls were completed successfully to the south of the disposal site. Three TV tows and a RoxAnn survey of the disposal site completed the work for the day. Arrangements were made involving with the deputy Stornoway Harbour Master for the disposal of the rubbish stored on the *Clupea*. At 1900 the *Clupea* berthed at Stornoway Harbour. The following morning, after the removal of the rubbish from the *Clupea*, twenty eight grabs were collected from within Stornoway Harbour and Stornoway disposal site. Two more trawls were completed at the disposal site before making passage to Kyle of Lochalsh. *Clupea* arrived at 2145 at Kyle of Lochalsh and berthed in the harbour. The following morning Alistair McIntosh disembarked at 0700 to catch the train back to Aberdeen. *Clupea* left the harbour at 1000 and made passage to the Ardvasar disposal site in the Sound of Sleat. A RoxAnn survey began at 1200 on arrival at the disposal site followed by the collection of seven grabs, however, the TV tows were abandoned due to extensive creeling across the disposal site. A Sholkovitz core was collected west of the mouth of Loch Nevis for the Environmental Impact Group. Passage was then made for an anchorage in Salen Bay, Isle of Mull. Deteriorating weather conditions resulted in a change to the original cruise schedule. Instead of going to Islay, two potential disposal sites were surveyed in the Loch Linnhe. This involved two RoxAnn surveys, two UWT tows and the collection of fourteen grabs. *Clupea* anchored in Ardmucknish Bay at 1900. Worsening weather conditions on 7 April resulted in aborting an attempted passage to Campbeltown and anchorage was sought at Loch na Mile in the Isle of Jura. The following

morning the weather conditions had eased and passage was made to Campbeltown departing at 0600 to catch the tide round the Mull of Kintyre. On arrival at the Campbeltown disposal site a RoxAnn survey, two TV tows and seventeen grabs were completed. *Clupea* berthed in Campbeltown Harbour at 1800 in preparation for the transfer of staff and equipment on 9 April and the inclusion of a rest day in the cruise schedule. On 9 April at 1500 J Mckie, E Dalgarno and G Packer embarked and M McKenzie disembarked and returned to Aberdeen by minibus.

At 0800 the next morning *Clupea* set sail for the Solway Firth completing work on the Clyde NMMP station on route (two water dips and 10 sediment grabs) and arrived in Wigtown Bay at 2000. Next morning (11 April) *Clupea* left the anchorage and sailed for the Solway Firth NMMP station completing the water (two dips) and sediment (10 sediment grabs) sampling before arriving at the proposed shellfish waste site. Due to tidal conditions the TV survey was abandoned until slack water, whilst waiting a RoxAnn survey was completed and the sediment grab stations identified. At around 1400 the TV survey commenced and was abandoned due to tidal conditions at 1500. The grab survey (9 stations) and two agassiz transects were completed before *Clupea* sailed for the Wigtown Bay anchorage arriving at 2000. The next morning *Clupea* sailed for Campbeltown in good weather docking at 1745, on route the rest of the survey work was planned and contingencies for bad weather considered.

On 13 April P Hayes, E Dalgarno and G Packer left the ship and D Moore and G Rodger embarked, the ship set sail at 0900 for Islay arriving at the Port Ellen alternative site to start the TV survey at 1500. After completing two TV transects and an extensive RoxAnn survey two grabs stations were sampled before *Clupea* departed for the anchorage at Port Ellen arriving at 1945. *Clupea* departed the anchorage and started TV work immediately on the Port Ellen disposal site completing three transects before undertaking the grab survey (five grabs) and completing the RoxAnn survey. The ship rubbed the bottom momentarily during the survey which delayed completion by approximately one hour whilst routine safety checks were carried out to confirm that no obvious damage had been sustained. Once all work was successfully completed at Port Ellen Clupea sailed to complete the grabbing and TV survey at the alternative site at Mull of Oa, Islay. When this work was complete, *Clupea* sailed to undertake a grabbing survey (five stations) and a RoxAnn survey at the proposed sea disposal site off Portnahaven. The TV and agassiz surveys were abandoned, guided by local knowledge, due to the tidal conditions at this site. On completion of all survey work Clupea sailed for Laggan Bay, Loch Indaal anchoring at 2000. The next morning *Clupea* sailed for Kyle of Lochalsh to disembark Gillian Rodger and undergo a diver survey of the hull. *Clupea* arrived in Kyle at 2100.

The next morning (16 April) having disembarked Gillian Rodger and following the completion of the diver survey, which confirmed no damage, *Clupea* set sail for the general area known as the Crowlin Deeps to undertake a UWT survey of potential shellfish waste disposal sites. Following the survey *Clupea* set sail for Lochinver arriving at the sea disposal site at 1930. Whilst there was still daylight it was decided to check for evidence of creeling in the vicinity of the site and to undertake a limited RoxAnn survey before anchoring in Achmelvich Bay at 2030.

Clupea set sail on 17 April for the survey area to complete the RoxAnn survey (3 lines), to undertake the UWT survey (3 transects) and collect two grab samples. On completion of these tasks *Clupea* set sail at 1000 for the Pentland Firth collecting two sets of water samples for radio caesium and tritium analysis, one at Cape Wrath and the other at Sandside Bay. Due to the worsening weather conditions and very poor weather forecast the vessel went to anchor in Dunnet Bay arriving at 1930. The next day the vessel continued to shelter in Dunnet Bay waiting for the weather to improve before attempting a passage through the Pentland Firth.

On the 19 April during a favourable weather window *Clupea* set sail from Dunnet Bay at 1300 for Fraserburgh arriving in the harbour at 2245.

After unloading the light equipment and tidying the laboratories scientific staff departed *Clupea* at 0945 and returned to Aberdeen by minibus. The heavy equipment was unloaded on 21 April.

The scientific staff would like to thank all on FRV *Clupea* for their sterling efforts throughout what was a very successful cruise.

Results

1a) At Stornoway an extensive grab survey (28 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 transects, three were completed, obvious pieces of manmade debris was logged.

1b) Six trawls were completed and sufficient fish (11 plaice, 10 dab and 8 flounder) were collected for the biological effects work. The first trawl, to a greater extent than subsequent trawls over this area, brought onboard extensive amounts of manmade debris which was landed for disposal in Stornoway. RoxAnn data was captured over an extensive area including the dumpsite.

1c) The biological effects samples were catalogued and stored under liquid nitrogen before being transported back to Aberdeen to be measured for EROD, PAH and PCB's, PAH bile metabolites and Vtg.

2a) Because of the amount of creels on the Ardvasser dumpsite the UWT survey was abandoned. However, seven grabs stations were sampled and a comprehensive RoxAnn survey was conducted. No obvious sign of manmade debris was observed in any of the grab samples. The data will be used to assess the continuing use of this site and the analytical data will be reported to OSPAR.

2b) Eight RoxAnn lines, three UWT transects and two grab stations were worked at the Lochinver sea disposal site. Some man-made debris was noted but is difficult to say if this was deposited by the sea disposal vessel. It was clear from the RoxAnn and UWT data collected that the south of the site is either bed rock or a boulder field, the northern portion of the site tended to comprise of mixed sediment with patches of weed. This would seem to suggest that the northern portion of the site could be fished and we may have to discuss the future use of this site with the licensee. To date no complaints have been received either during or after sea disposal activity. The data will be used to assess the continuing use of this site and the analytical data will be reported to OSPAR.

2c) (Additional work due to poor weather conditions at the scheduled survey area) A RoxAnn survey, two UWT transects and 17 grabs were completed at the Campbeltown sea disposal site. The data will be used to assess the continuing use of this site and the analytical data will be reported to OSPAR.

3a) Three UWT transects, an extensive and comprehensive RoxAnn survey and 5 grab deployments, digital photographs were taken of each grab, were completed on the Port Ellen (Islay) alternative sea disposal site. Early indications are that this site will be suitable for the disposal of dredged material from Port Ellen, there being no protected species or significant sensitive features within the proposed area. The seabed is not suitable for fishing thus confirming the earlier desk assessment that identified this as a potential site.

3b) Three UWT transects, an extensive and comprehensive RoxAnn survey and five grab deployments, digital photographs taken of each grab, were completed on the existing Port Ellen sea disposal site. Early indications are that this site may be unsuitable for the long-term disposal of dredged material from Port Ellen, due to its proximity to the channel, local fishing grounds, Maerl beds and unfavourable inshore location.

3c) Five grab stations were completed, digital photographs taken of each grab, along with a comprehensive RoxAnn survey of the potential Portnahaven sea disposal site. Due to tidal conditions, and as advised by local knowledge, the UWT was not deployed. Early analysis of the information confirms that the site is suitable for the disposal of dredged material, there being no obvious sensitive/protected species or features within the boundary of the survey area. Fishing is unlikely to be sustainable, as the initial assessment was advised by local knowledge, however, some creels were observed to the northeast of the survey area but these are unlikely, should this be a regularly fished area, to be impacted by disposal operations that are limited to the centre of the potential sea disposal site.

3d) (Additional work due to poor weather conditions at the scheduled survey area) A RoxAnn survey, two UWT transects and 19 grab samples in total were collected from two potential quarry waste disposal sites in the Lynn of Lorn. Once the data is available we will be able to confirm, or otherwise, their suitability for further consideration as potential sea disposal sites.

4a) At the proposed Kirkcudbright shellfish waste site nine grabs were successfully deployed and two UWT transects were completed. An extensive RoxAnn survey informed the decision to concentrate the sediment sampling on UWT surveys to the south west portion of the area and it is thought that this will be designated as the future shellfish waste disposal site. The proposed area is outside the Kirkcudbright firing range.

4b) A single UWT transect was completed at one of the proposed shellfish waste sites in the vicinity of the Crowlin Deeps, time did not permit any further work in this area. The UWT transect confirmed that the seabed was muddy sand with a large number of nephrop burrows. This probably means that it would be very difficult to establish a shellfish waste site in this area. However, it may be possible to find a suitable site nearby and consideration will be given to identifying potential sites prior to the August 2005 Scotia cruise.

5. Two water samples and 10 grabs samples were collected at the Clyde and Solway Firth NMMP sites and for the Scottish Coastal Eutrophication Assessment Survey. Samples were preserved and returned to Aberdeen for analysis.

6. All sediment samples were catalogued and deep frozen before being transported back to Aberdeen for analysis.

7. One long core was collected from Loch Hourn for Leeds University via the Environmental Impact Group.

8. Water samples were collected from Cape Wrath and Sandside Bay for radio caesium and tritium analysis in Burnham on Crouch (CEFAS laboratory).

James C Mckie
9 May 2005

Seen in Draft: A Simpson, OIC *Clupea*