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FRV *Clupea*

Cruise 0607C

## **REPORT**

30 April–14 May, 2007

**Loading:** Fraserburgh, 30 April

**Unloading:** Fraserburgh, 14 May

**Sample unloading:** Lochinver, 9 May

## **Personnel**

Matt Gubbins (In charge)

Dougal Lichtman

Karen Rodgers (student)

David Avery

**Project codes:** AE1192 14 days, MF0757 1 day

## **Equipment**

Zodiac inflatable

Outboard engine

Sealogger CTD/Rosette

2 Day grabs, 1 wooden table

2nd freezer for wetlab

80 L unleaded fuel

Zooplankton 'bongo' net

## **Objectives**

- 1) To collect water column hydrographic data from approximately 25 sea lochs in the North Minch and Voes in Shetland to provide validation / forcing data for models of fish farming carrying capacity.
- 2) To continuously monitor chlorophyll a in surface waters during the cruise.
- 3) To undertake sediment sampling close to fish farms in Lochs Torridon and Sunart to investigate the effects of copper based anti-foulants.
- 4) To sample by CTD / Rosette close to the Loch Torridon CAPTOR buoy
- 5) To take Day grab samples of sediments from sites in the central Minch which have previously been subject to acoustic habitat mapping (MF0757)

## Narrative

Scientific staff boarded the vessel at 1000 am on the 30 April and after loading scientific equipment and a short delay for tide at the Pentland Firth, Clupea departed at 1500 making for Loch Eriboll, arriving and anchoring in the loch during the night. Survey work commenced in Loch Eriboll on the 1 May, with 5 hydrographic stations (3 inside the loch, two outside) and a single zooplankton station sampled. Passage was then made to The Edrachillis Bay area of the West coast where a similar pattern of survey work (5 hydrographic stations and a single zooplankton station) was completed in Lochs Laxford and Cairnbhain before Clupea dropped anchor in Clashnessie Bay for the night.

After steaming to Loch Torridon on the morning of the 2 May, the Zodiak inflatable was launched in the upper loch for sampling to investigate the effects of copper antifoulants from nets at the fish farm at Camas an Leim. Shoreline macroalgae samples were taken far from and close to the farm and grab samples taken at different distances from the farm along transects North and South using a hand held VanVeen grab. Day grab samples were taken far from the farm in the upper loch for control purposes from Clupea and the vessel anchored overnight in the upper loch. The Torridon CAPTOR buoy was not deployed during survey work in this area, so CTD data was not collected from close to the buoy.

Hydrographic and zooplankton stations were sampled in Lochs Torridon and Ainort on the 3 May and the pier was taken at Kyle of Lochalsh to fill up with water before steaming to Loch Houran to complete sampling work for the day and anchoring overnight in Loch na Dam.

Outer stations in Loch Ailort were sampled by CTD and bongo net from Clupea and the Zodiak was launched to sample 2 stations further up the loch past the narrow entrance using reversing bottles. Clupea then steamed to Loch Sunart and the Zodiak was launched near the Glencripesdale fish farm for macroalgae sampling on the shoreline and grab sampling using the handheld VanVeen along transects East and West of the fish farm.

After anchoring overnight in Loch Sunart the Zodiak was launched again near the Laudale fish farm for macroalgae sampling on the shoreline and sediment sampling along transects from the Laudale farm (for copper analysis). Hydrostations were sampled by CTD and Bongo net whilst steaming out of Loch Sunart and Clupea then made passage across the Minch to the Western Isles, arriving and anchoring in Loch Boisdale at 2030 on the 5 May.

After dragging anchor in strong winds during the night, bad weather on the 6 May hampered sampling work. Strong Westerlies prevented Clupea from entering sea lochs on the East coast of the Western Isles, so sampling work was conducted at the outer stations only of Lochs Boisdale and Eynort before anchoring for the rest of the day in Uisinish Bay to wait for better weather. Weather conditions on the 7 May were too rough to enter the narrow entrance of Loch Eport or conduct small boat work in Loch Uiskevagh, so passage was made to Loch Maddy where hydrostations were sampled by CTD and bongo net. East Loch Tarbert and Loch Claidh were also surveyed and Clupea was anchored overnight in Loch Shell.

Loch Odhairn was surveyed on the 8 May and grab sampling work was then conducted North of the Shiant Islands to provide ground-truthing data for the Habitat Mapping ROAME (MF0757). Clupea then steamed for Lochinver and took the pier at 1600.

On the morning of the 9 May samples were offloaded at Lochinver and passage made for Shetland. Clupea arrived in Clift Sound and dropped anchor at 0500 am. On the 10 May survey

work was completed in SW Shetland by sampling in Clift Sound, Whiteness Voe, Seli Voe and Vaila Sound. After steaming to Swarbacks Minn in St Magnus Bay, some stations were also sampled in Olna Firth before anchoring overnight in Busta Voe.

Aith Voe and Olna Firth surveys were completed on the morning of the 11 May. In the afternoon, Ronas Voe was also surveyed and Clupea taken through Bluemull Sound to Balta Sound where a 5 station survey was completed. Due to the pier being unavailable in Balta Sound, Clupea was taken to Mid Yell Voe to anchor for the night.

Survey work in Shetland was completed on the 12 May with hydrographic and zooplankton sampling in Mid Yell Voe, Swinister Voe, Vidlin Voe and Dales Voe. Clupea was then taken to Lerwick and took the pier until 2200 when Clupea departed for Fraserburgh, arriving the following day at 1500. Samples and equipment were unloaded on the morning of the 14 May.

## Results

Full surveys by CTD were conducted in 26 lochs as shown in the table below.

<b>Loch</b>	<b>Date</b>	<b>Hydro-stations</b>	<b>Zoo-samples</b>	<b>Sediment samples</b>
Eriboll	01/05/07	5	1	0
Laxford	01/05/07	5	1	0
Cairnbhain	01/05/07	5	1	0
Torridon	2-3/05/07	5	2	12
Ainort	03/05/07	5	2	0
Hourn	03/05/07	5	2	0
Ailort	04/05/07	5	1	0
Sunart	4-5/05/07	5	2	23
Boisdale	06/05/07	2	0	0
Eynort	06/05/07	2	0	0
Maddy	07/05/07	5	2	0
East Tarbert	07/05/07	5	2	0
Claidh	07/05/07	5	2	0
Odhairn	08/05/07	5	2	0
Clift Sound	10/05/07	5	2	0
Whiteness Voe	10/05/07	5	2	0
Seli Voe	10/05/07	5	2	0
Vaila Sound	10/05/07	5	2	0

Olna Firth	10-11/05/07	5	2	0
Aith Voe	11/05/07	5	2	0
Ronas Voe	11/05/07	5	2	0
Balta Sound	11/05/07	5	2	0
Mid Yell Voe	12/05/07	5	2	0
Swinister Voe	12/05/07	5	2	0
Vidlin Voe	12/05/07	5	1	0
Dales Voe	12/05/07	5	2	0

In addition, seaweed and sediments close to fish farms were sampled for copper analysis in Lochs Torridon and Sunart to investigate the effects of net anti-foulants.

Sixteen sediment samples were collected by Day grab from pre-determined positions within an area previously mapped by acoustic methods from Scotia as part of a habitat mapping project (MF0757). These samples will be used to provide ground-truthing for interpretation of the acoustic data.

Samples collected during this cruise are still being analysed and data will be made available in due course.

Matt Gubbins  
14 April 2008