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FRV *Clupea*

Cruise 0702C

REPORT

26 April - 9 May 2002

Start: Fraserburgh, 26 April

Unloading: Lochinver, 2 May; Fraserburgh, 9 May

End: Fraserburgh, 9 May

Personnel

M Gubbins In charge

G Slesser

N Smith

Gear

SB15 (Sealogger) CTD

Zodiac inflatable

Phytoplankton sampling hose

Objectives

To conduct a 'spring' survey of a suite of sea lochs impacted to varying degrees by nutrient releases from fish farming activity. This survey will form part of a programme of work to assess the potential for eutrophication arising from nutrient 'hotspots' linked to aquaculture. This will be undertaken by measuring the following parameters at multiple stations in each loch:

1. CTD
2. Nutrients and silicates
3. Chlorophyll
4. Phytoplankton

These determinands will be assessed against criteria as defined by the OSPAR Eutrophication Task Group.

Cost to Project: 14 days AE11p

Narrative

Scientific staff boarded *Clupea* at 1000 hours on 26 April, but sailing was delayed until 1930 hours on 27 April due to storm force winds forecasted for the Fair Isle sea area. Following an overnight passage, survey work commenced in Loch Ewe, with CTD data, nutrient, silicate and phytoplankton water samples collected from seven stations and from a four position transect at different distances away from the salmon farm at Naast. Transect work was particularly difficult in this loch due to the windy conditions. The same work was

conducted at 11 stations in Loch Torridon, with a similar transect conducted at four distances away from the salmon farm at Camas an Leim.

On Skye, seven stations were sampled in Snizort Beg and later, five stations and a four position transect from the farm in Uig Bay were also sampled. *Clupea* then steamed to Lewis and anchored overnight in Loch Obhairn on 30 April. It had been necessary to omit Loch Kilerivagh on Benbecula from the survey in order to make up time lost to bad weather at the start of the cruise and to ensure that sufficient time remained to conduct an effective survey of Shetland Voes. Therefore, on 1 May, *Clupea* proceeded directly to Loch Grimshader, where five stations in the outer loch were sampled using the CTD/rosette sampler from *Clupea*. Three inner stations and a four position transect at distances from the salmon farm in the inner loch were sampled by reversing bottle from the zodiac inflatable launched from *Clupea*. The night of 1 May was spent in Lochinver, where samples already collected were off-loaded at 0900 hours on 2 May and *Clupea* subsequently made passage to Shetland. En route, 160 L of sea water for phytoplankton culture were taken from a site three miles NW of Cape Wrath on behalf of Shellfish Hygiene Research.

Following another overnight passage, 14 stations in Sandsound Voe were sampled from *Clupea*, and a four station transect at the salmon farm 'Brei Geo, Inshore' was sampled by reversing bottle from the Zodiac inflatable. The night of 3 May was spent at anchor in Gruting Voe in preparation for a survey of nearby Vaila Sound the following day. Ten stations in Vaila Sound were sampled and again the Zodiac was used to sample a transect at the 'Whitesness' salmon farm.

4-6 May were spent surveying the Swarbacks Minn system of sea lochs. A total of 20 stations were sampled in Aith Voe, Olna Firth and Busta Voe. In addition, Zodiac boat work enabled sampling alongside salmon farms at 'Bight of Braewick' in Aith Voe and 'Olna Firth 2' in Olna Firth.

Finally, the Swinster Voe system of sea lochs was surveyed on 6 and 7 May. A total of 17 stations in Swinning Voe, Collafirth Voe and Dales Voe (North) were sampled and transects from fish farms 'Inner Swinning Voe' and 'Collafirth 2' were sampled from the Zodiac.

After an overnight passage, *Clupea* returned to Fraserburgh on 8 May, and was unloaded at 0900 hours on 9 May.

Results

CTD profiles were recorded and water samples were taken for nutrient, silicate and phytoplankton analysis in the lochs listed below. Details on the scope of each survey are summarised.

Loch	Survey Details
Ewe	7 stations, 4 position transect, 49 samples
Torridon	11 stations, 4 position transect, 84 samples
Snizort Beg	7 stations, 22 samples
Uig	5 stations, 4 position transect, 38 samples
Grimshader	8 stations, 5 position transect, 37 samples

Loch	Survey Details
Sandsound Voe	11 stations, 3 pos.transect from empty farm, 4 pos. transect from full farm, 67 samples
Vaila Sound	10 stations, 4 position transect, 45 samples
Aith Voe	9 stations, 4 position transect, 55 samples
Olna Firth	8 stations, 4 position transect, 44 samples
Swinning Voe	7 stations, 4 position transect, 43 samples
Collafirth Voe	6 stations, 4 position transect, 43 samples

Busta Voe (three stations) and Dales Voe (North) (four stations) were also subject to a less intense survey.

In total, 13 lochs were surveyed, with 96 stations producing 553 water samples for separate analyses. Results from CTD calibration, nutrient, silicate, chlorophyll and phytoplankton analysis in the laboratory are awaited and will ultimately be included in a report for EPU scheduled for August 2002.

Matt Gubbins
10 June 2002

Seen in draft: Sandy Nichol, OIC (in absence of A Simpson)