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FRV *Clupea*

Cruise 1507C

REPORT

29 October – 15 November 2007

Loading Port: Fraserburgh

Unloading Port: Fraserburgh

Personnel

Alistair McIntosh

Margaret McKenzie

Gill Packer

Lynette Ritchie (p/t)

Maia Strachan (student p/t)

Fishing Gear: BT 158; beam trawl

Out-turn Days per project: 17 days AE11p

Objectives

1. To undertake fish and sediment sampling in the Clyde and Minch areas in support of the temporal trend and biomarker monitoring studies
2. To undertake sampling of flounder in St Andrews Bay and the upper Firth of Forth.
3. To undertake sampling of flounder collected from upper Clyde on behalf of SEPA West.
4. To determine hepatic protein and bile metabolite concentrations on board.
5. To sample plaice liver from Colonsay, Pladda, Solway Firth, Garroch Head and Cloch Point for macroarray assay in conjunction with Glasgow Caledonian University.
6. To sample *Buccinum* for imposex measurements in support of TBT effects survey.
7. To sample fish and sediment from the Clyde and Solway Firth CSEMP stations.
8. To obtain epibenthos samples from off Lybster in support of a project to investigate effects of drilling mud components on various invertebrates, mainly molluscs.
9. To sample 100 0-Group (<15 cm) cod, haddock or whiting from North Minch.
10. To collect wet fish food for the aquarium.

Narrative

Scientific equipment was loaded, set up and secured on 26 October. Three scientific staff and a student joined the vessel on evening of 28 October. *Clupea* sailed on 29 October for the Beatrice oilfield where epibenthos samples and sediments were collected in support of a project to investigate effects of drilling mud components on various invertebrates, mainly molluscs. *Clupea* then returned to Fraserburgh where the student disembarked at 2100. *Clupea* sailed again at 0800 on 30 October and made passage south. Fishing, and associated sediment samples, from St Andrews Bay was completed before anchoring overnight. *Clupea* sailed the next morning for the Firth of Forth where fishing by beam trawl at Blackness commenced at 1200. Five trawls were taken and returned only 7 flounder and the site was abandoned. *Clupea* made passage north and berthed in Fraserburgh at 0700 on 1 November to allow a fuel problem to be dealt with before sailing again at 1030 and making passage north. As the weather in the north Minch precluded passage to Broad Bay, *Clupea* continued passage south and arrived at Colonsay at 2300 on 2 November, anchoring overnight before fishing the next morning. On completion of this site, *Clupea* then made passage for the Solway Firth. Samples in support of CSEMP were taken and passage then made north, berthing in Campbelltown overnight on 4 November. L Ritchie joined *Clupea* on 5 November. Fishing at Pladda, and one of the Firth of Clyde offshore CSEMP sediment sites was completed before heading into the Firth of Clyde. Sampling was successfully carried out at Garroch Head before anchoring overnight in Kilchattan Bay. The Cloch Point site was successfully sampled the next morning and with an impending severe weather forecast, *Clupea* berthed in the Great Harbour, Port Glasgow, overnight on 7 and 8 November. As time and weather were to preclude sampling for *Buccinum* in the Clyde, L Ritchie disembarked and returned to Aberdeen on 8 November. An engineer visited *Clupea* on 8 November to carry out remedial work on an electrical problem which had developed earlier aboard the vessel. Due to the prevailing weather, the SEPA RV *Sir John Murray* was unable to sample flounder in the upper Clyde. Provision has been made for these samples to be obtained at a later date. The sampling sites at Skelmorlie and Hunterston were sampled on 9 November, anchoring overnight in Kilchattan Bay, and Irvine Bay on 10 November, anchoring overnight night in Lamash Bay. The remainder of the Firth of Clyde offshore CSEMP sediment sites were sampled on 11 November before starting passage north, where a further trawl was taken at Colonsay at 2100. Passage was then continued north during 12 November, berthing overnight in Stornoway. Fishing in Broad Bay was completed by 1800 on 13 November and, after stowing equipment and stripping the fishing gear, passage was made for Fraserburgh where berthing was completed by 1600 on 14 November. All scientific gear and biological samples were unloaded from *Clupea* and transferred to the Marine Laboratory on 15 November.

Results

The samples collected are summarised in Table 1.

All objectives except 3, 6 and 9 were completed.

Objective 3 was not met due to weather precluding the SEPA RV *Sir John Murray* from sailing. Provision has been made to obtain these samples on 15 November.

Objective 6 was not met due to weather but provision has been made for this work to be undertaken at a later date.

No 0-group cod, haddock or whiting were found and therefore objective 9 was not achieved.

From 16 bottom trawls, over 350 fish were processed for biological effects measurements and chemical analyses. Sediments were sampled from 37 locations for physico-chemical analyses; 10 sediments were sieved for epibenthos analysis.

During the cruise, the opportunity was taken to produce material for a Laboratory Reference Material (LRM) and a proposed EROD ring-test. Ten plaice were exposed to an inducing agent and sacrificed at 3 time intervals. Over 120ml of protein supernatant was produced.

All the main objectives were successfully completed thanks to the excellent co-operation of the officers and crew of *Clupea* and the scientific staff.

A McIntosh SIC
20 December 2007

Seen in draft
A Nicol OIC *Clupea*

Supplementary: On 15 November, 3 staff joined the SEPA RV *Sir John Murray* and successfully sampled the required number of flounder from Bowling in the upper Clyde.

Table 1

| <div> <div>Samples taken</div> <div>Sampling areas</div> </div> | EROD | Protein | Bile (PAH metabolites) | Plasma (Vtg) ⁽¹⁾ | Liver for PAH; CB; PBDE ; metals | Flesh for PAH; CB; PBDE ; metals | Liver for Glasgow Caledonia University | Sediments ⁽²⁾ for PAH; CB; PBDE; metals | CSEMP fish ⁽³⁾ | CSEMP Sediments and Water ⁽⁴⁾ |
|---|------|---------|------------------------|-----------------------------|--------------------------------------|--------------------------------------|--|--|---------------------------|--|
| Firth of Clyde Pladda | 25 | 25 | 25 | 10 | 5 pools 5 fish | 5 pools 5 fish | 20 male 10 female | - | 25 | 5 |
| Solway Firth | 25 | 25 | 25 | 10 | 5 pools 5 fish | 5 pools 5 fish | 20 male | 3 ⁽⁵⁾ | 25 | 2 ⁽⁵⁾ |
| Garroch Head | 20 | 20 | 20 | 10 | 4 pools 4 fish | 4 pools 4 fish | 10 male | 3 | - | - |
| Colonsay | 20 | 20 | 20 | 10 | 4 pools 4 fish | 4 pools 4 fish | 20 male | 3 | - | - |
| Irvine Bay | 20 | 20 | 20 | 10 | 4 pools 4 fish | 4 pools 4 fish | - | 3 | - | - |
| Hunterston | 20 | 20 | 20 | 10 | 4 pools 4 fish | 4 pools 4 fish | - | 3 | - | - |
| Skelmorlie | 20 | 20 | 20 | 10 | 4 pools 4 fish | 4 pools 4 fish | - | 3 | - | - |
| Cloch Point | 20 | 20 | 20 | 10 | 4 pools 4 fish | 4 pools 4 fish | 20 male | 3 | - | - |
| Broad Bay | 25 | 25 | 25 | 10 | 5 pools 5 fish | 5 pools 5 fish | - | 3 | 25 | - |
| St Andrews Bay | 25 | 25 | 25 | 10 | 5 pools 5 fish | 5 pools 5 fish | - | 3 | - | - |
| Firth of Forth Blackness | 7 | 7 | 7 | 5 | 1 pool 5 fish 1 pool 2 fish | 1 pool 5 fish 1 pool 2 fish | - | 3 | - | - |
| Upper Clyde Bowling | 25 | - | 25 | 10 | 5 pools 5 fish | 5 pools 5 fish | - | - | - | - |

1 Male fish only

2 Sediments sampled from start, mid and end of trawl track

3 CSEMP biological effects and chemistry requirements

- 4 Sediments - (1mm sieved) for epibenthos; organic, inorganic and physical chemistry
Water - CTD 5m from surface and 5m from bottom; nutrient chemistry
- 5 CSEMP requirements taken from 3 points on the trawl track; only 2 CSEMP sites
sampled