R1/6

Not to be cited without prior reference to the Freshwater Fisheries Laboratory, Aberdeen

FRV *Clupea*

Cruise 0898C

REPORT

14-25 May 1998

Ports

Loading: Fraserburgh
Unloading: Fraserburgh

Fishing Gear: PT163 (Large Pallets + 3 m^2 doors), Mini Methot Net

Personnel

R G J Shelton
A MacDonald
G Slesser
I S McLaren
I Simpson

Objectives

1. To improve our understanding of the ecology of post-smolt and pre-adult salmonid fishes in Scottish inshore waters.

2. To study the feeding ecology and circadian behaviour of juvenile salmonid fishes early in their marine life.

3. To obtain sea louse samples from the salmonid catch.

4. To undertake hydrographic and planktonic observations in the salmonid survey areas.

5. To make fish behaviour observations in a deck mounted tank.

Out-turn days per project: SFO10-12

Narrative

Clupea sailed from Fraserburgh at 1430, 14 May 1998 and proceeded to the Rosehearty Shoals. The PT 163 pelagic trawl was rigged to fish at the surface and a series of trials was undertaken to check the adequacy of wing end and head rope flotation and to select the most suitable warp length. The gear trials were completed successfully at 1745 when course was set for the Cromarty Firth.

Experimental fishing for post smolts began at 0900, 15 May 1998 in the outer basin of the Cromarty Firth and was extended to the NE by a line of three hauls between Tarbat Ness and

Burghead and a single station immediately to the east of the outer basin. *Clupea* then returned to the outer basin and completed three further hauls along the full length of the basin. The first two hauls were undertaken in darkness and the third at dawn. *Clupea* then proceeded to Invergordon where she docked later on the morning of 16 May 1998.

After leaving Invergordon on 17 May 1998, fishing was resumed at 1400 in the outer basin of the Cromarty Firth and at the south eastern end of a line of eight stations extending from the Moray coast to the Ord of Caithness. This line was completed during the evening of 18 May 1998. After an inshore haul off Dunbeath early on the morning of 19 May 1998, a new line of 10 stations was begun. The line began inshore off Clyth Ness and extended SE to Troup Head. This line was completed on 20 May 1998 after which *Clupea* steamed south to begin a new line of 10 stations ESE of Montrose. Fishing began early on the morning of 21 May 1998. The line was completed early in the afternoon of 22 May 1998 after which *Clupea* steered NNE to a position some 50 miles east of Montrose where a single haul was made. *Clupea* then proceeded a further 20 miles NNE to begin a line of 10 stations extending from *ca* 50 nm east of Findon Ness to Cruden Bay. The last station of this line was completed on the morning of 24 May 1998. *Clupea* docked at Fraserburgh in the early afternoon of the same day.

Results

1. Post-smolt Salmonid Ecology

The salmonid catch comprised 173 post-smolt salmon, eight post-smolt sea trout and two adult sea trout. One of the latter had some of the characteristics of a trout/salmon hybrid and has been submitted for genetic analysis.

Charts and a table showing the distribution of the post-smolt salmon catch were appended. Results were patchy and there was no apparent correlation between post-smolt distribution and temperature/salinity parameters. Apart from the hauls in the Cromarty Firth, where young sprats were the main bycatch, 0, and to a much lesser extent, one group sandeels were the main by-catch species caught in the net meshes. Successful post smolt hauls tended to be associated with intermediate sandeel densities (see table). No post smolt was caught at the highest sandeel densities observed, perhaps because shoaling post smolts prefer to remain in visual contact with one another.

Unlike the salmon post-smolts, which were patchily present up to 50 miles offshore, the juvenile and adult sea trout were all caught inshore.

2. Feeding Ecology and Circadian Behaviour

The guts of the salmon post smolts caught within the outer basin of the Cromarty Firth appeared to contain few food organisms. The gut samples from post smolts taken in the inner and outer Moray Firth and in waters to the east of Scotland appeared to be well-filled with 0 group sandeels.

There were limited opportunities to fish for post smolts in darkness and therefore to test the hypothesis that these fish drop down from the surface at night. However, three hauls in darkness/dawn in the Cromarty Firth yielded three 10 and one post-smolts, in contrast with the full daylight haul over the same track when 79 were caught.

3. Sea Louse Sampling

No sea louse was seen on any of the juvenile salmonids sampled. A closer examination will be undertaken in the laboratory.

4. Hydrographic and Planktonic Observations

The thermo-salino-graph was run continuously and the results charted. Sampling with the mini Methot net was abandoned after trial hauls yielded unacceptably large number of *Aurelia aurita.*

5. Post-smolt Behaviour

The condition of the post-smolts varied from "strong-alive" fully scaled specimens to well-rubbed dead ones. The best material was obtained from the first haul in the Cromarty Firth when 79 post-smolts were transferred to the deck-mounted tank. Most swam vigorously and were recorded on video. There was no clear evidence for fish orientating on one another.

Acknowledgement

The pelagic trawl survey completed considerably exceeded that envisaged by the cruise programme. Although good weather and the abandonment of the Methot net survey helped, the principal reasons for the success of the survey were the high professional standards and cooperative approach of Skipper Andrew Simpson and his crew.

R G J Shelton
4 June 1998

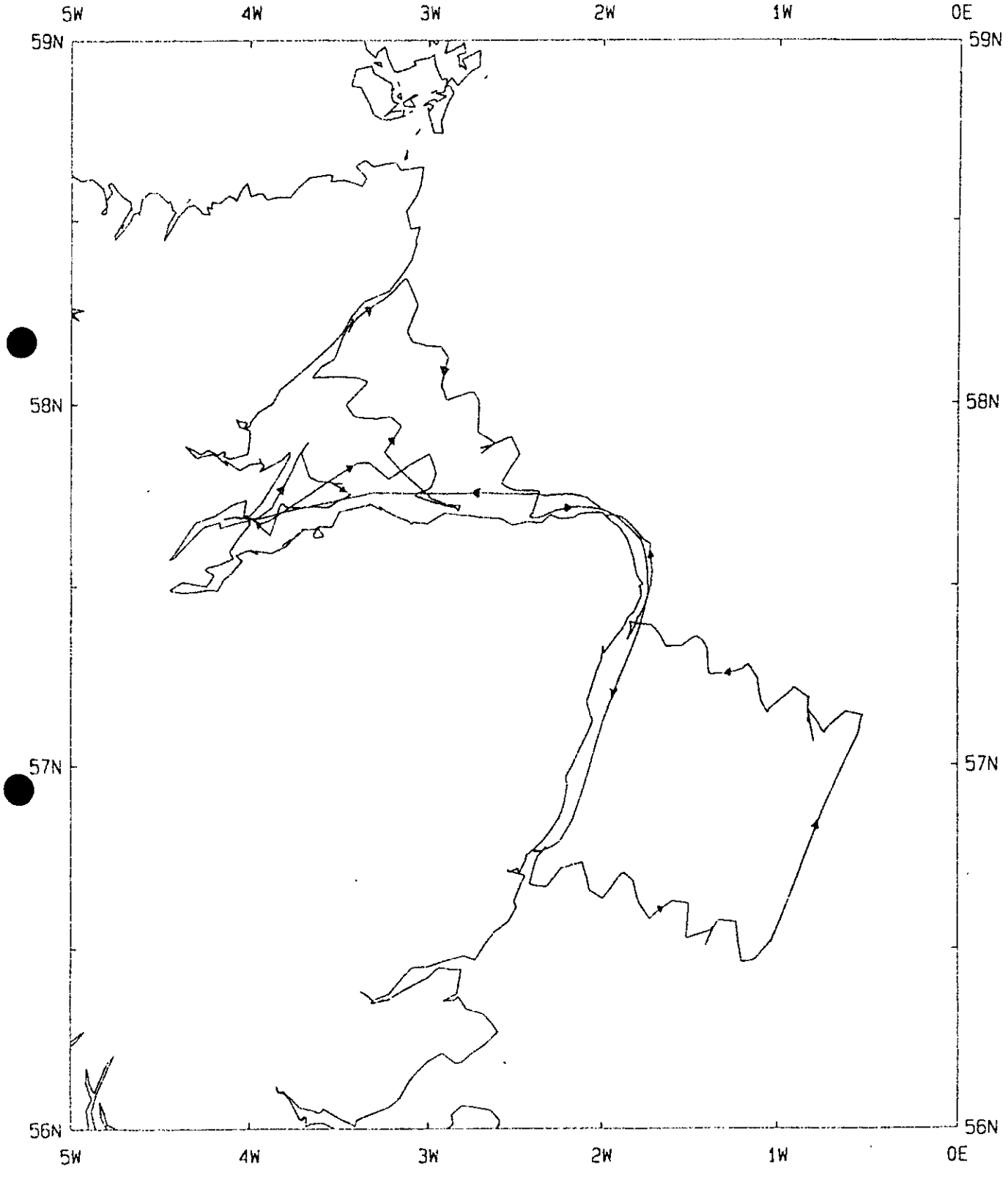
Seen in draft: A Simpson, OIC

Salmon Smolt Survey : 14-25 May, 1998

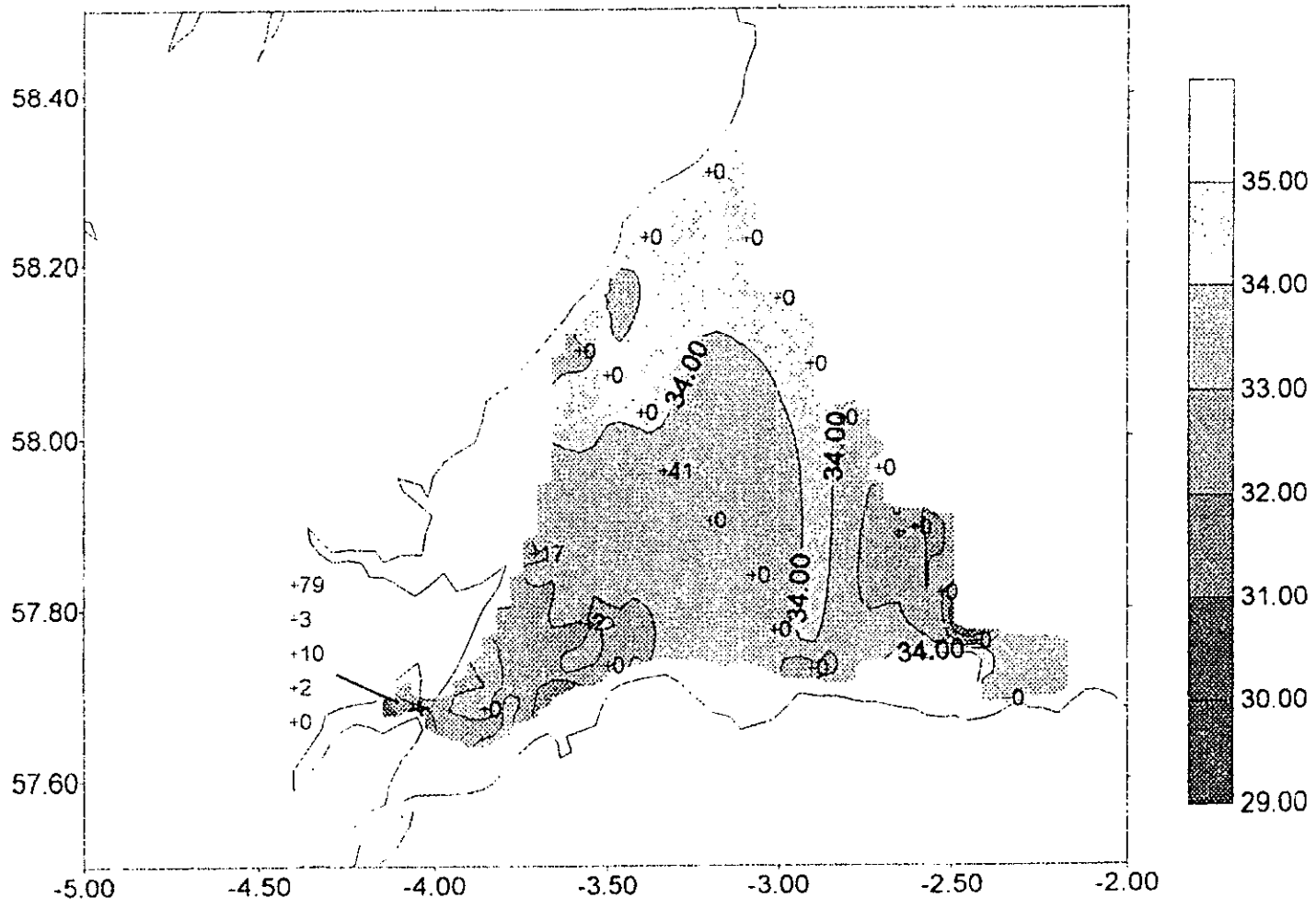
Haul	Date	Time GMT	Position	Time GMT	Position	Smolts	Sandeel "Density"
C30	15/5/98	0800	57 41.37'N 04 02.87'W	0839	57 40.67'N 03 58.16'W	79	0
C31		1200	57 50.19'N 03 44.75'W	1302	57 53.30'N 03 40.96'W	17	1
C32		1426	57 47.22'N 03 37.62'W	1527	57 46.82'N 03 30.04'W	2	2
C33		1700	57 44.71'N 03 27.14'W	1800	57 43.22'N 03 32.72'W	0	2
C34		1931	57 42.98'N 03 50.16'W	2031	57 39.04'N 03 52.70'W	0	2
C35		2200	57 41.36'N 04 02.98'W	2255	57 40.63'N 03 57.96'W	3	0
C36	16/5/98	0000	57 41.34'N 04 02.93'W	0053	57 40.61'N 03 57.62'W	10	0
C37		0322	57 40.75'N 03 58.53'W	0417	57 41.42'N 04 02.89'W	2	1
C38	17/5/98	1300	57 41.35'N 04 03.58'W	1352	57 40.58'N 03 57.87'W	0	0
C39		1718	57 49.06'N 03 07.72'W	1821	57 51.40'N 03 00.64'W	0	2
C40		1911	57 47.70'N 02 57.85'W	2011	57 45.25'N 03 03.60'W	0	2
C41	18/5/98	0736	57 43.25'N 02 50.39'W	0838	57 44.24'N 02 58.11'W	0	2
C42		1015	57 52.55'N 03 14.02'W	1115	57 55.70'N 03 09.77'W	0	1
C43		1206	57 57.58'N 03 15.88'W	1306	57 57.73'N 03 23.91'W	41	2
C44		1346	58 00.34'N 03 26.70'W	1447	57 03.11'N 03 21.12'W	0	2
C45		1527	58 04.25'N 03 25.12'W	1627	58 04.34'N 03 33.86'W	0	3
C46		1708	58 04.76'N 03 38.01'W	1808	58 07.15'N 03 32.07'W	0	1
C47	19/5/98	0743	58 12.33'N 03 26.31'W	0844	58 15.38'N 03 20.24'W	0	1
C48		0915	58 16.99'N 03 15.26'W	1016	58 20.07'N 03 08.86'W	0	2
C49		1123	58 15.46'N 03 04.13'W	1223	58 12.16'N 03 06.99'W	0	1
C50		1311	58 09.88'N 03 03.96'W	1412	58 09.30'N 02 56.66'W	0	1
C51		1446	58 06.83'N 02 53.61'W	1546	58 03.08'N 02 55.42'W	0	1
C52		1652	58 00.75'N 02 52.59'W	1752	58 01.82'N 02 45.73'W	0	2
C53		1833	57 59.62'N 02 42.42'W	1933	57 55.76'N 02 42.72'W	0	2
C54	20/5/98	0728	57 52.86'N 02 40.23'W	0829	57 54.34'N 02 32.29'W	0	2
C55		0919	57 50.72'N 02 29.57'W	1019	57 47.37'N 02 34.06'W	0	2
C56		1102	57 45.65'N 02 29.78'W	1202	57 45.56'N 02 22.32'W	0	1
C57		1252	57 41.14'N 02 23.51'W	1353	57 42.13'N 02 16.91'W	0	0
C58	21/5/98	0750	57 45.87'N 02 20.44'W	0851	56 41.50'N 02 24.24'W	0	2
C59		0938	57 40.75'N 02.18.05'W	1038	56 43.07'N 02 14.25'W	0	1
C60		1138	56 43.31'N 02 06.12'W	1238	56 39.99'N 02 04.34'W	0	2
C61		1326	56 38.95'N 01 58.46'W	1425	56 40.25'N 01 53.15'W	0	2
C62		1506	56 40.54'N 01 48.84'W	1606	56 37.62'N 01 47.29'W	1	2
C63		1657	56 35.64'N 01 41.97'W	1801	56 37.84'N 01 35.51'W	16	1
C64		1845	56 36.68'N 01 30.23'W	1945	56 32.39'N 01 30.91'W	0	1
C65	22/5/98	0719	56 31.24'N 01 23.64'W	0821	56 34.41'N 01 20.48'W	1	1
C66		0914	56 33.52'N 01 13.71'W	1015	56 28.52'N 01 12.35'W	0	1
C67		1056	56 28.46'N 01 07.10'W	1157	56 30.96'N 01 02.73'W	0	1
C68		1403	56 46.72'N 00 49.52'W	1503	56 50.82'N 00 46.34'W	0	0
C69		1641	57 04.24'N 00 33.20'W	1741	56 07.68'N 00 31.81'W	1	1
C70		1828	57 08.35'N 00 38.11'W	1929	57 05.84'N 00 43.70'W	0	2
C71	23/5/98	0720	57 07.75'N 00 49.76'W	0820	57 11.13'N 00 49.79'W	0	2
C72		0917	57 12.25'N 00 55.78'W	1017	57 09.38'N 01 02.62'W	0	2
C73		1101	57 11.24'N 01 05.80'W	1201	57 13.99'N 01 06.74'W	0	3
C74		1307	57 15.81'N 01 12.75'W	1407	57 15.17'N 01 20.86'W	0	3
C75		1438	57 15.95'N 01 23.50'W	1538	57 19.74'N 01 25.44'W	0	3
C76		1634	57 21.26'N 01 28.28'W	1734	57 19.80'N 01 33.12'W	0	3
C77		1816	57 20.44'N 01 38.74'W	1916	57 23.45'N 01 43.17'W	0	2
C78	24/5/98	0701	57 21.60'N 01 50.37'W	0802	57 24.81'N 01 47.64'W	0	3

FRV Clupea : 14-25th May 1998

Cruise Track



FRV Clupea Cruise 8 1998 - Salinity,No.Smolts



FRV Clupea Cruise 8 1998 - Salinity,No. Smolts