

R1/6

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FRV *Clupea*

Cruise 0103C

REPORT

6-25 January 2003

Personnel

Part 1

E Hatfield SIC (6-15 January)
P Copland
J Mills
J Drewery
J Donald

Part 2

J Kinnear SIC (16-25 January)
J Drewery
J Martin
S Wear
J Donald

Out-turn days per project: 20 days, MFO1T

Sampling Gear and Equipment

Modified PT154 with 6 mm codend
BT158 demersal trawl with 10 mm codend
2.8 m beam trawl with spare beam
Scanmar (Height and spread units)
2 Day grabs
Simrad EK500 /RoxAnn
CTD

Objectives

Part 1

1. To carry out detailed acoustic surveys in selected lochs, and the Sound of Sleat, using the EK 500 and RoxAnn to determine the distribution of herring and sprat. Concentrations of pelagic fish will be sampled using the PT154. Species composition and length-frequency distributions of the fish caught will be determined. Sub-samples will be weighed and otolithed to establish length-weight relationships and age structure. Herring samples will be analysed for sex, maturity and *Ichthyophonus* infection. Stomachs, DNA samples and photographs will also be taken from selected samples for the EU projects AQCESS, HERGEN and WESTHER.

Part 2

2. To carry out demersal trawls in each of the sea lochs to determine the abundance, distribution and variation of fish species and any epibenthic mega-fauna using the BT158 trawls and the 2.8 m beam trawl where appropriate. At each trawl station the length-frequency of all species will be taken and sub-samples of the major commercial species will be weighed and otolithed. Stomach contents will be removed from selected species for trophic studies.
3. Five grab samples will be taken before trawling, at each of the demersal trawl stations. A CTD will also be done at both pelagic and demersal trawl positions.

Narrative

Part 1

Clupea sailed from Fraserburgh on 6 January 2003, arriving in Kyle the following day where the scientific staff joined the ship. *Clupea* steamed to anchor in Balmacara Bay where the acoustics system was calibrated prior to the start of the survey. Acoustic transecting and pelagic trawling began the next day in Loch Nevis. A problem with the 38 kHz transducer required re-calibration for that transducer. This was carried out on the evening of 8 January 2003. Acoustic transecting and pelagic trawling was resumed the next day and carried out in Lochs Hourn, Duich and Kishorn. CTDs were carried out for each pelagic trawl haul. Work was limited to acoustic transecting in Lochs Alsh and Duich on 14 January 2003 due to increasingly inclement weather. 15 January 2003 was lost to work due to severe weather conditions and *Clupea* remained alongside at Kyle. Scientific staff changed over on 16 January 2003.

Part 2

The change over of scientific staff and fishing gear took place at Kyle on 16 January. Due to severe weather conditions *Clupea* did not start work until the following day when she steamed to Loch Kishorn to begin the survey. Weather conditions continued to hamper work and trawling was only possible in the outer loch. *Clupea* then proceeded to Loch Duich where the designated grabs and one trawl were completed before poor light conditions prevented further work due to the difficulty in seeing creel floats. *Clupea* returned to Kyle for the night. The following morning *Clupea* returned to Loch Duich to complete the trawling and to lift a mooring for the sonar team, before steaming to Loch Hourn where grabbing continued until dusk. Demersal trawling, beam trawling and CTDs were completed the next day in Loch Hourn. *Clupea* then steamed to Loch Nevis where the sequence of mud grabs, trawling and CTDs were repeated. Exploratory trawling was also carried out on suitable ground of Armadale on the south-east side of Skye, before returning to Loch Nevis and Loch Hourn on 21 January where a series of repeat trawls were carried out in each loch to reinforce the data already collected. An exploratory haul was also carried out on hard ground in Loch Alsh. The next day trawling and grabbing were completed in Loch Kishorn and additional repeat trawls were carried out in Loch Duich. On 23 January exploratory beam trawling was carried out in Loch Alsh, poor weather preventing fishing elsewhere. With all the work completed *Clupea* finished at Kyle on the afternoon of 23 January where scientific staff disembarked and the ship proceeded to Fraserburgh.

Results

Part 1

Nine pelagic tows were completed during the trip and sampling undertaken according to protocol. A problem with one of the signal processing boards meant that two acoustic frequencies (38 and 120 kHz) were used during this trip, as opposed to the usual three (38, 120 and 200). However, 38 and 120 kHz are the more commonly examined in analysis and post-processing. CTDs were taken at the centre point of each pelagic tow. Extra sampling was completed in three lochs for the EU projects HERGEN and WESTHER.

Part 2

Seventeen demersal and eight beam trawls were completed during the trip and sampling undertaken according to the protocol. Forty grab samples were taken and sieved through 2 mm and 1 mm mesh, the samples being retained for later identification. Mud samples were also taken at each grab station for particle analysis. CTD and water samples were taken routinely at each trawl station. Positions for the pelagic tows (part 1) and demersal tows (part 2) are detailed in the attached table. A detailed species list has also been drawn up for each loch. Analysis of the samples is underway and will be reported at a later date as part of the AQCESS project.

E Hatfield/J Kinnear
23 April 2003

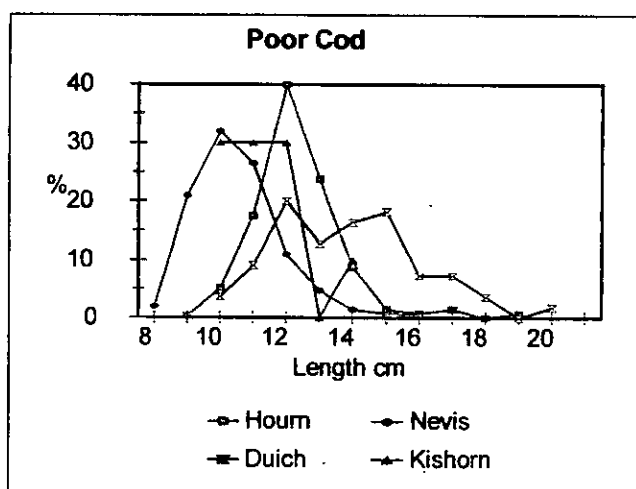
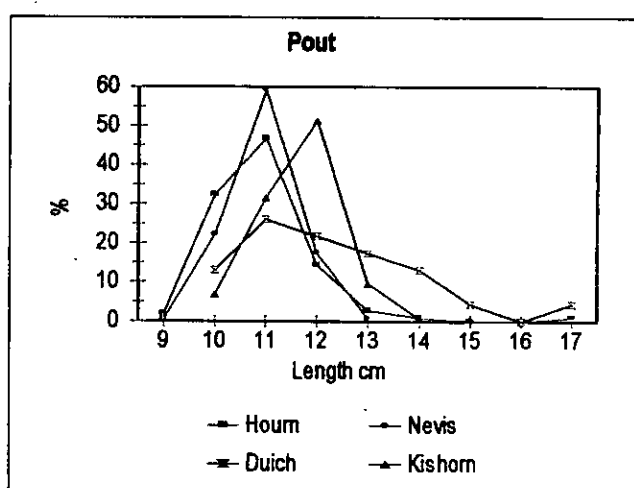
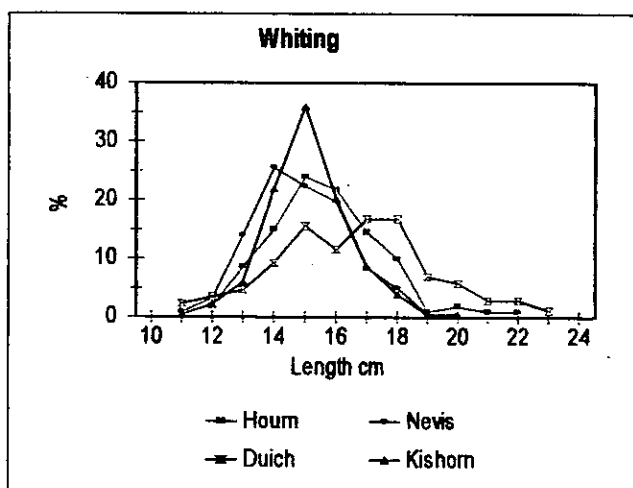
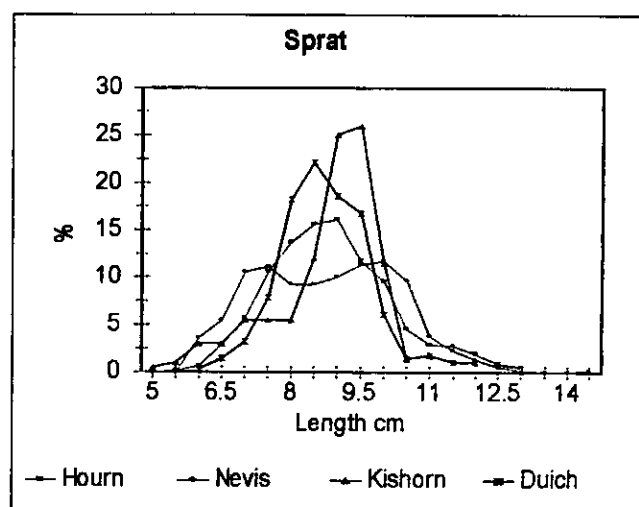
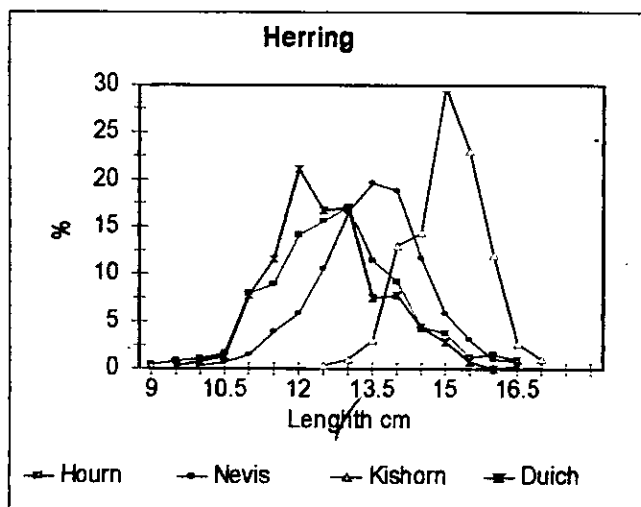


Table 1 Length composition of the major fish species by loch

Generalised Species List

Species	Loch Hourn	Loch Nevis	Loch Kishorn	Loch Duich
Fish				
Herring (<i>Clupea harengus</i>)	*	*	*	*
Sprat (<i>Sprattus sprattus</i>)	*	*	*	*
Whiting (<i>Merlangius merlangus</i>)	*	*	*	*
Haddock (<i>Melanogrammus aeglefinus</i>)	*	*	*	*
Norway Pout (<i>Trisopterus esmarki</i>)	*	*	*	*
Silvery Pout (<i>Gadiculus argenteus</i>)	*			
Poor Cod (<i>Trisopterus minutus</i>)	*	*	*	*
Cod (<i>Gadus morhua</i>)	*			*
Hake (<i>Merluccius merluccius</i>)	*	*		
Pearlside (<i>Maurolicus muelleri</i>)	*	*	*	*
Argentine (<i>Argentina sphyraena</i>)		*		
Saithe (<i>Pollachius virens</i>)		*		
Common Dab (<i>Limanda limanda</i>)	*	*	*	*
Long Rough Dab (<i>Hippoglossoides platessoides</i>)	*	*		*
Plaice (<i>Pleuronectes platessa</i>)	*	*		*
Dover Sole (<i>Solea solea</i>)				*
Lemon Sole (<i>Microstomus kitt</i>)	*			*
Thickback Sole (<i>Microchirus variegatus</i>)	*	*		
Solenette (<i>Buglossidium luteum</i>)	*			
Witch (<i>Glyptocephalus cynoglossus</i>)	*	*		*
Topknot (<i>Zeugopterus punctatus</i>)	*			
Brill (<i>Scophthalmus rhombus</i>)		*		
Flounder (<i>Platichthys flesus</i>)		*		
Scad / Horse Mackerel (<i>Trachurus trachurus</i>)	*			
Blue Whiting (<i>Micromesistius poutassou</i>)	*		*	*
Sandeel (<i>Ammodytes tobianus</i>)	*			
Butterfish (<i>Pholis gunnellus</i>)	*			
Sand Goby (<i>Pomatoschistus minutus</i>)		*		*
Common Goby (<i>Pomatoschistus microps</i>)		*		
John Dory (<i>Zeus faber</i>)	*	*		*
Grey Gurnard (<i>Eutrigla gurnardus</i>)	*	*	*	*
Dragonet (<i>Callionymus lyra</i>)	*	*		*
Spotted Dragonet (<i>Callionymus maculatus</i>)				*
Bull Rout (<i>Myoxocephalus scorpius</i>)	*			
Rock Cook (<i>Centrolabrus exoletus</i>)	*			
Five-bearded Rockling (<i>Ciliata mustela</i>)	*			
Great Pipefish (<i>Syngnathus acus</i>)	*			
Grey Skate (<i>Raja batis</i>)				*
Thornback Ray (<i>Raja clavata</i>)	*	*		*
Lesser Spotted Dogfish (<i>Scyliorhinus canicula</i>)	*	*		*
Spurdog (<i>Squalus acanthias</i>)	*		*	

Species	Loch Houm	Loch Nevis	Loch Kishom	Loch Duich
Crustaceans				
Nephrops (<i>Nephrops norvegicus</i>)	*	*	*	*
Euphausiids	*	*	*	*
<i>Pasiphea</i> spp.	*			*
<i>Calocaris macandreae</i>	*	*		*
Shrimp (<i>Dichelopandalus bonnierii</i>)				*
Common shrimp (<i>Crangon crangon</i>)				
Common prawn (<i>Palaeomon serratus</i>)	*	*		
Squatt lobster (<i>Munida rugosa</i>)	*	*		*
Squatt lobster (<i>Galathea dispersa</i>)	*	*		*
Green crab (<i>Carcinus maenas</i>)	*			*
Brown crab (<i>Cancer pagurus</i>)	*	*		*
Velvet crab (<i>Necora puber</i>)	*			
Harbour crab (<i>Liocarcinus depurator</i>)	*	*		
Harbour crab (<i>Liocarcinus holastus</i>)				*
Wrinkled swimming crab (<i>Liocarcinus corrugatus</i>)	*			*
Hermit crab (<i>Pagurus bernhardus</i>)	*			
Porcelain crab (<i>Psidia longicornis</i>)	*			
Spider crab (<i>Hias coractus</i>)	*			
Long-legged spider crab (<i>Macropodia rostrata</i>)	*	*		
Great spider crab (<i>Hias araneus</i>)	*			*
Scorpion spider crab (<i>Inachus dorsettensis</i>)				
Echinoderms				
Common starfish (<i>Asteria rubens</i>)	*			*
Brittle star (<i>Ophiura ophiura</i>)	*			*
Brittle star (<i>Ophiura robusta</i>)	*			*
Brittle star (<i>Asteronyx loveni</i>)	*			*
Brittle star (<i>Amphiura brachiata</i>)	*			*
Brittle star (<i>Ophiocomina nigra</i>)	*			*
Sun star (<i>Crossaster papposus</i>)	*	*		*
Cushion star (<i>Asterina gibbosa</i>)	*			*
Flattened cushion star (<i>Anseropoda placenta</i>)	*			*
Sea urchin (<i>Echinus esculentus</i>)	*			*
Sea potatoe (<i>Echinocardium cordatum</i>)	*			*
Sea potatoe (<i>Brissopsis lyrifera</i>)	*	*		*
Bivalves and Molluscs				
Icelandic cyprine (<i>Arctica islandica</i>)	*	*		*
Queen scallop (<i>Aequipecten opercularis</i>)	*	*		*
Great scallop (<i>Pecten maximus</i>)		*		
Blue rayed limpet (<i>Helcion pellucidum</i>)	*			
Hunch-back scallop (<i>Chlamys distorta</i>)	*			
Cowrie (<i>Trivia monacha</i>)	*			*
Red whelk (<i>Neptunea antiqua</i>)	*	*		
Squid (<i>Todaropsis oblanae</i>)	*			
Squid (<i>Alloteuthis subulata</i>)	*			*
Curled octopus (<i>Eledone cirrhosa</i>)		*		*
Cuttlefish (<i>Rossia macrosoma</i>)				
Other invertebrates				
Sea pen (<i>Funiculina quadrangularis</i>)	*	*		
Sea mouse (<i>Aphroditidae aculeata</i>)				*
Tube anemone (<i>Cerianthus lloydii</i>)	*			*
Mud anemone	*			
Ascidians (2 species)	*			*
Sabellid worms	*			
Ragworms	*			*
Sipunculid worms				*

Trawl Positions

AREA	DATE	HAUL	TIME	DURATION	POSITION		
Loch Nevis	8-Jan-03	PT01	14:39		SHOOT	HAUL	
			15:00	0:21	56.98883	-5.677333	56.99817 -5.69067
Loch Nevis	8-Jan-03	PT02	15:46				
			16:17	0:31	56.99117	-5.6745	57.01 -5.69067
Loch Nevis	9-Jan-03	PT03	15:10				
			15:27	0:17	56.98817	-5.6745	56.99517 -5.6905
Loch Hourm	10-Jan-03	PT04	15:56				
			16:05	0:09	57.12283	-5.596167	57.12383 -5.608
Loch Hourm	11-Jan-03	PT05	11:03				
			11:25	0:22	57.12483	-5.603	57.12883 -5.62667
Loch Hourm	11-Jan-03	PT06	15:08				
			16:04	0:56	57.12983	-5.570167	57.13183 -5.635
Loch Duich	12-Jan-03	PT07	12:12				
			12:24	0:12	57.22517	-5.435	57.22667 26.82
Loch Duich	12-Jan-03	PT08	13:07				
			13:31	0:24	57.22783	-5.442167	57.23867 -5.46517
Loch Kishom	13-Jan-03	PT09	13:30				
			14:13	0:43	57.3285	-5.723667	57.35133 -5.69883
Kishom	17-Jan-03	DT1	11:15				
			11:30	0:15	57.32583	-5.737667	57.31467 -5.75417
Duich	17-Jan-03	DT2	15:25				
			15:40	0:15	57.2295	-5.452167	57.23867 -5.47083
Duich	18-Jan-03	DT3	9:00				
			9:15	0:15	57.24067	-5.469667	57.2515 -5.48767
Hourm	19-Jan-03	DT4	10:20				
			10:35	0:15	57.12217	-5.610333	57.12933 -5.58517
Hourm	19-Jan-03	DT5	12:10				
			12:25	0:15	57.12533	-5.6135	57.12917 -5.62883
Nevis	20-Jan-03	DT6	10:15				
			10:30	0:15	57.01617	-5.69	57.00017 -5.67767
Nevis	20-Jan-03	DT7	12:25				
			12:40	0:15	57.00417	-5.704833	56.99267 -5.68733
Armadaile	20-Jan-03	DT8	14:45				
			15:20	0:35	57.09517	-5.848833	57.07267 -5.876
Nevis	21-Jan-03	RDT6	8:55				
			9:10	0:15	57.01633	-5.69	57.00267 -5.68083
Nevis	21-Jan-03	RDT7	9:40				
			9:55	0:15	56.99217	-5.688833	57.00267 -5.70517
Hourm	21-Jan-03	RDT5	12:20				
			12:35	0:15	57.13133	-5.631833	57.125 -5.6045
Hourm	21-Jan-03	RDT4	13:15				
			13:30	0:15	57.129	-5.589667	57.13 -5.61533
Alsh	21-Jan-03	DT9	15:15				
			15:30	0:15	57.26617	-5.6025	57.2705 -5.63
Kishom	22-Jan-03	DT10	9:40				
			9:55	0:15	57.3755	-5.662167	57.36867 -5.36867
Kishom	22-Jan-03	RDT1	12:10				
			12:25	0:15	57.32833	-5.735667	57.31767 -5.75533
Duich	22-Jan-03	RDT2	16:10				
			16:25	0:15	57.22833	-5.450333	57.23933 -5.47317
Duich	22-Jan-03	RDT3	14:30				
			14:45	0:15	57.25017	-5.486667	57.26017 -5.50517
Duich	18-Jan-03	BM1	10:45				
			11:00	0:15	57.22933	-5.452333	57.23733 -5.43833
Duich	18-Jan-03	BM2	12:15				
			12:30	0:15	57.239	-5.467	57.25 -5.486
Hourm	19-Jan-03	BM3	8:50				
			9:05	0:15	57.12783	-5.6225	57.12367 -5.6005
Hourm	19-Jan-03	BM4	9:30				
			9:45	0:15	57.123	-5.591333	57.13183 -5.61883
Nevis	20-Jan-03	BM5	8:50				
			9:05	0:15	56.995	-5.6945	57.00667 -5.70833
Nevis	20-Jan-03	BM6	9:30				
			9:45	0:15	57.00467	-5.684667	57.0155 -5.702

PT - Pelagic
D - Demersal
BM - Beam