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FRV *CLUPEA*

Cruise 0192C

REPORT

8-15 January 1992

Personnel

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Objectives

To carry out an echo-integrator survey to determine the biomass and distribution of clupeid shoals in the Moray Firth and to determine species and size composition of clupeids through trawl sampling. To assess fish predator numbers through demersal trawl sampling and to collect stomach samples for dietary analysis. To determine the numbers and distribution of mammalian and avian predators using transect census methods.

Narrative

The scientific equipment was loaded onto *Clupea* on 7 January. Scientific staff joined the ship on the morning of 8 January at Fraserburgh. The ship sailed at 1100 and steamed around the Buchan coast. *Clupea* reached longitude 02°30' W off the Moray coast at 1400. The towed transducer body was put over the side and acoustic and top-predator survey work was started while the ship continued towards the Cromarty Firth. An acoustic survey of the Inner Moray Firth region and inner firths was carried out between the hours of 0700 and 1700 over the next four days; the survey track is shown in Figure 1. At night *Clupea* anchored either in the Cromarty Firth or off the southern shore of the Dornoch Firth. Large pelagic shoals encountered were sampled using the shrimp/sprat trawl to determine species and size composition; haul positions are indicated in Figure 2. During daylight hours the density of seabirds, seals and cetaceans was assessed using standard survey methods: Figure 1 shows sections of the cruise track where top predator survey was undertaken. In addition to this formal survey, all casual sightings of seals and cetaceans were noted.

On the night of 12 January the shrimp/sprat net was replaced with the demersal rockhopper trawl. Over the next two days samples of demersal fish were taken at the same sites where pelagic fish samples had been taken. Stomach samples were taken from species which were potential predators of clupeids. When all the haul stations had been repeated *Clupea*

sailed for Fraserburgh where she berthed at 2200 on 14 January. The scientific equipment was unloaded on the morning of 15 January and the scientific staff finally left the ship at 1130.

Results

Pelagic fish traces were scarce throughout the area covered by the survey. The heaviest marks were observed off the Moray coast near Nairn, few fish traces were detected within the inner firths. Pelagic traces were sampled at the positions indicated in Figure 2. Length-weight relationships of:

$$\text{weight} = 0.003562 * \text{length}^{3.19271}$$

for herring and:

$$\text{weight} = 0.002533 * \text{length}^{3.39781}$$

for sprat were determined. The number of sprat and herring at length, total catch, total biomass, and percentage composition of sprat by both number and biomass in each haul is given in Table 1. These data, together with the integrator data, were used to estimate the biomass of herring and sprat in 5' latitude by 5' longitude rectangles. Total biomass estimates for the area surveyed were 9,627 tonnes of herring and 2,295 tonnes of sprat.

The number of auks, divers, shags and the two commonest sea duck species estimated for 5' latitude by 5' longitude rectangles showed no correlation with clupeid biomass. Only three cetaceans were seen throughout the entire cruise and 10 seals were observed at sea. Two-hundred and twenty-four seals were counted at White Ness Sands, just SE of Chanonry Point, at 0825 on 9 January.

1-group whiting were the major potential gadoid predator of sprats, and they were caught in moderate numbers at all the haul stations. 1-group saithe and cod were only caught in any significant number at the stations inside the Inverness Firth. Table 2 gives the number at length and total catch of cod, saithe and whiting at each of the haul stations. The acoustic survey data indicated a total gadoid biomass of 1,461 tonnes within the area surveyed. Stomach samples for dietary analysis have still to be worked up.

S P R Greenstreet
22 April 1992

TABLE 1

Numbers at length distribution of herring and sprat in pelagic trawl samples

Length	Haul 1 - 09 01 92 57°32.00'N 04°10.00'W		Haul 2 - 09 01 92 57°33.00'N 04°07.00'W		Haul 3 - 10 01 92 57°38.00'N 03°48.00'W		Haul 4 - 10 01 92 57°42.00'N 03°41.00'W		Haul 5 - 11 01 92 57°53.00'N 03°41.70'W		Haul 6 - 11 01 92 57°55.78'N 03°52.49'W		Haul 7 - 12 01 92 57°51.00'N 03°34.00'W	
	Herring	Sprat	Herring	Sprat	Herring	Sprat	Herring	Sprat	Herring	Sprat	Herring	Sprat	Herring	Sprat
4.0														4
4.5		1												
5.0		1												
5.5		2												
6.0		1												
6.5														
7.0							1	69						40
7.5							2	260						206
8.0	8		8				2	952						452
8.5	36		65		10		4	1333						626
9.0	11		59		31		1	762						293
9.5	5	15	37	1	41		2	242						48
10.0	4	33	16	1	428		1	87						16
10.5	1	21	5	1	761		1			1				8
11.0	4	7	4		741		8			6				
11.5	3	2	2		449		6						18	
12.0	1	2	2	2	313		4						46	
12.5				1	104		1						71	
13.0		1	3		83		1						101	
13.5					63								92	
14.0	1				31					1			51	
14.5					31								32	
15.0					10								12	
15.5													7	
16.0					21								2	
16.5														
17.0					10									
17.5														
18.0														
18.5			2		10									
19.0					10									
19.5					1									
20.0					1									
20.5					1									
Catch	74	86	206	6	3147	32	535	3705	8	1626			432	1693
% sprats		53.8		2.8		1.0		87.4		99.5				79.7
Biomass	318.9	569.7	1103.6	56.1	26318.3	252.3	7368.9	11118.2	67.0	3324.6			5226.5	4795.1
% sprats		64.1		4.8		0.9		60.1		98.0				47.8

TABLE 2

Numbers at length distributions of whiting, cod and saithe taken in demersal trawl samples

Length (cm)	Haul 8 - 13 01 92 57°51.00'N 03°34.60'W			Haul 9 - 13 01 92 57°51.90'N 03°40.41'W			Haul 10 - 13 01 92 57°54.19'N 03°51.09'W			Haul 11 - 14 01 92 57°42.39'N 03°39.51'W			Haul 12 - 14 01 92 57°38.43'N 03°48.62'W			Haul 13 - 14 01 92 57°32.00'N 04°10.00'W			Haul 14 - 14 01 92 57°33.00'N 04°07.00'W			
	Whiting	Cod	Saithe	Whiting	Cod	Saithe	Whiting	Cod	Saithe	Whiting	Cod	Saithe	Whiting	Cod	Saithe	Whiting	Cod	Saithe	Whiting	Cod	Saithe	
7																						
8	19						11										1					
9	44			37			63	1		33			115			24	6				1	
10	249			262			571			143			433			286	6					
11	318			315			846			252			853			775	10		4		2	
12	237			267			719			247			713			953	4		244			1
13	156			160			307			186			306			476	5		264			1
14	143			80	1		148			115			178			143	3		180	1		16
15	81			112			42			60			89			143	1		160			39
16	69			37			32			60			127			48	1	1	52			38
17	62			8						66			25			48			12			16
18	22			4						44			13			12			12			5
19	4			3						44			13			12			4			4
20										2									4			1
21				1						1												
22										2												
23														2								
24										1												
25	2																					
26	2									2												
27										1												
28																						
29																						
30																						
Total	1408			1286	1		2739	1		1259			2865	2		2920	37	1	984	4	121	

FIGURE 1. Survey Track, Moray Firth, January 1992.

Seabird Survey Track; Moray Firth; January 1992.

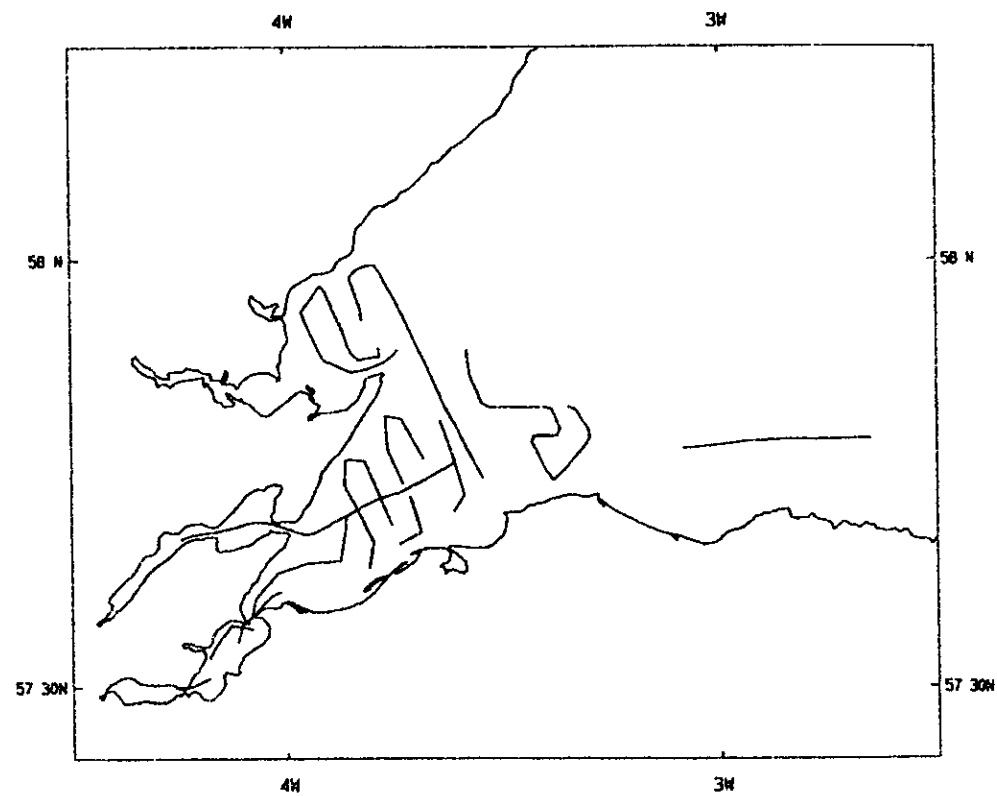
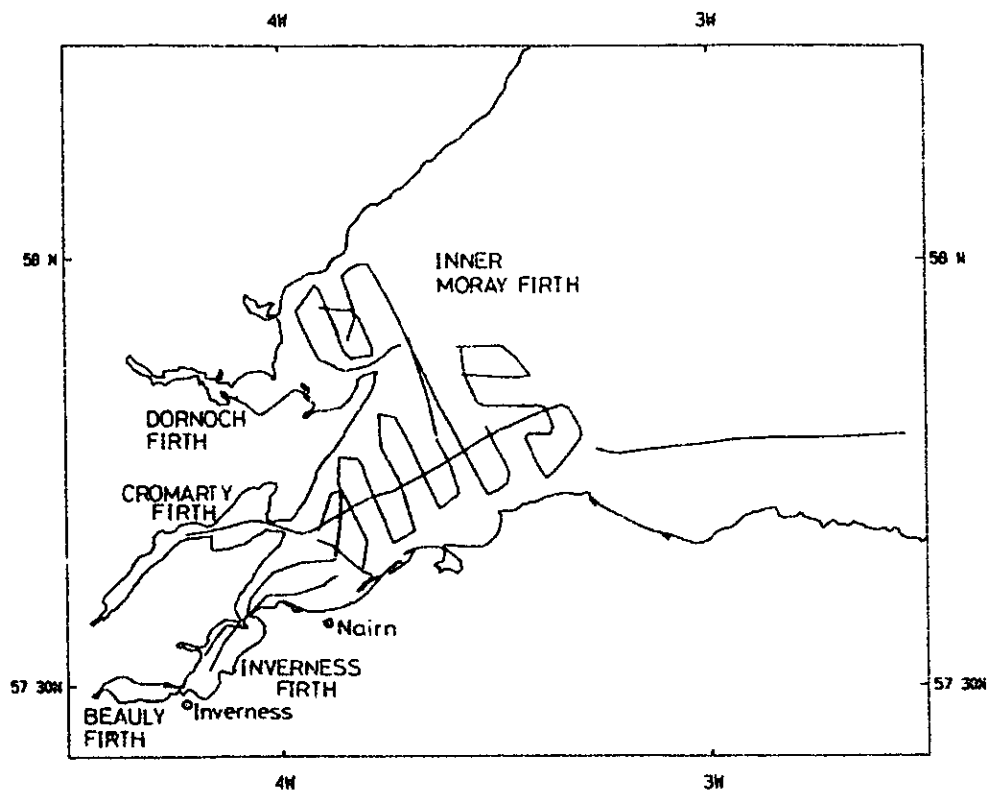


FIGURE 2. Haul positions in the Moray Firth, January 1992.

- O Pelagic hauls
- ◇ Demersal hauls

