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FRV *Scotia*

Cruise 1400S

REPORT

2-16 September 2000

Personnel

A W Newton	(In charge)
J R G Hislop	
C Shand	
I Tuck	
C J Davis	
T Blasdale	
F N Burns	
B Ward	
J D M Gordon	Visitor
P Crozier	Visitor
S Tallack	Visitor

Out turn days per project: MF01t, 14 days

Gear

Deep water trawl (BT 184) fitted with a 20 mm internal liner.

Objectives

1. To map the composition, distribution and abundance of shelf edge and slope species, including anglerfish and megrim.
2. To investigate the occurrence of *Nephrops* on the upper shelf slope using both the TV sledge and drop frame systems.

Area

From the edge of the continental shelf down to approximately 1,600 metres in an area of latitudes 55 and 59 North and between longitudes 7 and 10 West.

Narrative

Scotia sailed at 1300 hours on Saturday 2 September and initially tests were undertaken on a modified winch at a station off Aberdeen. On completion of the tests the contractor's engineer was landed at Aberdeen via pilot boat and *Scotia* proceeded towards the survey area. The vessel arrived on station at 1500 hours on 3 September and surveying began immediately. During the next three days fishing occurred as and when required although the seastate gradually worsened and eventually hindered the operation of the TV sledge. By Wednesday the weather forecast was predicting severe gales in the immediate area of operation and it was

decided to steam to the southern limit of the survey area in an attempt to continue operations in a more favourable climate. However, although the weather was an improvement on that in the area vacated, the vessel was still subjected to severe SW gales and 36 hours were lost whilst dodging. Work resumed as the weather improved and the trawling survey and TV work proceeded smoothly with *Scotia* gradually working northwards. The survey was completed at 0200 hours on 15 September at a position approximately 40 miles NW of the Butt of Lewis. The vessel steamed for Aberdeen; docking at 0600 hours on Saturday 16 September.

Results

Building on the base of a previous survey in 1998, 38 hauls were made with a Jackson deep water trawl fitted with an internal 20 mm liner. Wherever possible the fishing tows were of two hour duration and a number of depth ranges were selected. The shelf edge slope was surveyed from 55 N to 59 N with extra trawls being undertaken on the Hebridean Terrace where an international set of trawl data exists from 1975. The net was deployed to a maximum depth of 1,600 metres, the maximum allowed with the current length of warp carried on *Scotia*. There was surprising little damage to the fishing gear and a number of new fishing tows were added to the Laboratory's database. The average catch weight was 927 kg per haul although catches at 1,000 metres and greater and at stations south of 56 N tended to be above average. Table 1 provides a provisional list of the 122 species encountered during the survey (a small minority have still to be identified) and it can be seen that the dominant species were Black scabbardfish, Greater argentines, Chimeraes, Roundnose grenadiers and Smoothheads. Table 2 lists the more important species by depth stratification and it can seen, for example, that the bulk of the Roundnose grenadiers were caught at depths greater than 1,400 metres whilst the majority of Smoothheads were caught at depths between 1,000 and 1,400 metres. The complete survey results will be analysed in the Laboratory.

In addition a large number of samples were taken for various chemical analyses in two separate PhD studies. The opportunity was also taken to process several species for weight/length relationships; this work concentrated on elasmobranchs and macrourids. A total of 2,028 fish were examined – details are provided in Table 3.

Underwater TV operations were carried out over night, after the trawling work was completed. Work started on the evening of 3 September, and continued the following night. On 5 September sea conditions meant that TV work was not possible, and it was not started again until 9 September, after which it was possible to work every night until the end of the cruise.

The TV operations were very successful, working down to a maximum depth of 634 m. *Nephrops* burrows were observed at 25 of the 32 TV stations, although burrow densities were low compared to inshore stocks. The highest densities were recorded on the Geikie Escarpment, WSW of St Kilda. As well as video recordings, a number of photographs were taken at each station. Details of each of the TV stations are provided in Table 4.

A W Newton
2 October 2000

Seen in draft: Capt P Ramsay, Master

Table 1. Weight (kgs) of species caught on survey.

Angler (Monk)	163.6
Antimora	16.1
Bathylagus europs	1.0
Bean's sawtoothed eel	2.6
Bentnose rabitfish	89.9
Beryx decadactylus	0.4
Bigelow's ray	0.1
Big-eyed Rockling	0.6
Bighead searsid	0.6
Black dogfish	57.9
Black Mouthed Dogfish	194.4
Black Scabbardfish	1827.0
Blue Ling	157.3
Blue ray	0.2
Blue Whiting	1473.4
Blue-mouth	1118.2
Bluntsnout Smooth-head	67.8
Bonaparte's Spiny Eel	44.3
Borostomias antarcticus	1.7
Bullseye	14.9
Cataetyx laticeps	294.2
Chemnitz's Spiny Eel	47.2
Chiasmodon niger	0.1
Cod	59.5
Conger Eel	276.4
Cuckoo Ray	1.8
Cut-throat Eel	97.0
Deepwater Ray	0.1
Diretmus argenteus	0.1
Duckbill oceanic eel	0.1
False Catshark	25.0
Four-spot Megrim	8.4
Fylla's Ray	1.6
Gonastomia elongatum	0.1
Greater Argentine	2341.7
Greater Forkbeard	539.1
Greater lantern shark	229.5
Greenland Halibut	11.2
Grey Gurnard	0.1
Gulper Shark	4.0
Gunther's grenadier	58.4
Haddock	133.8
Hake	919.1
Halargyreus johnsonii	97.3
Halosauropsis macrochir	0.3
Hatchetfish	0.1
Hollowsnout Rat tail	104.9
Horse Mackerel (Scad)	8.2
Iceland Catshark	46.7
Ilyophis blachei	0.3
Jelly Cat	12.7
Johnson's Scabbardfish	8.2
Koefoed's searsid	0.1
Large-eyed Rabbitfish	55.4
Leafscale Gulper Shark	449.6
Lemon Sole	19.9
Lepidion eques	436.2
Lesser Argentine	26.1
Lesser Smoothhead	2.1
Lesser Spotted Dogfish	100.5
Ling	233.1
Long Rough Dab	0.1
Longnose velvet dogfish	779.4
Lycodes atlanticus	3.5
Lycodonus flagellicauda	0.1
Madeiran smooth-head	336.8
Mediterranean Grenadier	51.5
Megrim	36.2
Melanostigma atlanticum	0.3
Mora	20.9
Mouse catshark	4.8
Multipore searsid	0.7
Murray's Rat tail	241.8
Norway Haddock	2.3
Norway Lobster	39.1
Norway Pout	5.5
Orange Roughy	14.9
Pachycara obesa	0.6
Pale Catshark	16.9
Pallid sculpin	10.4
Paralepis atlantica	0.3
Plaice	0.3
Polymetme corythaeola	0.2
Poor Cod	3.3
Portuguese Shark	854.4
Rabbit Ratfish	2255.6
Redfish (marinus)	10.0
Risso's Spiny Eel	11.8
Round Nosed Grenadier	7746.2
Saithe	91.8
Shagreen Ray	4.6
Short Finned Squid	77.3
Shovelnosed Shark	379.7
Silvery Pout	235.5
Skate	40.6
Sloan's Viperfish	0.3
Smalleye rabbitfish	149.4
Smooth Rat tail	65.7
Smoothhead	5716.6
Snipe Eel	0.3
Softhead Rat tail	54.1
Softskin smooth-head	0.7
Spear-snouted grenadier	36.5
Spiderfish	3.7
Spurdog	6.4
Squids unidentified	1.5
Stomias boa ferox	0.4
Straightnose rabbitfish	55.4
Torsk	69.8
Unidentified - Apristurus	4.9
Unidentified - Hatchetfish	0.8
Unidentified - Lantern fishes	1.8
Unidentified - Lycodes	0.6
Unidentified - Melamphaidae	0.3
Unidentified - Paraliparis	1.2
Unidentified - Rat tails	0.2
Unidentified - Rocklings	0.1
Unidentified - Shrimps	0.6
Unidentified - Smoothheads	0.9
Velvet Belly	123.5
Whiting	0.3
Witch	70.1
Total	31525.7

Table 2. Depth range of selected species.

Species	Depth range (metres)				Total
	<500	500-999	1000-1400	>1400	
Haddock	134				134
Cod	60				60
Saithe	87	5			92
Angler (Monk)	6	152	6		164
Blue Whiting	1262	207	5		1473
Blue-mouth	897	220	1		1118
Conger Eel	254	22			276
Greater Argentine	141	2199	2		2342
Hake	259	660			919
Ling	157	76			233
Megrim	29	7			36
Silvery Pout	220	15			236
Lemon Sole	20				20
Lesser Spotted Dogfish	92	9			101
Lesser Argentine	26				26
Witch	9	52	9		70
Softhead Rat tail	34	20			54
Skate	41				41
Bullseye		13	2		15
Greater Forkbeard	238	282	19		539
Halargyreus johnsonii		56	34	7	97
Lepidion eques		299	137		436
Norway Lobster	34	5			39
Round Nosed Grenadier		1516	2722	3509	7746
Short Finned Squid	8	52	10	7	77
Torsk	25	37	8		70
Rabbit Ratfish	1478	650	80	49	2256
Redfish (marinus)	1	9			10
Smooth Rat tail		58	8		66
Hollowsnout Rat tail	50	55			105
Velvet Belly	4	119			124
Cut-throat Eel		2	8	86	97
Black Mouthed Dogfish	138	57			194
Blue Ling	1	84	72		157
Mora		13	8		21
Bluntsnout Smooth-head		23	44		68
Smoothhead		395	4463	858	5717
Black Scabbardfish		978	832	18	1827
Longnose velvet dogfish		285	489	6	779
Leafscale Gulper Shark		280	141	29	450
Portuguese Shark		134	415	306	854
Shovelnosed Shark		204	173	3	380
Bonaparte's Spiny Eel		14	17	14	44
Antimora		1	4	12	16
Gunther's grenadier		1	11	47	58
Murray's Rat tail		8	76	157	242
Spear-snouted grenadier		1	11	25	37
Black dogfish		4	23	31	58
Pallid sculpin			4	6	10
Greenland Halibut				11	11
Bentnose rabitfish			21	69	90

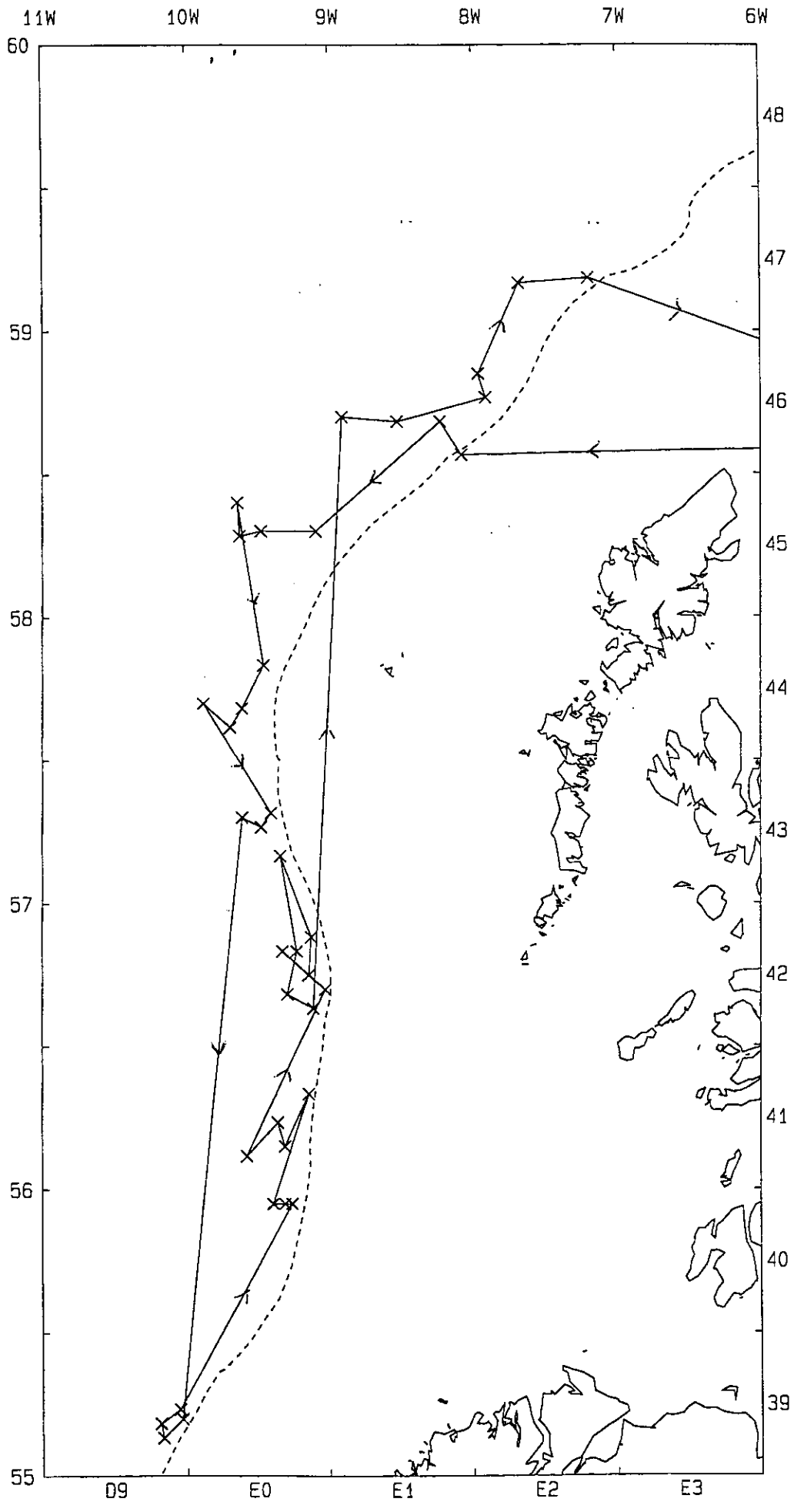
Species	Depth range (metres)				Total
	<500	500-999	1000-1400	>1400	
Greater lantern shark		12	181	37	230
Pale Catshark			1	16	17
Cataetyx laticeps			44	250	294
Mediterranean Grenadier			5	47	52
Risso's Spiny Eel			2	10	12
Chemnitz's Spiny Eel		3	11	33	47
Orange Roughy			15		15
Large-eyed Rabbitfish		39	16		55
Iceland Catshark		8	20	19	47
Straightnose rabbitfish			29	27	55
Smalleye rabbitfish			66	84	149
Madeiran smooth-head			334	3	337
Jelly Cat			13		13
False Catshark			25		25

Table 3. Species processed for length/weight relationships.

Common name	Scientific name	Observations
Pale Catshark	*Apristurus aphyodes*	15
Iceland Catshark	*Apristurus laurussonii*	85
Tripod fish	*Bathypterois dubius*	62
Cataetyx laticeps	*Cataetyx laticeps*	13
Leafscale Gulper Shark	*Centrophorus squamosus*	70
Black dogfish	*Centroscyllium fabricii*	164
Portuguese Shark	*Centroscymnus coelolepis*	99
Longnose velvet dogfish	*Centroscymnus crepidater*	172
Rabbit Ratfish	*Chimaera monstrosa*	169
Hollowsnout Rat tail	*Coelorhynchus coelorhynchus*	60
Spear-snouted grenadier	*Coelorhynchus labiatus*	101
Conger	*Conger conger*	60
Pallid sculpin	*Cottunculus thomsonii*	9
Shovelnosed Shark	*Deania calceus*	105
Greater lantern shark	*Etmopterus princeps*	53
Velvet Belly	*Etmopterus spinax*	121
Black Mouthed Dogfish	*Galeus melastomus*	135
Guentheri's grenadier	*Coryphaenoides guentheri*	130
Bentnose rabbitfish	*Hariotta raleighana*	38
Orange roughy	*Hoplothethis atlanticus*	8
Large-eyed Rabbitfish	*Hydrolagus mirabilis*	75
Softhead Rat tail	*Malacocephalus laevis*	46
Mora	*Mora moro*	9
Johnson's Scabbardfish	*Nesiarchus nasutus*	3
Bigelow's ray	*Raja bigelowi*	2
Fylla's ray	*Raja Fyllae*	2
Straightnose rabbitfish	*Rhinochimaera atlantica*	9
Murray's Rat tail	*Trachyrhynchus murrayi*	183
Bluntsnout Smooth-head	*Xenodermichthys copei*	30

Table 4. Underwater TV station details.

Tow no	Date	Latitude (N)		Longitude (W)		Depth (m)	Distance (m)	*Nephrops* density m^{-2}
1	03/09/2000	58	37.38	8	1.50	320	260	0.000
2	04/09/2000	58	4.26	9	28.02	410	171	0.029
3	05/09/2000	58	5.16	9	33.24	518	126	0.071
4	05/09/2000	57	53.94	9	33.36	418	166	0.012
5	05/09/2000	57	53.04	9	26.76	300	106	0.009
6	09/09/2000	55	50.70	9	18.42	370	78	0.000
7	09/09/2000	55	55.02	9	16.98	440	163	0.018
8	09/09/2000	56	0.24	9	15.18	438	84	0.024
9	09/09/2000	56	7.08	9	14.76	460	204	0.025
10	10/09/2000	56	14.94	9	10.86	365	97	0.021
11	10/09/2000	56	25.44	9	6.29	407	107	0.019
12	10/09/2000	56	28.62	9	7.20	575	119	0.000
13	11/09/2000	56	32.70	9	9.42	630	123	0.008
14	11/09/2000	56	35.22	9	8.46	618	126	0.008
15	11/09/2000	56	40.26	9	1.44	545	99	0.000
16	11/09/2000	57	0.88	9	12.97	589	6	0.000
17	11/09/2000	57	3.88	9	17.11	634	218	0.106
18	12/09/2000	57	7.38	9	19.14	592	242	0.107
19	12/09/2000	57	11.43	9	21.72	571	164	0.165
20	12/09/2000	57	17.31	9	25.50	557	182	0.071
21	12/09/2000	57	25.72	9	32.61	634	114	0.070
22	13/09/2000	57	30.36	9	33.42	593	106	0.066
23	13/09/2000	57	35.52	9	35.40	610	102	0.127
24	13/09/2000	57	39.60	9	35.70	519	102	0.176
25	13/09/2000	57	44.82	9	36.06	511	98	0.051
26	13/09/2000	58	27.30	8	59.94	496	119	0.059
27	13/09/2000	58	33.78	8	47.58	586	147	0.048
28	14/09/2000	58	34.74	8	40.62	546	126	0.048
29	14/09/2000	58	40.62	8	4.98	443	122	0.016
30	14/09/2000	59	13.98	7	4.68	526	21	0.000
31	14/09/2000	59	13.74	7	3.78	493	137	0.000
32	14/09/2000	59	16.74	6	53.16	560	206	0.015


Track of Scotia for Survey 1400S (Sep 2000)
11W
10W
9W
8W
7W
6W
60
59
58
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42
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D9
E0
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E3