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FRV *Scotia*

Cruise 1108S

Report

Dates: 2-23 September 2008

Project Codes: RV1008 14 days **MF01TA** 7 days

Half-landing: Stornoway

PART 1: Rockall haddock survey

Personnel:

FRS staff
P Copland (SIC)
F Neat
R Kynoch
H Dobby
C Shand
A Weetman
M Gault
A Jaworski

Visitors
V Khlivnoy (PINRO, Russia)
C Marshall (Plymouth University)

Personnel:

FRS staff
F Neat (SIC)
P Copland
R Kynoch
H Dobby
M Gault
J Drewery
E Dalgarno

Visitors
T Blasdale (JNCC)
G Hoff (NOAA Alaska Fisheries Science Center, USA).
S Helyer (University of Bangor, Wales)
V Khlivnoy (PINRO, Russia)

PART 2: Deepwater

PART 1

FRS Objectives:

1. Routine daylight survey of the Rockall Plateau to assess the haddock stock within the 200 m contour.

2. Habitat and *Nephrops* TV observation work along the East edge of the bank to depths of 900 m using the drop frame.

3. Identify, quantify and record all benthic invertebrate species caught.

4. Obtain temperature and salinity data from the surface and seabed at each trawling station.

5. Collect additional biological data in connection with the EU Data Directive 1639/2001.

Plymouth University objectives:

1. Opportunistic use of the TV drop frame to contribute to mapping distribution of Annex I reef habitat as required under the EC Habitats Directive.

Narrative

Scotia sailed from Aberdeen at 0500 on Tuesday 2 September. Passage was made to the Buchan deeps where the 4 hour training period was used to familiarize the crew with the deployment of the fishing gear and operation of deck equipment including OOW bridge familiarization and DP training. *Scotia* made passage to the Rockall plateau arriving at the North West corner of the survey area at 2300 on 3 September. One drop frame camera deployment was carried out overnight before *Scotia* commenced fishing with the BT 137 (GOV) trawl at 0700. On completion of the first day's fishing activities, *Scotia* made passage to the 1000m contour East of the plateau to spool off the drop frame cable and re-tension it onto the TV winch. A single frame deployment was carried out on her return to the plateau and the cable spooled very well for the rest of the cruise. Fishing activities resumed throughout daylight hours for the remainder of the cruise with camera deployments as weather allowed overnight. A total of 37 trawl stations were completed despite poor weather during part of the cruise and repeated damage to gear wing ends in the North Western areas of the plateau which reduced the possible number of trawls per day. CTD deployments were carried out at each trawl location with surface and near seabed salinity samples being collected. Thirteen camera frame deployments were carried out over 4 nights to investigate possible areas of coral and *Nephrops* habitation. Video footage and digital still images were recorded of various fish and benthic species. The deepest camera frame deployment was to 953m. The trawl survey of the Rockall plateau was completed by 1600 on 9 September.

Good weather allowed the BT 137 doors to be changed over for the BT184 (Deep water trawl) doors at sea and the BT184 trawl was rigged on passage overnight to the shelf edge. Two deep water tows were completed, at 1500m and 1700m, before *Scotia* broke off work to make passage to Stornoway for a half landing at 1500 hrs. The half landing, to allow for a scientific crew change and to satisfy the requirements of the WTD, was made early in anticipation of a severe storm forecast for the area. *Scotia* docked in Stornoway at 0730 on 11 September where A Weetman, C Shand and C Marshall (Plymouth University) left the vessel.

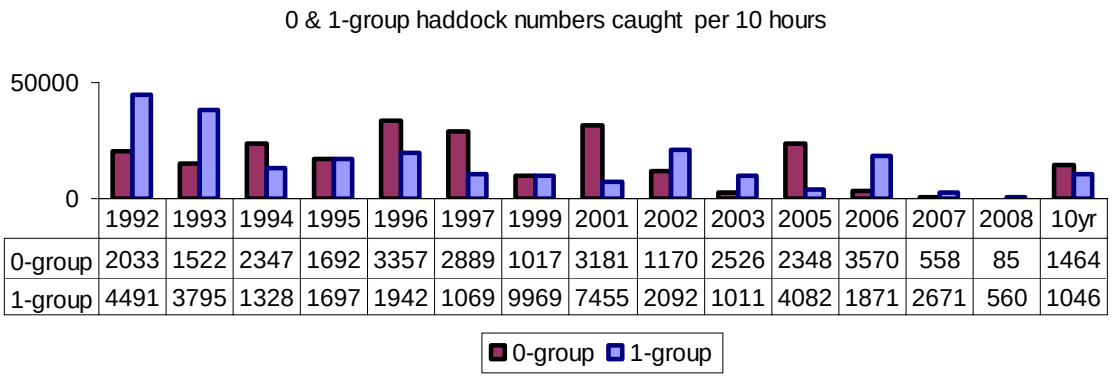
Results

Objectives 1 to 5 were satisfactorily completed. Trawl positions as well as the locations where the drop frame were deployed are displayed in Figure 1.

1. Routine daylight survey of the Rockall Plateau to assess the haddock stock within the 200 m contour.

The primary objective of the survey is to assess the state of the haddock stock on the Rockall Plateau: this is done by comparing the strength of the respective year classes in the current year with those of previous years. The provisional indices using a length rather than age

based-delimiter indicate yet another poor 0 –group recruitment for Haddock on Rockall with 2008 being the worst on record. The paucity of one year old fish was also expected and reflects the poor recruitment seen in 2007 (Figure 2).



	1992	1993	1994	1995	1996	1997	1999	2001	2002	2003	2005	2006	2007	2008	10yr
0-group	2033	1522	2347	1692	3357	2889	1017	3181	1170	2526	2348	3570	558	85	1464
1-group	4491	3795	1328	1697	1942	1069	9969	7455	2092	1011	4082	1871	2671	560	1046

Figure 2: Rockall Haddock index 1992 – 2008, including 10 year average.

2. Habitat and *Nephrops* TV observation work along the East edge of the bank to depths of 900 m using the drop frame.

A total of 13 habitat and *Nephrops* TV observation deployments where undertaken along the East edge of the bank to depths of 900 m using the drop frame (Table 1)

3. Identify, quantify and record all benthic invertebrate species caught.

The invertebrate by-catch was sorted, identified and recorded. Any rare or unidentified specimens were frozen or preserved for further study and future reference.

4. Obtain temperature and salinity data from the surface and seabed at each trawling station.

CTD casts and water samples were taken at each trawl station. A data logger attached to the net headline also recorded depth and temperature.

5. Collect additional biological data in connection with the EU Data Directive 1639/2001.

The data directive no longer requires maturity stages to be determined in quarter 3 surveys, therefore this was not undertaken as been done in previous years. Otherwise standard biological data was collected for haddock, cod, saithe, whiting, megrim and monkfish.

Additional sampling

Tissue and 8 whole specimens of common skate (*Dipturus batis*) were collected for genetic and taxonomic research by Aberdeen University and The Marine Biological Association (Plymouth, UK).

PART 2

FRS Objectives

1. To map the composition, distribution and abundance of continental slope species including anglerfish (*Lophius spp.)* on the deepwater slope west of the Hebrides and Rosemary Bank

2. Identify, quantify and record all benthic invertebrate species caught.

3. Collect temperature at depth during all hauls using a data storage tag attached to the trawl headline.

4. Collect biological samples (genetics and otoliths) for key species for population studies as requested.

5. Collect additional biological data in connection with the EU Data Directive 1639/2001.

6. Collect tissue, liver and otolith samples for contaminant analyses.

Narrative

Following the half-landing and personnel change over in Stornoway, *Scotia* sailed at 08.00 hrs on the 12 September making passage south down the Minch to arrive on station on the shelf slope the following morning to recommence the deepwater trawl survey. A series of 2 hour hauls were undertaken at 500, 1000, 1500 and1700 m depths from 06.00 hrs to 19.00 hrs (See Map 1). The night-time was used to steam between stations or make opportunistic sounding of areas of interest for survey work. On 14 September FRV *Scotia* and RV *Celtic Explorer* of the Marine Institute in Ireland coordinated operations and undertook 3 hauls for comparative purposes in ICES square 39D9. After this the survey continued as before to the north in ICES square 41EO. On the night of 16 September *Scotia* made soundings over the crown of the Hebridean Terrace Seamount, a potential site for future TV habitat surveys. The following day Scotia was informed of MOD operations that required all vessels to vacate the area currently under survey (ICES squares 44EO and 43EO). In compliance passage was made North of 58 ° and the survey recommenced the next day in square 45EO. That night *Scotia* returned south to complete the unfinished work in ICES squares 44EO and 43EO. In order to get back on schedule some tow durations was reduced to 1 hour on that day. Overnight passage was made to Rosemary bank to arrive at 06:00 hrs on 19 September. Three hauls were completed on the bank at 600, 800 and 900m and a further haul was made at 1500 m to the east of the bank at the northern rise of the Rockall Trough. Overnight passage was made to the continental shelf edge and the set of trawl stations in ICES squares 46E1 and 46E2 completed on 20 September. The plan to recover a lost lander at the Buzzard oil field was cancelled on 21 September by the oil company and the remainder of the day was spent trawling stations in ICES square 47E1. *Scotia* began passage to Aberdeen on the night of 21 September, docking and unloading in Aberdeen the morning of 23 September.

Results

Objectives 1-6 were satisfactorily fulfilled and are summarised as follows;

1. To map the composition, distribution and abundance of continental slope species including anglerfish (*Lophius spp.)* on the deepwater slope west of the Hebrides and Rosemary Bank. (See Map 2).

A total of 31 deepwater hauls were made on the shelf slope (Map 1) at 500 m (n = 8), 1000 m (n = 9), 1500 m (n = 8) and at depths between 1700-1800 m (n = 3). Three hauls were made on Rosemary bank (Map 1). On only three occasions were problems encountered when the gear dug into soft mud or the sounder suggested the approach of a rough seabed. On such occasions the gear was hauled early to avoid potential damage. On one occasion the headline parted, but no other significant gear damage was incurred. Scanmar data was collected on gear performance including door tilt, door depth, door spread, wing spread and headline height.

From each haul all species were sorted, weighed and a length frequency distribution obtained. The catches were dominated by roundnose grandier (*Coryphenoidies rupestris)* and baird's smoothhead (*Alepocepahlus bairdii)*. In addition to the common species, several species not previously recorded on the survey were captured including *Pachystoma microdon* and *Regalecus glesne* (oarfish). A number of unidentifiable specimens were preserved or frozen for further study back at the laboratory (a *Paraliparis* species, a *Bathygadus* species and a *Chimaera* species).

2. Identify, quantify and record all benthic invertebrate species caught.

The invertebrate by-catch was sorted, identified and recorded. Any rare or unidentified specimens were frozen or preserved for further study and future reference. Of note were a squid (*Bathypolypus ergasticus*) new to the survey, specimens of Black coral (Schizopathidae) *Stauropathes arctica*, a Bamboo coral (Isididae) new to the survey which is provisionally identified as *Acanella arbuscula*, a solitary coral (Caryophyllidae) *Stephanocyathus nobilis* and two species of Seapen (Pennatulidae) new to the survey and as yet unidentified. DNA samples were retained from all.

3. Collect temperature at depth during all hauls using a data storage tag attached to the trawl headline.

The temperature at depth logger was deployed and downloaded successfully. Average bottom temperatures at each trawling depth are given in Table 2.

4. Collect biological, genetics and otoliths samples for key species for population studies as requested.

a. Elasmobranch species sampled for the University of Bangor for DNA 'barcoding', phylogenetics and potential forensic identification studies included; *A. aphyodes, A.manis, A. laurussonii, A. melanoasper, A.microps, E. princes, E. spinax, C.squamosous, C. crepidater, C. coelolepis, C. fabricii, D. calceus, G. melastomus, G.murinus, H. griseus, S. canicula, S. licha, C. monstrosa, H. affinis, H. pallidus H.mirabilis.* The following species were sampled from mother and offspring for paternity analyses *E. princeps* (n= 5), *Centroscymnus coelolepis* (n =1) and *Deania calceus* (n =1). Grenadier species sampled for testing of cross species amplification of

molecular markers were *Chalinura mediterranea, Coelorhynchus coelorhynchus, Coelorhynchus labiatus, Coryphenoidies gunterii, Coryphenoidies rupestris, Malacocephalus laevis, Nezumia aequalis, Trachyrhynchus murrayii* and one Bathygadus species. Decapod samples taken for genetic analysis included *Neolithodes grimaldi, Sabina hystrix, Sergia robusta, Nephropsis atlantica, Pasiphaea tarda, Pasiphaea multidentata, Gerylon trispinosus, Acanthephyra pelagica, Stereomastis grimaldi, Glyphocragnon longeristris, Bathyneltes maravigna, Dichelopandalus bonnieri, Polycheles typhlops*.

b. Tissue samples from conger eels (*Conger conger*) (n = 57) were taken for population genetic analysis for University of the Algarve, Portugal.

c. Stomachs from Portuguese sharks (*C. coelolepis)* were collected for analysis of diet by Plymouth University.

5. Collect additional biological data in connection with the EU Data Directive 1639/2001.

Biological data was collected for angler fish (*Lophius piscatorius*). In addition weight-length data was collected for 40 species to supplement the FRS deepwater database (Table 3).

6. Collect tissue, liver and otolith samples for contaminant analyses.

Samples were collected from 65 roundnose grenadier (*C. rupestris*), 35 black scabbard (*A.carbo*), 10 greater argentine (*A. silus*), 10 smoothhead (*A. bairdii*) and 20 black dogfish (*C.fabricii*) which will be analysed for contaminats including CB's, PBDE's, lipids and heavy metals.

Additional objectives

a) Soundings were made over the Hebridean Terrace Seamount (Map 1) which revealed the crown of the bank to be approximately 1.8 nm to the south-east of where it is currently positioned on the admiralty charts. A note to the Royal navy Hydrographic office will be prepared so that they can update their charts.

b) Potential 1700 m trawl stations were sounded in ICES squares 41EO and 43EO, although only in 43EO was the seabed considered suitable for trawling. This is will be incorporated into the FRS deepwater survey in 2009.

c) In addition to the core times series stations, new tows at 1700 m were successfully completed in ICES square 45EO and at 1500 m in 47E2.

d) Number of tissue samples and whole specimens were collected for further taxonomic research purposes at the Alaska Fisheries Science Center (USA). These included *Chimaera mostrosa, Galeus melanostomus, Rajidae skate unidentified, Malacocephalus laevis, Anoplogaster cornuta, Lycodes atlanticum, Paraliparis sp., Lycodes crassiceps, Raja clavata, Amblyraja jensenii, Raja fyllae, Halargyreus johnsonii.*

P Copland and F C Neat
14 November 2008 (seen in draft by Captain E. W. Casson).

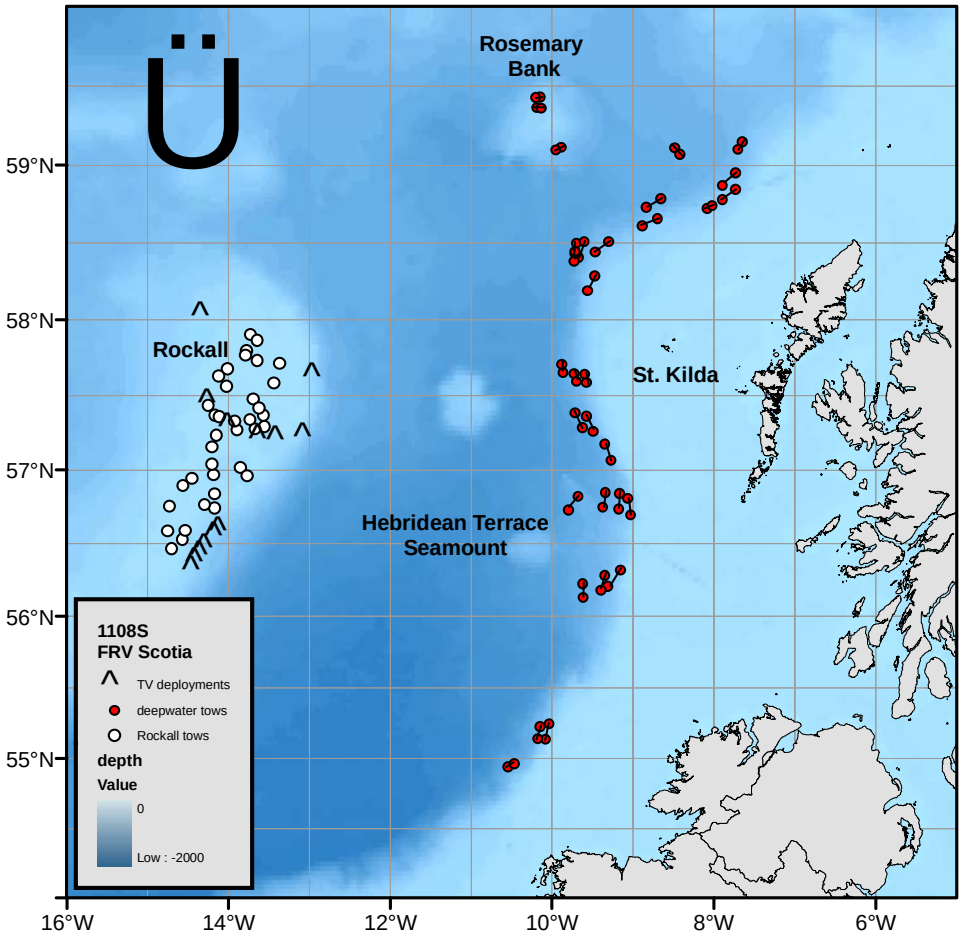


Figure 1: Map of survey area including trawl stations and TV deployments.

Table 1: TV drop-frame deployments for habitat mapping and *Nephrops* observation

No.	Area	Purpose	Depth (m)	Duration (min)	Coral Observed	No. Digital Stills
1	NW Rockall	Coral Site	311	30	Y (dead)	22
2	East Rockall	Cable Stretch	844	9	Y (dead)	0
3	West Rockall	Coral Site	174	29	N	38
4	SE Rockall	*Nephrops*	524	15	N	20
5	SE Rockall	*Nephrops*	491	15	N	25
6	SE Rockall	*Nephrops*	493	20	N	23
7	SE Rockall	*Nephrops*	510	20	N	14
8	SE Rockall	Coral Site	509	20	N	35
9	SE Rockall	Coral Site	481	30	N	42
10	East Rockall	Coral Site	192	30	N	39
11	East Rockall	Coral Site	226	30	Y (dead)	44
12	East Rockall	Coral Site	825	30	N	43
13	East Rockall	*Nephrops*	935	18.5	Y (alive)	37

Table 2: Average bottom temperature for each depth strata of the survey

trawl depth (m)	mean temperature (°C)
500	9.93
1000	7.10
1500	4.26
1700	3.64

Table 3: Species for which weight length data was collected

Species	Number
Apristurus Melanoasper	20
Apristurus Microps	3
Apristurus Manis	7
Galeus melanostomus	183
Centroselachus crepidator	153
Dalatias licha	4
Raja Fyllae	5
Centrophorus squamosus	14
Centrosymnus coelolepis	39
Hexanchus griseus	15
Alepocephalus agasasizi	93
Lophius piscatorius	37
Bathyopterus dubious	30
Centrolophus niger	5
Molva dipterygia	92
Notacanthus bonaparti	79
Epigonus telescopus	29
Chimaera monstrosa	106
Chimaera sp.	15
Cataetyx laticeps	55
Notacanthus chemnitzi	13
Hippogliossoides reinhardtius	2
Merluccius merluccius	87
Hydrolagus pallidus	12
Hariotta reighlana	112
Hydrolagus affinis	46
Lycodes atlantica	74
Conocara murrayi	4
Hoplosichthys atlantica	78
Roualina attrita	85
Rhinochimaera atlantica	10
Coryphaenoides rupestris	48
Polyacanthonotus rissoanus	47
Spetrunculus grandis	5
Sebastes mentella	16
Alepocephalus bairdii	35
Coelorhynchus labiatus	27
Trachyrhynchus murrayi	15
Brosme brosme	39
Xenodermichthys copei	60