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MFV *Audacious* BF83

Cruise 0723H

Report

Dates

10-23 May 2023

Personnel

J Drewery (SIC)

M Gault

L Sinclair

T West (SFF)

Out-turn days: 14 days – MONKRV / 20702

Fishing Gear: Anglerfish Trawl BT 195 (Supplied by Jackson Trawls)

Objectives

1. To undertake the Scottish Irish Anglerfish Megrin Industry Science Survey (SIAMISS) cruise covering the Scottish North West Shelf and Rockall Bank (ICES areas VIa and VIb).
2. To collect species distribution, length frequency and biological data of Anglerfish, Megrin, Four-Spot Megrin, Cod (*Gadus morhua*), Blue Skate (*Dipturus batis*) and Flapper Skate (*Dipturus intermedius*).
3. To collect additional species distribution, length frequency and biological data in connection with the EU Data Collection Framework (DCF).

Background

The SIAMISS cruises form an annual nationally coordinated demersal trawling survey series of Anglerfish (*Lophius piscatorius* and *L. budegassa*), Megrin (*Lepidorhombus whiffiagonis*) and Four-Spot Megrin (*L. boscii*) in the northern North Sea, the Western shelf of Scotland and Ireland and Rockall Bank. Marine Directorate (MD) chartered the commercial fishing vessel *Audacious* BF83 for cruise 0723H, the third cruise in the Scottish 2023 series. During this survey the vessel and scientific staff conducted trawl operations up to a maximum of eighteen hours a day with adequate breaks for WTR compliance. The duration of the charter included twelve days at sea and one day each side to allow for mobilisation/demobilisation.

Narrative

MD staff joined *Audacious* at Ullapool at 1230 on 10 May and, with the survey net and other equipment still on board following cruises 0523H and 0623H, put to sea immediately following familiarisations and safety briefings from the vessel master and a risk assessment recap from the SIC. *Audacious* steamed to the first station some 14 nmi north of the Butt of Lewis in calm conditions while scientific staff set up two measuring stations on the fish processing deck. Station 1 was successfully undertaken that evening following which *Audacious* steamed overnight to Wyville-Thomson Ridge (WTR) with the intention of proceeding to Rockall bank after completion of the programmed stations there. Station two was shot at 0600 however this came fast after 50 minutes and, on immediate hauling, was found to have sustained severe damage to the belly of the net. A large amount of netting (four panels) was either missing or had to be cut away and the amount of replacement netting required for repairs unfortunately exceeded the amount carried. Skipper and SIC coordinated to arrange transport of trawl repair materials the most suitable port (Kinlochbervie) which were picked up at 2100 that same day and the vessel headed back out west within an hour carrying ample spare netting. Repairs to the trawl were completed by the skilled crew during passage to the next station to the west of Lewis.

On 12 May stations 3-6 were completed fishing successively further west of Lewis after which *Audacious* made the overnight steam to Rockall Bank in fine conditions (and after having been given MOD go-ahead to proceed though areas intermittently closed by ongoing NATO exercise *Formidable Shield* over the Rockall Trough) ready for the first station (7) at the north end of the bank at 0630. Despite a brief increase in the wind to some 40kts from the west a further three hauls were made that day with some good catches of angler recorded. The next day was spent on the western slope of the bank recording mixed catches of anglers from four hauls as well as the only haul (14, 950m depth) not to record any angler at all. On 15 May survey continued in the SW of survey area, and although the first haul (15) come fast after 6 minutes this was retrieved without damage and was reshot successfully close by. Another three hauls were completed the same day before *Audacious* shifted overnight to the eastern side of the bank. Three hauls were completed with good catches of angler before haul 23 encountered sticky ground and came hard fast after only two minutes on the seabed. The net remained stuck after the warps were retrieved as far as possible, but was eventually worked free following patient effort by the skipper. The net was found to be almost undamaged apart from abrasion to the port wing but was however missing several port wing floats and unfortunately also a scanmar sensor from the same wing. Following repairs and replacement of floats and sensor the haul was successfully repeated without incident some 4 nmi to the Northeast in the same stratum, followed by a further haul in the adjacent stratum. The skipper was kept updated by email on the progress of military exercise *Formidable Shield* that had potential to complicate passage back east when the time came.

A further five hauls (28-30) were completed on 17 May with some good catches of angler recorded. Haul 29 was undertaken on what is considered gillnet (Spanish fleet) ground, and rarely trawled. The survey moved to the seas surrounding Rockall Islet on 18 May and six hauls in breezy conditions and moderate swell were conducted with lower catches of angler, however this was as expected in the area. Haul 35 was scored as foul when it was hauled back to find a broken tickler chain and was a repeated a

short distance away. The following day the final set of three hauls were completed with haul 39 representing the last haul at Rockall. With a message from the MOD that unobstructed passage back to the Hebrides shelf was permitted *Audacious* started the steam east at 1400.

While time scheduled to complete the required number of programmed stations in all strata in the NW area was tight due to an almost 24 hour period being lost following damage at the second haul, the fact that seven stations had already been completed in three out of the five strata during 0523H took a lot of the pressure off. Five hauls were completed on 20 May, and while angler catches were found in general to be low these seemed comparable with commercial catches close by as determined by the skipper. The presence of a large longline fleet covering an approximately 60 nmi strip over the 290-350m depth zone to the north of St.Kilda was noted in that it would be an effective barrier to the survey in that area, however suitable alternate stations were available in this case. With a moderate swell building on the back of a 35 kt south-westerly breeze *Audacious* steamed overnight to the WTR and completed the two programmed hauls there without incident. Two hauls were planned for the final day however the first of these (49) came fast after 54 minutes and was hauled back, with difficulty, to find severe damage again to the belly panels. Following examination repairs were judged to require too long to allow either a repeat or a further final haul, and thus the survey effectively ended - gratifyingly, this was with more than the programmed total of valid hauls.

Audacious made for Peterhead to land the catch and allow for demobilisation of MD equipment and a return to commercial fishing. *Audacious* was tied up at Peterhead at 0400 on 23 May. The damaged BT195 trawl was passed on to Jacksons Trawls Ltd. for salvage of the groundgear and any other undamaged trawl components with all other equipment and all staff having left the vessel by 1100.

Results

Trawl Survey

The SIAMISS survey series utilises a semi-random-stratified survey design which generates station positions based on area and anglerfish catch variability within five predefined strata within ICES areas VIa (NW shelf and slope) and five at VIb (Rockall) to a maximum depth of 1000m in both cases. Positions for a total of thirteen primary and thirty-seven alternative stations were generated for the NW shelf and slope along with those for twenty-three primary and forty-four secondary stations at Rockall. Primary stations would be the main focus with alternative stations being utilised to increase effort or to replace primary stations where surveying was not suitable. A 5 nm buffer was applied to the positions and trawling was undertaken within this 5 nm buffer with the intention of transecting the centre of the position during the tow where possible. Trawl locations within the buffer zone were agreed on an individual basis by daily consultation between skipper and SIC, taking in factors such the requirement to avoid protected or sensitive marine habitats, the presence of static fishing gear or commercial trawlers operating or simply unsuitable ground. A combination of established trawl locations along with those previously unfished by *Audacious* were used to complete the survey.

The Scanmar net monitoring system was used to monitor trawl headline height, wingspread, door-spread, and distance covered during each tow. The vessel's own Scanmar SS4 door units and Trawleye unit along with a receiver unit rented by the vessel, were used throughout. The Trawleye unit was used to monitor bottom type and fish density entering the net to reduce the likelihood of trawl damage and excessive fish catches.

An MSS built bespoke bottom contact sensor was attached to the trawl's groundgear during each tow to monitor ground contact as well as to validate record of touch-down and lift-off of the groundgear. During 0723H functioning bottom contact sensors data were only available for hauls 1-18, however headline height and depth sensors showed no tendency of the net to lift off during any of the hauls. Scanmar sensors for all but four of the trawl stations worked well, with only hauls 2, 20, 45 and 49 lacking wing readings. Valid trawl duration was typically the standard of 60 minutes, with only haul (37) being three minutes under, this one being hauled immediately on coming fast after 57 minutes. There were five occasions of foul hauls, one where an alternative station was chosen (haul 2), three where the station was successfully repeated close by (hauls 15, 23 and 35) and one where the station was not repeated (haul 49) due to extensive damage and the damage taking place right at the end of the survey.

The same trawl gear (BT195) was used throughout the survey and was deployed forty-nine times giving a final total of forty-four valid stations, well up on the thirty-six programmed for the cruise. Primary stations were used on twenty-three occasions with another twenty-one being alternatives. Commercial fishing conflict, positions generated in protected areas, poor or unknown ground at the primary station along with the undertaking of additional stations were the main factors influencing the relatively high proportion of alternatives in the total. Figures 1 (Rockall) and 2 (NW shelf and slope) illustrate positions of valid and invalid trawl stations with respect to SIAMISS survey strata while Table 1 provides detail on the number of stations completed and percentage coverage achieved per stratum (taking into account the additional stations completed during 0523H on certain of the 0723H strata)

All target species (Table 2) were identified, weighed, and measured to generate a length frequency and individual biological data were collected according to pre-set survey sampling targets. Due to logistical limitations on chartered commercial vessels and the low levels of scientific staffing only the target species were recorded during 0723H.

Results from 0723H are not in themselves fully meaningful without the combined results from the other two chartered surveys 0523H and 0623H along with that from the Irish component of SIAMISS 2023 however some preliminary catch per unit effort (CPUE) estimates for the areas surveyed (Rockall and NW combined) may be made: A total of 574 anglerfish (2384 kg) were caught and biologically sampled to give a CPUE of 54.9 kg/hr fishing. Likewise a total of 21 black-bellied anglerfish (47.9 kg) caught and sampled gave a CPUE of 1.2 kg/h. A total of 2014 megrim were caught of which 541 were biologically sampled resulting in a CPUE of 17.0 kg/h. A total of 249 four-spot megrim gave a CPUE of 1.0 Kg/h. Cod were encountered both at Rockall and NW with 108 individuals being caught for a CPUE of 7.7 kg/h. Provisional CPUE of these and other species is given in Table 3. Due to difficulties with taking large individuals of several skate species down into the fish hopper and then back out again

these were preferentially removed from the net on deck, measured and quickly released and thus in some cases these do not form part of the biological data set summarised in Table 3.

All otoliths collected from biological sampling were aged upon return to the marine laboratory. The full dataset from this survey is available on the MSS FSS database.

Electronic Data Capture

All SCANMAR net monitoring data were collected electronically. Length frequency and biological data were entered into the FSS system at sea using the electronic data capture (EDC) methodology while haul summary data and catch composition files were incorporated post survey to form the full dataset. All data was uploaded to the laboratory servers following final screening and quality checks.

Many thanks is due to the skipper and crew of *Audacious* with whom scientific staff formed an excellent working relationship and who utilised their experience and professional attitude to the full, ensuring the survey ran as smoothly as possible. We are also grateful for both the skipper's coordination of transport of replacement trawl materials from laboratory storage to port in as timely a manner as possible and for the crew's swift net mending skills which came to the fore more than once. Thanks also for the keen efforts and experience of SFF staff which contributed strongly to the success of the survey.

Jim Drewery
04 August 2023

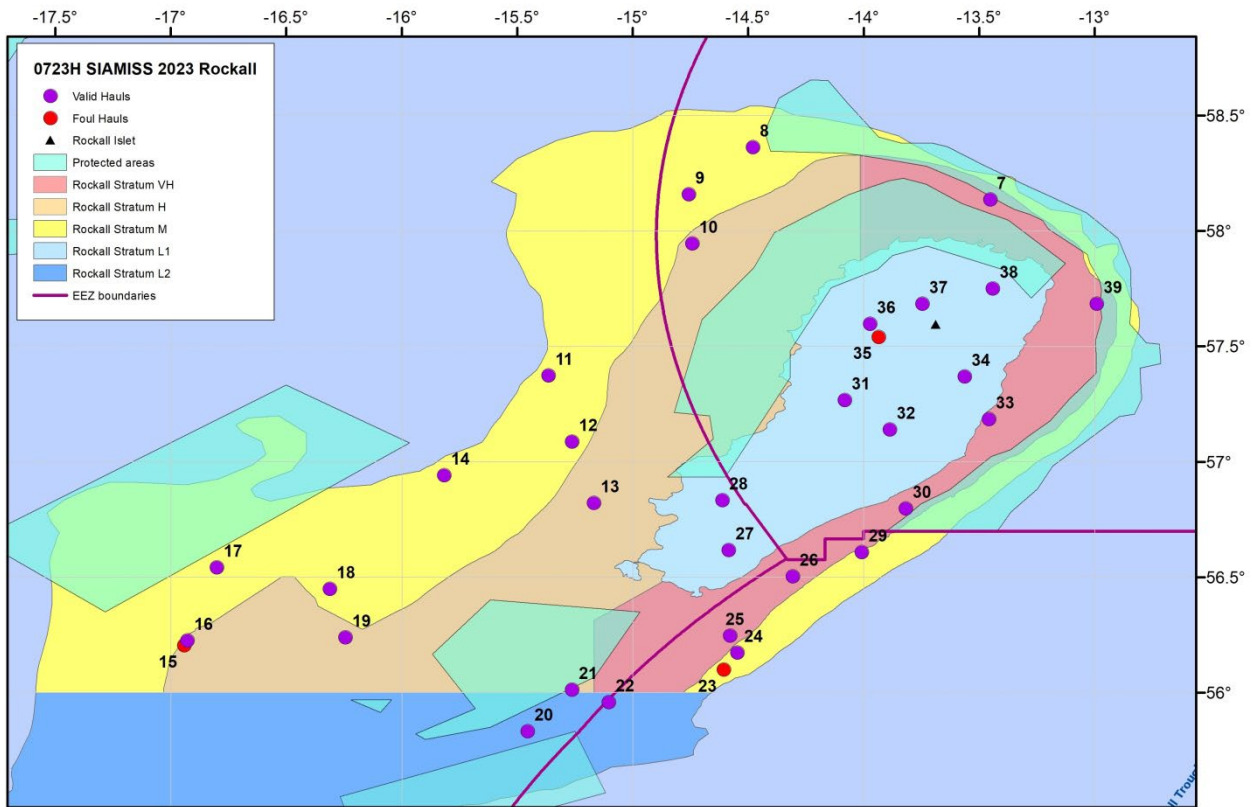


Figure 1: Survey chart illustrating SIAMISS strata used at Rockall Bank along with locations of valid and foul hauls completed during 0723H.

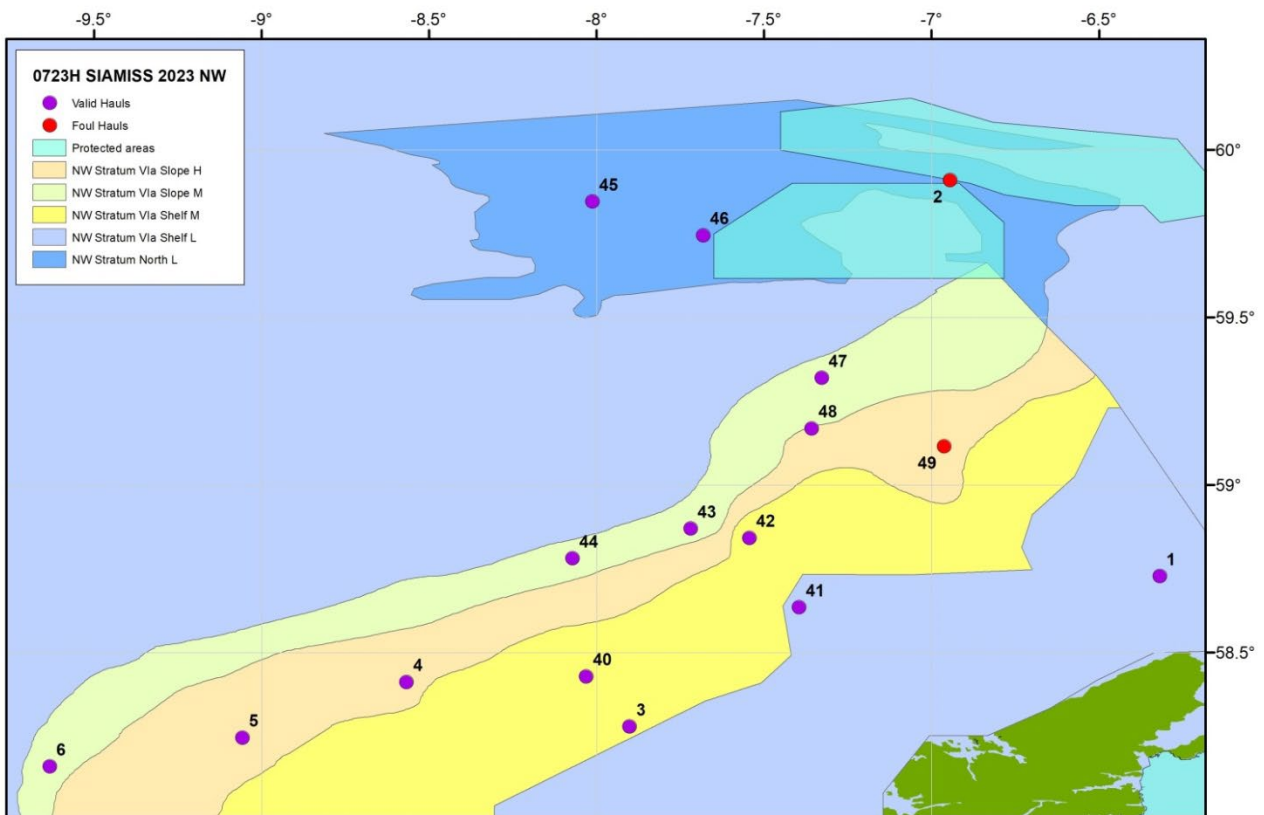


Figure 2: Survey chart illustrating SIAMISS strata used at the North West shelf and slope along with locations of valid and foul hauls completed during 0723H. See 0523H cruise report for additional stations completed during that cruise on Via shelf L, Via shelf M and slope H strata.

Table 1: Number of programmed and valid stations completed for 0723H along with percentage completion per stratum. Percentages in brackets are those taking into account stations completed during cruise 0523H.

Table 1: 0723H Trawl Stations per Stratum					
Stratum	No. of Stations Programmed	No. Valid Core Stations	No. Valid Alternative Stations	Total No. Valid Stations	Percentage Completion
Rockall VH	3	3	3	6	200
Rockall H	4	3	2	5	125
Rockall M	8	4	5	9	110
Rockall L1	6	5	3	8	130
Rockall L2	2	2	0	2	100
NW Via Slope H	3	2	1	3	100 (200)
NW Via Slope M	3	2	2	4	130
NW Via Shelf M	2	1	2	3	100 (170)
NW Via Shelf L	3	1	1	2	70 (170)
NW North L	2	0	2	2	100

Table 2: Biological sampling targets for 0723H. (* Individual weight, gutted weight, sex, maturity and age; ** Individual weight, gutted weight, sex and maturity; *** Individual weight, sex and maturity – males only)

Table 2: 0723H Biological Sampling Targets	
Species	Target
<i>L. piscatorius</i> (ANG) *	All
<i>L. budegassa</i> (BAN) *	All
<i>L. wiffiagonis</i> (MEG) **	1 / cm
<i>L. boscii</i> (FME) **	1 / cm
<i>G. morhua</i> (COD) *	1 / cm
<i>A. radiata</i> (STY) ***	1 / cm
All other skates and rays ***	All - except CRA, SPY and TRA

Table 3: Provisional overall CPUE (Rockall and NW combined) of target and other species observed during 0723H. Note that CPUE values of cod and several of the skate species given here should be treated with caution on their own as the depth range of these species may only overlap, or be a subset of, that covered by the survey overall.

Table 3: 0723H CPUE of Target Species		
Name (Species)	CPUE nos./h	CPUE kg/h
Angler (<i>Lophius piscatorius</i>)	13.1	54.9
Megrim (<i>Lepidorhombus whiffiagonis</i>)	45.8	17.0
Blue Skate (<i>Dipturus batis</i>)	3.1	12.5
Cod (<i>Gadus morhua</i>)	2.5	7.7
Black Skate (<i>Dipturus nidarosiensis</i>)	0.3	6.3
Long Nosed Skate (<i>Dipturus oxyrinchus</i>)	1.8	5.7
Flapper Skate (<i>Dipturus intermedia</i>)	1.0	5.0
Sandy Ray (<i>Leucoraja circularis</i>)	1.6	4.5
Black-bellied Angler (<i>Lophius budegassa</i>)	0.5	1.2
Four-spot Megrim (<i>Lepidorhombus boscii</i>)	5.7	1.0
Shagreen Ray (<i>Leucoraja fullonica</i>)	0.5	0.7
Fyllas Ray (<i>Rajella fyllae</i>)	0.5	0.2
Blue ray (<i>Neoraja caerulea</i>)	<0.05	<0.05

Table 4: Numbers of biological observations per species collected during 0723H (length, weight, sex, maturity & age; * length, weight, sex & maturity (males only); ** length, weight, sex & maturity).

Table 4: Number of Biological Observations per Species	
Name (Species)	No.
Angler (<i>Lophius piscatorius</i>)	574
Black-bellied Angler (<i>Lophius budegassa</i>)	21
Megrim (<i>Lepidorhombus whiffiagonis</i>) **	541
Four-spot Megrim (<i>Lepidorhombus boscii</i>) **	107
Cod (<i>Gadus morhua</i>)	94
Flapper Skate (<i>Dipturus intermedia</i>) *	35
Blue Skate (<i>Dipturus batis</i>) *	123
Black Skate (<i>Dipturus nidarosiensis</i>) *	9
Blue Ray (<i>Neoraja caerulea</i>) *	2
Fyllas Ray (<i>Rajella fyllae</i>) *	19
Long nosed Skate (<i>Dipturus oxyrinchus</i>) *	80
Sandy Ray (<i>Leucoraja circularis</i>) *	69
Shagreen Ray (<i>Leucoraja fullonica</i>) *	9