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MFV *Audacious*

Cruise 0523H

Report

Dates

12-23 April 2023

Personnel

R Gillespie-Mules (SIC)
J Dooley (Co-SIC)
G McAllister (SFF)
C Henderson (SFF)

Out-turn days: 12 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). An annual nationally coordinated demersal trawling survey of Anglerfish (*Lophius piscatorius* and *Lophius budegassa*), Megrin (*Lepidorhombus whiffiagonis*) and Four-Spot Megrin (*Lepidorhombus boscii*) in the West of Scotland (ICES area VIa) and the North Sea (ICES area IVa).
2. To collect species distribution, length frequency and biological data of Anglerfish (*Lophius piscatorius* and *Lophius budegassa*), Megrin (*Lepidorhombus whiffiagonis*), Four-Spot Megrin (*Lepidorhombus boscii*) 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).

Narrative

With *Scotia* out of action due to her retention in drydock following the MRV *Petrel* incident, it was decided to proceed with the plan to complete the entire survey of ICES areas IVa, VIa and VIb using chartered fishing vessels reimbursed using scientific quota. For 0523H, the vessel chartered for the survey was the MFV *Audacious*. The duration of the charter included ten days at sea and one day each side to allow for mobilisation/demobilisation that often cut prescribed survey time on previous charters. The vessel and scientific staff conducted trawl operations up to a maximum of 18 hours a day with adequate breaks for WTR compliance. As the weather forecast for the entire

survey looked positive, the plan was for *MFV Audacious* to complete the Moray Firth strata before working north to the East of Shetland, then work west to allow any surplus time to be used North and East of Lewis and Harris in VIa.

On 12 April, following vessel familiarisation and a risk assessment review, the BT195 survey trawl and associated survey equipment were loaded onto *MFV Audacious* and rigged pre-sailing. Following rigging, electronic data capture (EDC) setup and SCANMAR receiver installation and testing, *MFV Audacious* sailed at 23:00 in fine weather and made her way NE to the first trawl station in the Moray Firth to conduct the first/shakedown trawl at 0600 the next morning. When the trawl was first deployed, conflicts with the SCANMAR net monitoring sensors occurred however these were quickly troubleshooted and adjusted to ensure the full suite of net monitoring data was collected. Unfortunately, during the shakedown tow, the trawl stuck on the sea floor and single ended due to the sweeps parting on the port side. The trawl was quickly recovered by the crew, sweep replaced, and the tow repeated successfully. Two further stations in the Moray Firth were completed without incident. During trawl deployment on the fourth station, the trawl stuck immediately on the seafloor, resulting in the hoppers twisting up. The trawl was recovered, hoppers rectified, and the station repeated successfully.

The following morning, the first station resulted in a catch of ~8T of Spurdog with little evidence seen on the net monitoring system. The catch from the station was not processed for scientific data due to a large tear in the trawl tunnel caused by the quantity of Spurdog and subsequent rubbing of the trawl on the seafloor. The trawl was promptly repaired, and four further stations were completed successfully. Whilst towing on station eight, the trawl lifted off the seafloor for two minutes due to a strong tidal current with the tow time being modified to reflect this (two minutes deducted from the haul time).

The next two days passed smoothly with ten stations being completed successfully. The trawl stuck on the seafloor a few times during station eighteen, however, due to the trawl settling following sticking the tow was continued and catch worked up.

Three stations were completed on 17 April, station number 20 using an alternative position due to vessels commercially fishing and poor ground at the primary station position (P21). Following completion of station number 22, *MFV Audacious* made for Scrabster to unload the catch overnight before making for the next station.

Fine weather on the steam out ensured trawling commenced immediately on schedule allowing five stations to be completed successfully. The following day, four stations were completed successfully however the first attempt at the fourth station resulted in the trawl sticking before the minimum duration (20 minutes). The trawl was retrieved, emptied and the station successfully repeated however due to a HyperTerminal issue, net monitoring data was not recorded. Average SCANMAR data was inputted into FSS.

The following two days proceeded smoothly, with ten stations completed successfully without incident before *MFV Audacious* made for Peterhead, docking ~ 2000 on 22 April. Staff departed the vessel whilst fortunately, as the vessel was to be used for the following charter (0623H), all equipment remained onboard.

Results

Trawl Survey

The SIAMISS survey series, utilising a semi-random-stratified survey design, resulted in station positions being generated by distributing effort based on area and anglerfish catch variability within ten predefined strata within ICES areas IVa and VIa. A total of thirty-four primary station positions and fifty-nine alternative station positions were generated for 0523H. The priority was to survey primary stations initially 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 were selected within the 5 nm buffer of the provided positions using a combination of established trawl locations along with new locations, undertaken for reasons including avoidance of protected and sensitive marine habitats, inability to trawl due to static fishing gear, presence of commercial trawlers operating in the station area or unsuitable ground. The good survey progress due to mild weather conditions and lack of surveying or mechanical issues, allowed for an increase in the number of alternative stations in strata towards the end of the survey in VIa, particularly beneficial due to the uncertainty of the latter charters at the time.

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 along with a receiver unit rented by the vessel, were used throughout to reduce the burden on equipment supplied by Marine Directorate (MD). The SCANMAR Trawleye 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 (TD) and lift-off (LO) of the groundgear. This was downloaded and analysed after every haul to verify and cross-check trawl TD and LO times against the SCANMAR data recorded. The SCANMAR sensors for all but three of the trawl stations worked well, with the issues encountered including intermittent wing readings (H29), failure of the height sensor during a station (H1) and a failure of the SCANMAR recorder, HyperTerminal (H32).

Trawl duration at each station was typically of 60 minutes duration, however, the duration of H8 was reduced by two minutes due to the net lifting off the seafloor for that duration. The duration of H31 was only 20 minutes due to the net sticking on the seafloor and was thusly deemed invalid due to the duration being below 50% of the standard trawl duration. The station was successfully repeated.

The same trawl gear (BT195) was used throughout the survey, deployed at forty-three stations. Two of these stations were invalid leaving the final number of valid stations at forty-one. Primary stations were used on thirty-two occasions (*out of a possible 34*). Two alternative stations were substituted for the primary stations in the same strata

due to commercial fishing conflict and poor ground at the primary station (P21) along with a primary station being within an MPA (P10). In addition, due to fine weather, lack of gear damage and good survey progress, seven additional alternative stations were completed to increase survey resolution, particularly in the western strata for which a following survey to cover those strata was not yet confirmed.

The trawl gear performed well during the survey, having recently been overhauled with damage only occurring during two stations (H5 and H18). A chart of the survey area is included below illustrating valid and invalid trawl stations, SIAMISS strata and cruise track (Figure 1.). Table 1. details the number of stations completed and percentage coverage per stratum.

As the survey was undertaken on a chartered commercial vessel, the entire catch was not observed due to vessel limitations and staffing with only the target species being observed on the survey. All target species were identified, weighed, and measured to generate a length frequency. Individual biological data were collected from the target species according to the pre-set survey sampling targets as detailed in Table 2.

Observations from the catch data from the survey identifies the catch per unit effort (CPUE) for Anglerfish (*L. piscatorius*) as 22.2 kg/h, a total of 315 individuals caught and biologically sampled on the survey. Of Black-bellied Anglerfish (*L. budegassa*), 21 individuals were caught and sampled, resulting in a CPUE of 1.2 kg/h. A total of 584 Megrim (*L. whiffiagonis*) were observed of which 381 were biologically sampled resulting in a CPUE of 7.9 kg/h. Only one Four-spot Megrim (*L. boscii*) was encountered likely due to the depth range of the stations sampled during 0523H. Cod (*G. morhua*) were encountered regularly with 1411 individuals being observed, of which 726 were biologically sampled. This resulted in a CPUE of 108.9 kg/h. The only target skates and rays observed were Blonde Ray (*Raja brachyura*) (3), Blue Skate (*D. batis*) (15) and Flapper Skate (*D. intermedius*) (126). Biological sampling was done on all but 4 Flapper Skate as due to their large size, they were removed from the remaining catch on deck before being measured and released. The numbers of biological observations per species are detailed in Table 3. All otoliths collected from biological sampling will be aged upon return to the marine laboratory.

The full dataset from this survey is available on the MSS FSS database. From this a set of abundance indices is calculated for the target commercial species.

Electronic Data Capture

All SCANMAR net monitoring data were collected electronically. Haul summary data, catch composition, length frequency data and biological data were entered into the FSS system at sea using the electronic data capture (EDC) system. This allowed error screening during and post capture, vastly increasing efficiency and quality of the data collected. All data was uploaded to the lab servers following final quality checks post survey.

Thanks to the excellent working relationship with the charter vessel *MFV Audacious'* Skipper and crew along with their experience, the survey went extremely smoothly with any issues being rectified promptly. The MD scientists on board appreciated the

good working relationship with SFF observers leading to completion of the survey with high quality data collected.

Ruadhán Gillespie-Mules
30 May 2023

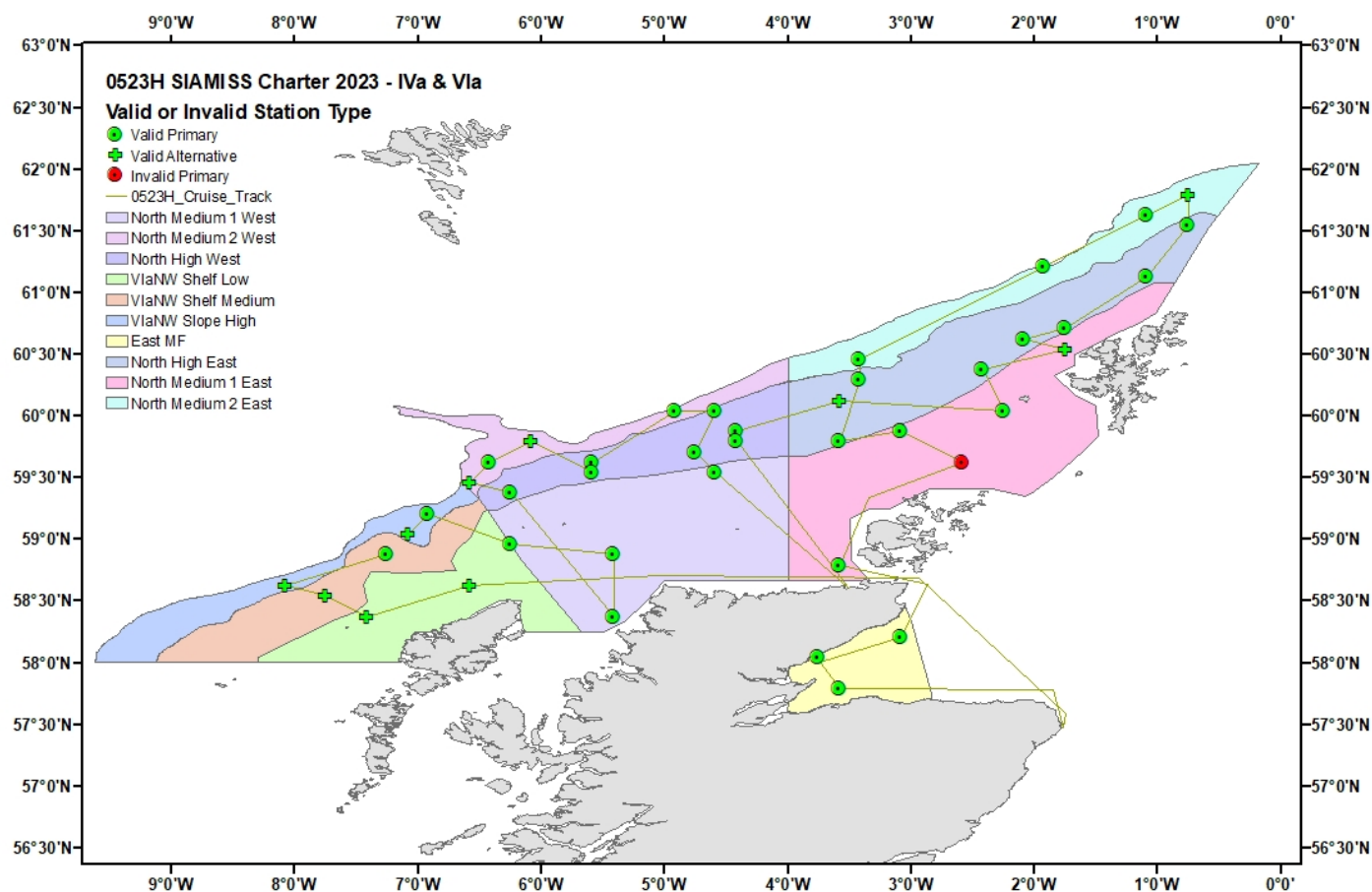


Figure 1: Survey chart illustrating, valid hauls, SIAMISS strata and cruise track in IVa and VIa for 0523H.

Table 1: Number of programmed, valid and percentage completion of stations per stratum for 0523H.

Table 1: 0523H Trawl Stations per Stratum					
Stratum	Programmed No. of Stations	No. of Valid Core Stations	No. of Valid Alternative Stations	Total No. of Valid Stations	Percentage Completion
North.H.E	8	7	1	8	114
North.H.W	7	7	-	7	100
North.M1.E	4	3	1	4	100
North.M1.W	3	3	-	3	100
North.M2.E	3	3	1	4	133
North.M2.W	3	2	2	4	133
V1aNW.Shelf.L	1	1	2	3	300
V1aNW.Slope.H	1	1	2	3	300
V1aNW.Shelf.M	1	1	1	2	200
East MF	3	3	-	3	100

Table 2: Biological sampling targets for 0523H. (* Individual weight, gutted weight, sex, maturity and age; ** Individual weight, gutted weight, sex and maturity; *** Individual weight, sex and maturity – males only)

Table 2: 0523H Biological Sampling Targets	
Species	Target
<i>L. piscatorius</i> (ANG) *	All
<i>L. budegassa</i> (BAN) *	All
<i>L. whiffiagonis</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: CPUE of target species observed during 0523H.

Table 3: 0523H CPUE of Target Species		
Name (Species)	CPUE nos./h	CPUE kg/h
Cod (<i>Gadus morhua</i>)	34.4	109.9
Angler (<i>Lophius piscatorius</i>)	7.7	22.2
Flapper Skate (<i>Dipturus intermedius</i>)	3.1	14
Megrim (<i>Lepidorhombus whiffiagonis</i>)	14.3	7.9
Blue Skate (<i>Dipturus batis</i>)	0.4	1.4
Black-bellied Angler (<i>Lophius budegassa</i>)	0.5	1.2
Blonde Ray (<i>Raja brachyura</i>)	0.1	0.3
Four-spot Megrim (<i>Lepidorhombus boscii</i>)	<0.05	<0.05

Table 4: Numbers of biological observations per species collected during 0523H (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.
Cod (<i>Gadus morhua</i>)	726
Angler (<i>Lophius piscatorius</i>)	315
Flapper Skate (<i>Dipturus intermedius</i>) *	122
Megrim (<i>Lepidorhombus whiffiagonis</i>) **	381
Blue Skate (<i>Dipturus batis</i>) *	15

Black-bellied Angler (<i>Lophius budegassa</i>)	21
Blonde Ray (<i>Raja brachyura</i>) *	3
Four-spot Megrin (<i>Lepidorhombus bosci</i>) **	1