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MRV *Scotia*

Survey 0422S

Report

Dates

18th April – 27th April 2022

Personnel

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Out-turn days: 10 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 internationally co-ordinated demersal trawling survey of Anglerfish (*Lophius piscatorius* and *Lophius budegassa*), Megrin (*Lepidorhombus wiffiagonis*) and Four-Spot Megrin (*Lepidorhombus boscii*) at Rockall (ICES area VIb) 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 wiffiagonis*), 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).
4. Collect and quantify all marine litter encountered on the survey as part of our MSFD responsibilities.
5. To obtain temperature at depth data from the trawl using a DST.
6. To identify and quantify the presence of non-indigenous species observed.
7. To collect mollusc shells for species distribution mapping.

Narrative

Due to mechanical issues the survey was cut short by 10 days. *Scotia* sailed from Aberdeen at 11:00 UTC on the 18th April in good sea conditions following repairs and sea trials. Trawl operations were conducted 24 hours a day with two shifts of scientific crew to work up the catch.

The primary plan, looking at the long range forecast, was for *Scotia* to work East in an

anticlockwise circle to cover the North Sea, Norwegian waters, North of Shetland, West of Scotland Shelf then work back to finish in the Moray Firth.

With all equipment loaded and rigged pre-sailing, Scotia proceeded northeast to the undertake a familiarisation tow. This was completed successfully with the fishing gear, SCANMAR and bottom contact sensors performing well. Some hydraulic leaks were identified following the trial tow, however these were quickly repaired and Scotia proceeded east to the first trawl station. The first trawl station was completed without incident with all systems performing normally.

Steady progress was made the following two days with 11 further trawl stations being completed successfully. On the 21st and 22nd April, Scotia at multiple trawl stations encountered long liner and gill netter fishing vessels with fixed gear covering substantial areas. Conflict was avoided however as following dialogue, the vessels provided positions of their fishing gear and it was avoided by utilising the buffer around the trawl station positions. The 12 trawl stations over the two days were completed successfully.

On the 23rd, Scotia surveyed the deeper water on the slope of Vla. On two stations (H58 and H62), the trawl lifted off the bottom whilst towing as indicated in the sensor data. This will need to be accounted for during data workup. The remaining 5 trawl stations were completed without incident.

The 24th and 25th saw further fine weather and 15 trawl stations completed successfully, Stations 75 and 77 not of the full duration, due to the trawl snagging (H75) on the seafloor and due to upcoming creels (77).

The final 4 trawl stations were completed successfully on the 26th. Following the last trawl, the net was cleaned, bundled and wires stripped before Scotia made for Aberdeen, docking ~ 09:00 on the 27th. The scientific staff, equipment and trawl were unloaded on the 27th April bringing an end to the survey.

Results

Trawl Survey

The survey, being a semi-random stratified survey meant that the locations used for the trawl stations were provided beforehand with a 5 nautical mile buffer. Trawl tows were selected from the provided positions using a combination of established trawl locations as well as new locations, undertaken for a number of reasons including; avoidance of protected and sensitive marine habitats, inability to trawl due to static fishing gear or poor ground. Due to time limitations with the delay in sailing, trawl positions were selected to reduce steaming distances as much as possible, to ensure at least two stations were completed in each strata and proportionally increase coverage in strata with a greater number of initially allocated stations. This required a conservative approach to selecting the number of stations during the initial part of the survey to allow for any disruptions. As the survey progressed smoothly due to good weather conditions and lack of surveying or mechanical issues, this allowed for an increase in the number of stations in strata covered towards the end of the survey.

The SCANMAR system was used to monitor headline height, wing-spread, door-spread, and distance covered during each trawl. The SCANMAR Trawleye was used to monitor bottom type and fish density entering the net. The SCANMAR sensors for the majority of the trawl stations worked well, with the only issues being encountered including some intermittent wing readings (H45 & H46, H51), failure of the height sensor during a station (H40) and depth anomalies (H52 & H65). A bottom contact sensor was attached to the groundgear for each trawl to monitor ground contact to validate touchdown and lift-off of the groundgear which performed well. The EDC system was used to collect all catch data, with data being downloaded and quality checked following every haul.

The same trawl gear (BT195) was used throughout the survey area. The trawl gear performed well during the survey however will need overhauled due to the reoccurring damage in the wings and the mesh weakened by sun exposure whilst in storage. In total there were 51 deployments of the trawl gear, all being valid stations bar the initial trial tow. A chart of the survey area is included

below illustrating valid trawl stations, SIAMISS strata and cruise track (Figure 1.). Table 1. details the number of stations completed per stratum. Due to the lack of survey time, all Rockall strata were not completed.

A total of 99 species were observed for an overall catch weight of 31,039.5kg. All fish and commercial shellfish were identified, weighed and measured to generate a length frequency. Individual biological data were collected from the target species and all skates and rays. The major components (tonnes) caught during the survey included; Saithe (*P. virens*) (~5.1), Haddock (*M. aeglefinus*) (~5.1), Greater Argentine (*A. silus*) (~2.4), Cod (*G. morhua*) (~2.0), Ling (*M. molva*) (~1.9), Blue Ling (*M. dypterygia*) (~1.3) and Anglerfish (*L. piscatorius*) (~1.3). Observations of the catch data identify the catch per unit effort (CPUE) for *L. piscatorius* was 27.6 kg/h, a total of 451 individuals caught on the survey, with biological data collected from 373. All Anglerfish (*L. piscatorius* & *L. budegassa*) sampled for biological data were aged at sea. The CPUE for the target species is detailed in Table 2. with the CPUE of all major components observed, detailed in Table 3. A total of 1951 individual fish were sampled for biological data, detailed in Table 4.

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.

Hydrography

Scotia's on-board thermosalinograph was run throughout the survey collecting temperature and salinity data from 5m deep. A DST was attached to the net for all trawl stations to collect temperature data at depth.

Biological Sampling

Additional biological data were collected from a number of species in support of the EU Data Collection Framework (DCF). A summary of numbers collected by species is displayed in Table 4.

Electronic Data Capture

All haul summary data, catch composition, length frequency data and biological data were entered into the FSS system at sea utilising 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.

Marine Litter

All litter picked up in the trawl was classified, quantified and recorded then retained for appropriate disposal. A notable amount of abandoned monofilament longline and gill netting was retrieved.

Non-indigenous Species

All catch, fish and benthos were screened for the presence of 'Non-Indigenous Species' with none encountered.

Miscellaneous Sampling

- Anglerfish (*L. piscatorius*): ~25 individuals were frozen to support a PhD project studying parasite load in anglerfish. In addition, ~30 individuals of Whiting (*M. merlangus*) and Herring (*C. harengus*) were frozen from each sample area (MSS/Napier University).
- Tissue samples from elasmobranchs (54 samples, 17 species) were retained for genetic sequencing (MSS).

- All shelled molluscs were retained frozen for identification and distribution mapping by D. Mackay.
- Morphometric images of selected species were taken to improve REM species recognition.

My sincere thanks go out to the scientific staff and crew of MRV Scotia who pulled together to successfully cover a vast survey area with the reduced time available.

Ruadhán Gillespie-Mules 06/06/2022

Figure 1: Survey chart illustrating, valid hauls, SIAMISS strata and cruise track in IVa and VIa for 0422S.

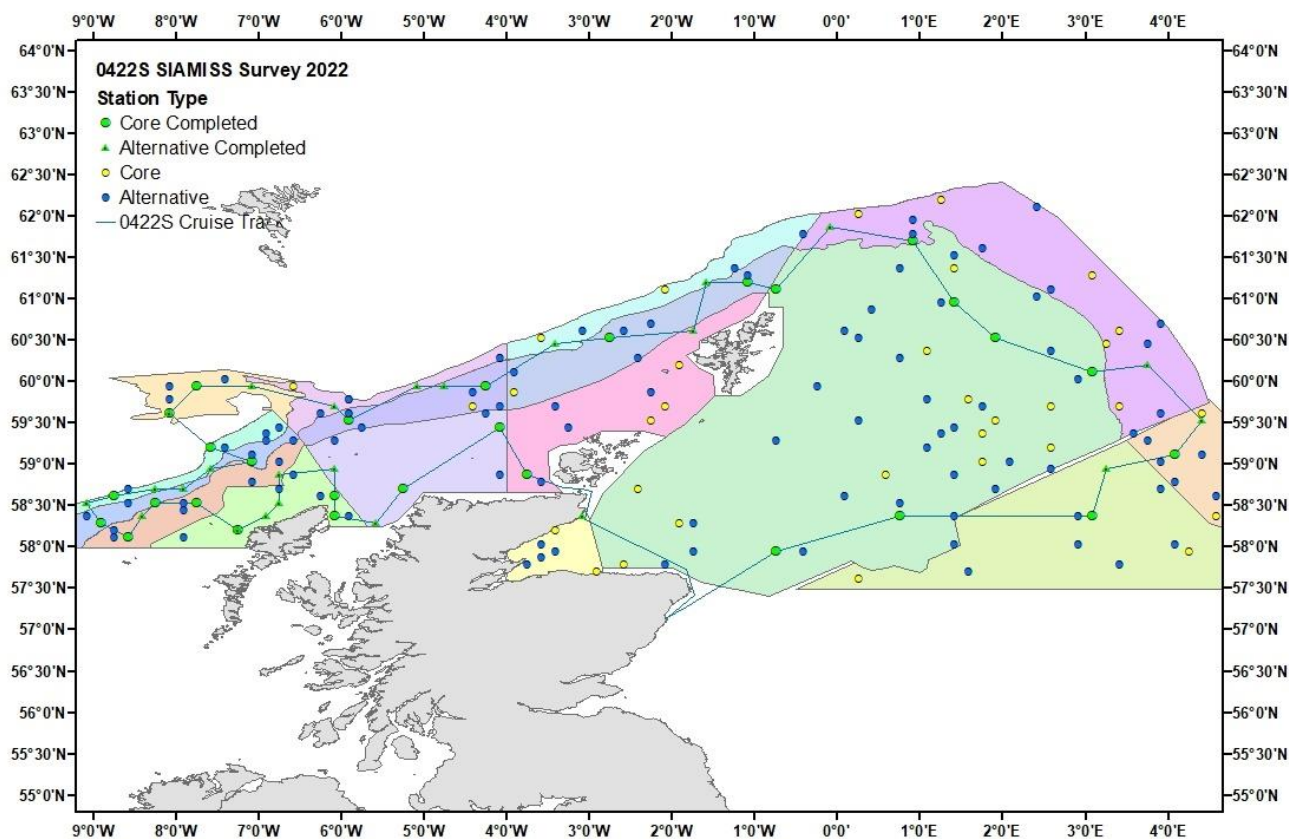


Table 1: Number of trawl stations per stratum for 0422S.

Stratum	Programmed No. of Stations	No. of Completed Core Stations	No. of Completed Alternative Stations	Total No. of Completed Stations	Percentage Coverage
East.L	7	1	2	3	42.9
East.M	18	6	-	6	33.3
East3	3	1	1	2	66.7
East4	3	1	1	2	66.7
North.H.E	3	2	-	2	66.7
North.H.W	4	2	1	3	75
North.L	2	2	1	3	150
North.M1.E	4	1	1	2	50
North.M1.W	2	2	2	4	200
North.M2.E	2	-	2	2	100
North.M2.W	2	-	2	2	100
Rockall.H	5	-	-	-	0
Rockall.L1	6	-	-	-	0
Rockall.L2	3	-	-	-	0
Rockall.M	8	-	-	-	0
Rockall.VH	4	-	-	-	0
VIaNW.Shelf.L	3	3	2	5	166.7
VIaNW.Slope.M	2	2	2	4	200
VIaNW.Slope.H	3	3	2	5	166.7
VIaNW.Shelf.M	2	2	2	4	200
MF	2	-	1	1	50

Table 2: CPUE of target species observed during 0422S.

Name (Species)	CPUE nos./h	CPUE kg/h
Cod (<i>Gadus morhua</i>)	17	41.4
Angler (<i>Lophius piscatorius</i>)	9.1	27.6
Flapper Skate (<i>Dipturus intermedius</i>)	1.5	15.2
Megrim (<i>Lepidorhombus whiffiagonis</i>)	16	8.7
Spotted Ray (<i>Raja montagui</i>)	5.9	4.2
Cuckoo Ray (<i>Leucoraja naevus</i>)	4.2	3.5
Blue Skate (<i>Dipturus batis</i>)	0.3	2.2
Black-bellied Angler (<i>Lophius budegassa</i>)	1.2	1.5
Thornback Ray (<i>Raja clavata</i>)	1.3	1.2
Four-spot Megrim (<i>Lepidorhombus boscii</i>)	0.8	1
Starry Ray (<i>Amblyraja radiata</i>)	1.2	0.4
Blonde Ray (<i>Raja brachyura</i>)	0.1	0.4
Sandy Ray (<i>Leucoraja circularis</i>)	0.1	0.3
Fyllas Ray (<i>Rajella fyllae</i>)	0.6	0.2
Long Nosed Skate (<i>Dipturus oxyrinchus</i>)	0	0.2
Shagreen Ray (<i>Leucoraja fullonica</i>)	0	0

Table 3: CPUE of all major species observed during 0422S.

Name (Species)	CPUE nos./h	CPUE kg/h
Saithe (<i>Pollachius virens</i>)	75.1	109.9
Haddock (<i>Melanogrammus aeglefinus</i>)	334.4	104
Greater Argentine (<i>Argentina silus</i>)	146.9	49.2
Cod (<i>Gadus morhua</i>)	17	41.4
Ling (<i>Molva molva</i>)	15	38.5
Angler (Monk fish) (<i>Lophius piscatorius</i>)	9.1	27.6
Blue Ling (<i>Molva dypterygia</i>)	13.6	27.6
Hake (<i>Merluccius merluccius</i>)	18.1	24.7
Blue-mouth (<i>Helicolenus dactylopterus</i>)	77	23.7
Rabbit Ratfish (<i>Chimaera monstrosa</i>)	19.9	23.4
Spurdog (<i>Squalus acanthias</i>)	11.3	20.1
Lesser Spotted Dogfish (<i>Scyliorhinus canicula</i>)	17.9	15.7
Flapper Skate (<i>Dipturus intermedia</i>)	1.5	15.2
Whiting (<i>Merlangius merlangus</i>)	35.5	13.7
Megrim (<i>Lepidorhombus whiffiagonis</i>)	16	8.7
Leafscale Gulper Shark (<i>Centrophorus squamosus</i>)	0.8	8.3
Greater Forkbeard (<i>Phycis blennoides</i>)	6.4	6.9
Mackerel (<i>Scomber scombrus</i>)	17.6	5.7
Red Gurnard (<i>Chelidonichthys cuculus</i>)	17.5	5.7
Grey Gurnard (<i>Eutrigla gurnardus</i>)	29.6	5.5

Table 4: Numbers of biological observations per species collected during 0422S (length, weight, sex, maturity & age; * length, weight, sex & maturity (males only); ** length, weight, sex & maturity).

Name (Species)	No.	Name (Species)	No.
Megrim (<i>Lepidorhombus whiffiagonis</i>) **	413	Starry Smooth Hound (<i>Mustelus asterias</i>) *	28
Angler (<i>Lophius piscatorius</i>)	373	Four-spot Megrim (<i>Lepidorhombus boscai</i>) **	26
Cod (<i>Gadus morhua</i>)	354	Blue Skate (<i>Dipturus batis</i>) *	14
Spotted Ray (<i>Raja montagui</i>) *	252	Brill (<i>Scophthalmus rhombus</i>) **	9
Cuckoo Ray (<i>Leucoraja naevus</i>) *	188	Sandy Ray (<i>Leucoraja circularis</i>) *	7
Flapper Skate (<i>Dipturus intermedius</i>) *	73	Blonde Ray (<i>Raja brachyura</i>) *	7
Thornback Ray (<i>Raja clavata</i>) *	65	Turbot (<i>Scophthalmus maximus</i>) **	4
Black-bellied Angler (<i>Lophius budegassa</i>)	57	Halibut (<i>Hippoglossus hippoglossus</i>) **	3
Starry Ray (<i>Amblyraja radiata</i>) *	48	Shagreen Ray (<i>Leucoraja fullonica</i>) *	1
Fyllas Ray (<i>Rajella fyllae</i>) *	28	Long Nosed Skate (<i>Dipturus oxyrinchus</i>) *	1