

Not to be cited without reference to the Marine Laboratory, Aberdeen

FRV *Scotia*

Cruise 1120S

Report

Dates

30th July – 19th August 2020

Personnel

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Out-turn days: 21 days – RV2010 / 20584

Fishing Gear: GOV Trawl (BT 137) fitted with groundgear A or B.

Objectives

1. To complete an internationally coordinated demersal trawling survey in the North Sea in ICES area IV.
2. To obtain temperature and salinity data from the water column at each trawling station using a SEABIRD 19+CTD.
3. To collect additional biological data in connection with the EU Data Collection Framework (DCF).
4. To collect and quantify all marine litter encountered on the survey for the MSFD.
5. To identify and quantify the presence of non-indigenous species observed.
6. To collect surface water phytoplankton samples at pre-determined trawl stations.
7. To collect low nutrient sea water from 43F0 for the MSS chemistry department.
8. To retrieve an acoustic sound recorder and C-Pod mooring 80nm East of Montrose.

Narrative

Scotia sailed from Aberdeen at 07:00 UTC on the 30th July in good sea conditions. Pre-sailing, groundgear A was attached to the GOV trawl to allow the completion of the southern half of the survey first. Due to suspected fish processing difficulties with Covid-19 mitigations in place, completing the usually less time consuming southern North Sea stations first would result in all survey staff being available to process the diverse and time consuming Northern stations on the latter half of the survey after mitigation measures were to be relaxed. The first trawl station Southeast

of Aberdeen in rectangle 43E8 doubled as a familiarisation tow and was completed successfully with the fishing gear, SCANMAR and bottom contact sensors performing well and a further two stations were completed without issues. The third tow was cut short due to a large pelagic mark being observed on the sounder entering the trawl.

With the final trawl being completed for the day, passage was made south to the acoustic mooring position to undertake retrieval. Following initial communication difficulties, the entire mooring assembly was recovered successfully.

The following morning during the first trawl, ~20 carboys of low nutrient sea water were collected from 43F0 for analysis by Marine Environmental chemists back at MSS. Smooth sailing and trawling resulted in a large number of stations being completed (26) over the next 5 days, the only issues encountered being dense pelagic marks at trawl station S20/181 and the trawl sticking at S20/193 although no damage was recorded. On the 4th Aug, the weather worsened in the evening although progress went unhindered with another 11 stations being completed over the next two days. Pelagic marks were encountered on S20/205 and S20/209 resulting in the trawls being shortened.

Station S20/212 on the 6th Aug marked the completion of the southern half of the survey (South of 57° 30N) with groundgear A being swapped for groundgear B for the following morning.

The next two days passed largely without incident, a further 12 stations being completed, dense fish marks being encountered twice, resulting in shortened trawls. On the 9th Aug, dense Herring and Pout marks were encountered on all 4 stations slowing progress. In addition, before catch sorting could commence following the forth trawl, the hopper conveyor belt's bearings disintegrated resulting in surveying being halted for the day whilst Scotia's engineers fixed the issue. Catch processing resumed that evening, with the forth trawl's catch being successfully worked up.

The 10th - 12th Aug resulted in another 13 stations being completed successfully, with two trawls shortened due to fish density. On the afternoon of the 12th Aug, Scotia made for Lerwick to resupply stores and water before sailing again later that evening. With the weather staying fine albeit foggy, surveying commenced on the morning of the 13th Aug. During the second trawl, the net was damaged resulting in the first and only invalid trawl of the trip. Following repair the trawl was repeated successfully with a further two being conducted that day, 0.9T of mixed Sandeel species on the second last and dense Pout being encountered on the final trawl.

The next two days passed smoothly, despite catches remaining large the survey progressed well with 10 stations successfully completed. On the 16th Aug, the final three core stations were completed successfully with the Norwegian survey having undertaken four of the Scottish allocated stations early on. Time in hand allowed Scotia to undertake seven additional trawls in Scottish only survey areas. This improves survey definition and enhances overall coverage whilst also utilising the time available to find new trawlable ground. Following the last trawl on the 17th Aug, the net was cleaned and stripped and Scotia made for Aberdeen for unloading a day early on the 18th Aug. The majority of equipment was unloaded on the 18th Aug, with final unloading being completed on the 19th Aug.

Results

Trawl Survey

The locations used for the trawl stations were a combination of established trawl locations as well as completely new locations. 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. A bottom contact sensor was attached to the groundgear for each trawl to monitor ground contact as well as to validate touchdown and lift-off of the groundgear. Not all trawl stations had associated bottom contact data and this was due to sensor failures. The EDC system was used to collect all catch data, with data being downloaded and screened for errors following every successful haul. All trawls were undertaken during the daylight period.

Groundgear A was deployed on all stations south of 57°30' N with groundgear B being used on all stations north of that latitude. In all, 40 stations using groundgear A and 53 stations using groundgear B were completed successfully. All stations used the West Coast GOV trawl design with strengthening strips to limit the damage that regularly occurs throughout the survey area.

The GOV was deployed on 94 occasions, with 93 valid trawls resulting in coverage of 74 statistical rectangles. Of those rectangles where Scotland was the sole surveying nation (21), 14 were sampled twice, with 4 having additional trawls undertaken at the end of the survey (see Figure 1). Only 1 invalid trawl occurred during the survey and this was successfully repeated. 19 trawls were of a non-standard duration of ≥ 15 minutes due to dense fish marks or to prevent gear damage.

A total of 87 species were observed for an overall catch weight of 53,892.5 kg, a marked increase in catch weight compared to the normal average of ~33 tons in the previous few years. Initial observations of the catch data show a significant 1 year old Haddock class coming through along with a very large 0-group Pout index in the Scottish area of the IBTS. Major components (tonnes) included: Haddock (~10.92), Norway Pout (~9.0), Whiting (~7.01), Mackerel (~6.5), Herring (~5.97) and Horse Mackerel (~3.63). The catch per unit effort (CPUE) for major species is detailed in Table 1. A total of 6328 individual fish were sampled for biological data, detailed in Table 2.

The full dataset from this as well as from the other surveys undertaken during the international quarter 3 North Sea survey programme are uploaded to the ICES DATRAS trawl survey database. From this, a set of international abundance indices is calculated for the target commercial species. This international combined survey index is provided to ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK) where it is used as a tuning tool in the stock assessment models for several commercial species.

Hydrography

The CTD (Seabird 19+) was deployed at 93 trawling stations in order to obtain a temperature and salinity profile at each station.

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 2.

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 the quality of the data collected. All data was uploaded to the lab servers following final quality checks whilst Scotia was returning to port.

Miscellaneous

Acoustic Mooring Recovery:

- The acoustic mooring was recovered successfully with all components present.

Marine litter:

- All litter picked up in the trawl was classified, quantified and recorded then retained for appropriate disposal.

Seawater sampling:

- Low nutrient seawater samples were collected in square 43F0 for routine monitoring.

Non-indigenous Species:

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

Phytoplankton Sampling:

- Phytoplankton samples were collected from 34 stations including 34 net samples and 23 natural water samples for training and future research projects.

Ichthyophonus Sampling:

- All sampled Herring were checked for the presence of Ichthyophonus and coded accordingly.

Inter-vessel Variability:

- Additional deployment and retrieval parameters were recorded to better understand international inter-vessel variability.

Species Collection:

- A variety of fish and invertebrate species were collected for outreach and training activities within the Marine Laboratory.
- Haddock were retained for ABU's MSc practical on fish dissection.
- A variety of species were retained for ABU's practical on fisheries biological data collection.

My sincere thanks go out to the scientists and crew of MRV Scotia who pulled together to successfully complete a challenging though ultimately rewarding survey despite the operational restrictions in place to mitigate the continuing threat posed by SARS Cov-2.

Ruadhán Gillespie-Mules 16/10/2020

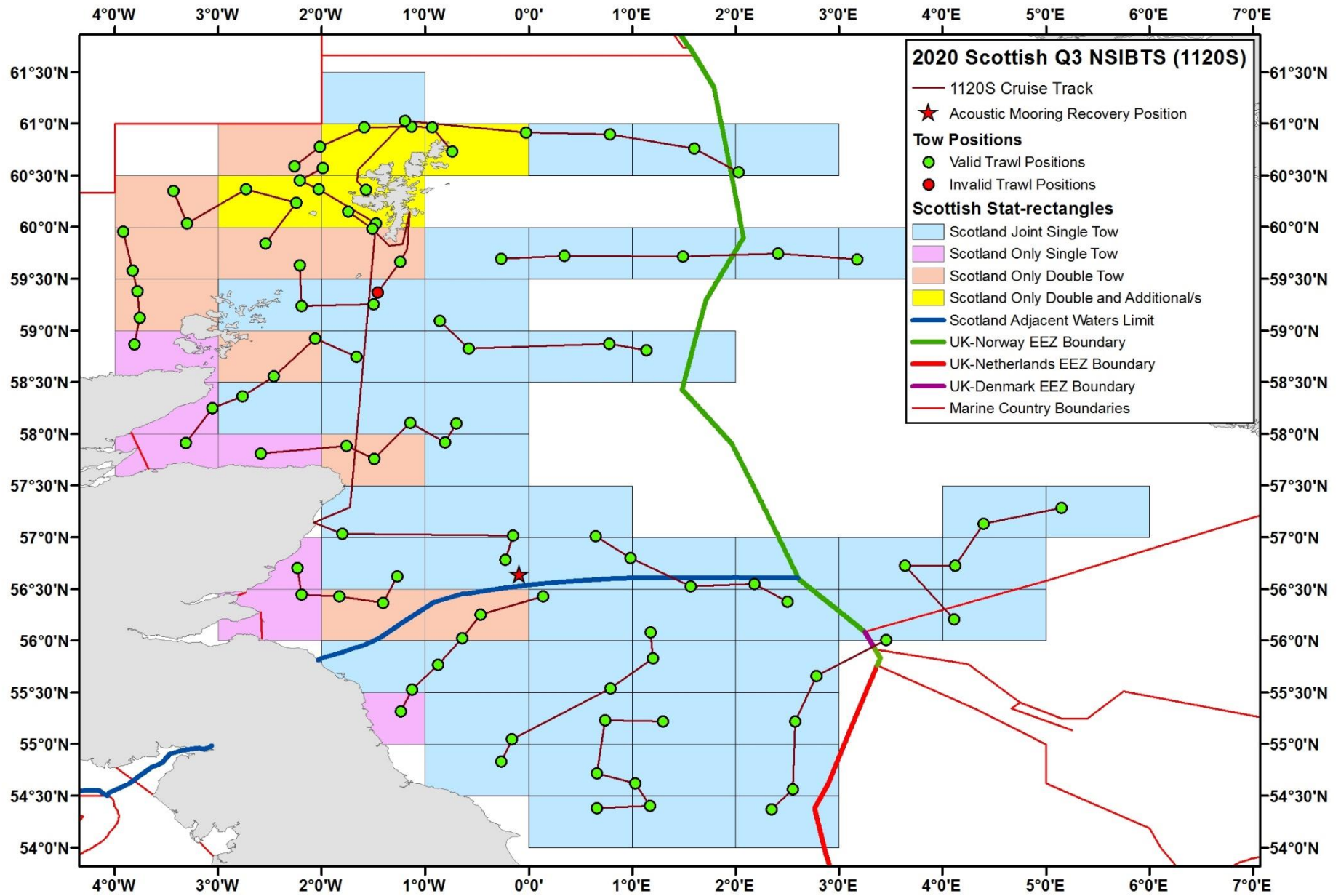


Figure 1: Survey map illustrating completed rectangles, valid hauls, invalid haul, daily cruise track, marine boundaries and acoustic mooring position for 1120S.

Table 1: CPUE of major species observed during 1120S.

Species	CPUE nos/h	CPUE kg/h
Haddock (<i>Melanogrammus aeglefinus</i>)	2315.9	255.5
Norway Pout (<i>Trisopterus esmarkii</i>)	37310.7	210.5
Whiting (<i>Merlangius merlangus</i>)	2061.2	163.9
Mackerel (<i>Scomber scombrus</i>)	600.5	152.1
Herring (<i>Clupea harengus</i>)	821.8	139.6
Horse Mackerel (Scad) (<i>Trachurus trachurus</i>)	302.5	84.9
Blue Whiting (<i>Micromesistius poutassou</i>)	2648.7	68.3
Common Dab (<i>Limanda limanda</i>)	705.4	44.9
Smooth Sandeel (<i>Gymnammodytes semisquamatus</i>)	1422.5	23.5
Cod (<i>Gadus morhua</i>)	15.8	17.6
Grey Gurnard (<i>Eutrigla gurnardus</i>)	140.4	16.1
Saithe (<i>Pollachius virens</i>)	9.8	8.5
Lemon Sole (<i>Microstomus kitt</i>)	69.8	8.3
Lesser Spotted Dogfish (<i>Scyliorhinus canicula</i>)	9.3	8.2
Sprat (<i>Sprattus sprattus</i>)	495.3	7.7
Poor Cod (<i>Trisopterus minutus</i>)	167.7	6.8
Long Rough Dab (<i>Hippoglossoides platessoides</i>)	166.1	6.5
Plaice (<i>Pleuronectes platessa</i>)	39.2	6.2
Hake (<i>Merluccius merluccius</i>)	10.9	5.5
Flapper Skate (<i>Dipturus intermedius</i>)	0.2	5.2
Lesser Argentine (<i>Argentina sphyraena</i>)	55.3	2.9
Angler (Monk fish) (<i>Lophius piscatorius</i>)	1.8	2.8
Corbins Sandeel (<i>Hyperoplus immaculatus</i>)	54.5	2.6
Ling (<i>Molva molva</i>)	1.6	2.1
Greater Sandeel (<i>Hyperoplus lanceolatus</i>)	29.7	2
Megrim (<i>Lepidorhombus whiffiagonis</i>)	3.7	1.1

Table 2: Numbers of biological observations per species collected during 1120S (length, weight, sex & age, * length, weight, sex, maturity & age, ** length, weight and age, *** length, weight, sex & maturity (males only), **** length, weight, sex plus otoliths retained but not aged) ***** length, weight & sex.

Species	No.	Species	No.
Haddock (<i>Melanogrammus aeglefinus</i>)	1551	Starry Ray (<i>Amblyraja radiata</i>)***	46
Whiting (<i>Merlangius merlangus</i>)	1202	Cuckoo Ray (<i>Leucoraja naevus</i>)***	34
Herring (<i>Clupea harengus</i>)*	916	Spotted Ray (<i>Raja montagui</i>)***	14
Mackerel (<i>Scomber scombrus</i>)*	665	Flapper Skate (<i>Dipturus intermedius</i>)***	5
Norway Pout (<i>Trisopterus esmarkii</i>)	451	Turbot (<i>Psetta maxima</i>)*****	2
Cod (<i>Gadus morhua</i>)	435	Starry Smooth Hound (<i>Mustelus asterias</i>)***	2
Plaice (<i>Pleuronectes platessa</i>)	393	Brill (<i>Scophthalmus rhombus</i>)*****	2
Hake (<i>Merluccius merluccius</i>)****	229	Halibut (<i>Hippoglossus hippoglossus</i>)*****	1
Sprat (<i>Sprattus sprattus</i>)**	172	Blonde Ray (<i>Raja brachyura</i>)***	1
Saithe (<i>Pollachius virens</i>)	139	Blue Skate (<i>Dipturus batis (flossada)</i>)***	1
Spurdog (<i>Squalus acanthias</i>)***	66	Thornback Ray (<i>Raja clavata</i>)***	1