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MRV Scotia

Survey 0220S

## **REPORT**

24<sup>th</sup> January – 13<sup>th</sup> February 2020

### **Personnel**

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### **Objectives**

1. To complete Scotland's commitments to the Quarter 1 International Bottom Trawl Survey (Q1 IBTS) 2020 in the North Sea in ICES area IV.
2. To undertake a concurrent plankton survey during the hours of darkness within the trawl survey area to provide indices on:
  - pre-metamorphosed herring and sprat larvae
  - stage 1 cod and plaice eggs
3. To collect temperature and salinity data, along with water samples for nutrient analysis from the surface and seabed water at each trawling station.
4. To collect additional biological data in connection with the EU Data Collection Framework, to collect data on marine litter and to complete agreed sampling requests from the wider scientific community.

**Out-turn days:** 21 days, RV2001 / 20543

### **Survey Gear:**

- GOV Trawl (BT 137) rigged with 47m sweeps and ground gears A and B
- Midwater Ring Net (MIK) with attached subsidiary ring nets (MIKeyM)
- CTD (Seabird 19+)

### **Narrative**

Scotia sailed from Aberdeen at 0900 on 24<sup>th</sup> January and steamed east to undertake a shakedown haul (station 14) in square 43E8. With the fishing gear and net monitoring instrumentation working correctly the haul was considered valid for the survey and was subsequently worked up. Despite conditions to the north being fair the local forecast was for

fairs seas and proceeded further east into the central North Sea with GOV trawl stations being undertaken during daylight hours then switching over to MIK sampling during the hours of darkness.

With plans to undertake the exposed North and North-western sector of the survey area as soon as sea conditions allowed and a hopeful forecast in the medium term the decision was made to work the easternmost areas then survey north towards Shetland. Over the next three days Scotia surveyed up past Fair Isle in good sea conditions. The forecast of a short but strong westerly gale a few days hence meant that Scotia worked to the west and NW of Shetland planning to be in the eastern lee when the gale struck. On 30<sup>th</sup> Jan Scotia had surveyed to her northernmost point (station 36) and was to the east of Yell and Unst the following day well placed to work through the gale affecting the west of the islands. Thereafter the survey rounded Sumburgh and completed stations to the North-west of Orkney. On 3<sup>rd</sup> Feb Scotia completed two stations (49 and 50) however the appearance of a westerly gale combined with engine issues necessitated a halt and the vessel dodged towards Kirkwall harbour making landfall just after midnight on 4<sup>th</sup> Feb for half landing and a change in scientific staff.

Scotia left harbour at 0600 on 5<sup>th</sup> Feb and with conditions to the west of Orkney remaining poor continued the survey to be off Caithness by the end of the day. After passage through the Pentland Firth square 46E6 was completed for MIK. With time to spare the first set of MIK calibrations were undertaken whilst maintaining position west of Hoy for the first haul in the morning. With yet another poor forecast this time for prolonged severe conditions the trawl sampling in squares 46E6 and 47E6 were cut from two hauls to one to allow time for MIK and passage south to the relatively sheltered waters of the Moray Firth. The following three days were spent in the Firth itself and with the South-westerly wind direction and severity permitting no options to work anywhere else the chance was seized to undertake repeat stations there on behalf of Germany who were lacking permission to work in UK waters. Squares 44E6, 44E7, 45E7, were thus covered twice with both trawl and MIK, however the prevailing conditions prevented the more exposed squares further east being similarly covered. A second set of MIK calibrations were also undertaken. On 10<sup>th</sup> Feb the gale switched fully to the west and Scotia was able to complete MIK deployments south of Aberdeen through to the Montrose area and trawls were also completed in the squares closest to land on the 11<sup>th</sup>. With all available squares completed as far as possible, however with no apparent let-up in the forecast, Scotia moved to square 43F0 overnight in conditions prohibiting MIK deployments. Conditions at dawn were poor and this, in conjunction with engine issues and an unrelenting forecast meant that the survey was called off at 1100hrs and Scotia dodged to Aberdeen, arriving in port at 2000 hrs on the 12<sup>th</sup> Feb. All scientific equipment was unloaded on 13<sup>th</sup> February and staff departed the vessel the same day.

## **RESULTS**

### **Demersal Trawl Survey**

All demersal trawling was undertaken with the GOV trawl incorporating ground gear B on all stations north of 57°30N (47 valid hauls and 1 foul) and ground gear A on all stations south of that latitude (8 valid hauls). The Scanmar system was used throughout the survey to monitor headline height, wing spread and door spread. The vessels GPS navigation system provided data on vessel speed over the ground and distance covered during each haul. A self-recording bottom contact sensor was attached to the ground gear with the data being downloaded and checked after each tow to monitor groundgear contact with the seabed.

A total of 56 hauls were undertaken for 0220S of which 55 were considered valid (Figure 1). Of the 48 rectangles in the survey area 44 were surveyed with at least one valid haul. A total of 11 out of the 44 squares contained two valid hauls. These consisted of 3 squares

(44E6, 44E7 and 45E7) to cover international commitments that arose towards the end of the overall planning process, another 7 squares (43E8, 47E7, 48E7, 49E8, 50E8, 50E9 and 51E9) that were part of the standard survey plans for Scotland and 41E7 where an extra haul on new grounds was undertaken to increase options for future surveys. Extra Scottish sampling was originally planned in a further 4 squares (42E8, 46E6, 47E6, and 51E8) however planning around the poor sea conditions encountered during the second half of the survey precluded the first 3 and one haul in 51E8 was foul. Squares 42E9, 42F0, 43F0 and 43F1 while not being covered by Scotland during 0220S were however each covered once by NSIBTS Q1 overall.

There was only a single occurrence of an invalid haul (station 35) with significant damage to the starboard wing. Due to time considerations this particular station was not repeated, however there was another haul (station 36) undertaken in the same square as part of the initial survey plan.

Catches were found to be moderate in general. However the age 1+ group indices for several key species show above average recruitment; in particular these were haddock, whiting, norway pout, mackerel and sprat (Table 1). A total of 80 different species were observed with a total catch weight of 14081 kg for 26.65 hours combined valid trawl time.

**Table 1.** Preliminary 1+ group indices of selected species for Q1 IBTS 2020 (all countries).

Species	Final 2019	Preliminary 2020	Mean (Av. 1980-2019)
cod	2.2	3.8	7
haddock	153	1975	492
whiting	274	598	445
norway pout	1158	6555	2928
herring	1543	746	1977
sprat	3414	3593	1364
mackerel	89	671	107

The above indices are based on the numbers of fish caught per hour below a pre-defined length selected as a probable delimiter of age 1+ fish. The definitive indices will be calculated once all the catch data from all the surveys have been uploaded together with the corresponding age data.

### MIK Survey

A total of 94 MIK hauls were undertaken 4 of which were repeats due to unusable sample following contact of the sampler with the seabed. The 90 valid deployments covered 42 out of the programmed 48 rectangles each with at least 2 samples except for 44F0 (1 sample), 45F1, 45E7 and 46E6 (3 samples) and 44E6 and 44E7 (4 samples). A total of 6 squares (42E9, 42F0, 43E9, 43F0, 43F1, and 44F1) could not be sampled at all due to unworkable weather conditions. The vertical profile of each haul was monitored using a Scanmar depth sensor. Identification and measurement of the clupeid and other larval species encountered will be undertaken back at the lab. MIKeyM samples were collected once from each of the 42 rectangles covered. These samples will be picked for fish eggs at Marine Lab then subsequently sent to Norway for full processing for stage 1 cod and plaice eggs.

### Biological Sampling / Age determination / Additional DCF sampling

In total 3567 biological samples (Table 2) were collected as part of the routine biological sampling programme on a broad range of mainly commercial species. Otoliths from cod,

haddock, whiting, saithe, norway pout, herring, mackerel and sprat were collected for immediate ageing back at Marine Lab. Hake and plaice otoliths were also retained from the survey, a subset of which will be aged at a later date.

**Table 2.** Numbers of routine biological samples collected.

Species	No. bio Sampled	No. Aged
Angler ( <i>Lophius piscatorius</i> )	36	22
Blonde Ray ( <i>Raja brachyura</i> )	40	0
Blue Skate ( <i>Dipturus flossada</i> )	9	0
Cod ( <i>Gadus morhua</i> )	305	305
Cuckoo Ray ( <i>Leucoraja naevus</i> )	15	0
Flapper Skate ( <i>Dipturus intermedia</i> )	7	0
Haddock ( <i>Melanogrammus aeglefinus</i> )	956	956
Hake ( <i>Merluccius merluccius</i> )	84	tba
Herring ( <i>Clupea harengus</i> )	224	224
Lemon Sole ( <i>Microstomus kitt</i> )	90	0
Mackerel ( <i>Scomber scombrus</i> )	253	253
Ling ( <i>Molva molva</i> )	1	0
Norway Pout ( <i>Trisopterus esmarkii</i> )	341	341
Plaice ( <i>Pleuronectes platessa</i> )	117	tba
Saithe ( <i>Pollachius virens</i> )	66	66
Spotted Ray ( <i>Raja montagui</i> )	20	0
Sprat ( <i>Sprattus sprattus</i> )	292	292
Spurdog ( <i>Squalus acanthias</i> )	5	0
Starry Ray ( <i>Amblyraja radiata</i> )	2	0
Starry Smooth Hound ( <i>Mustelus asterias</i> )	14	0
Thornback Ray ( <i>Raja clavata</i> )	11	0
Turbot ( <i>Scophthalmus maximus</i> )	2	0
Whiting ( <i>Merlangius merlangus</i> )	677	677
Total	3567	

### Hydrographic Data

The CTD and reverser bottle were successfully deployed at 54 out of a possible 55 valid GOV stations in order to obtain temperature/salinity data. In addition surface and near-seabed water samples were collected from all deployments for analysis of nitrate, silicate and phosphate content back in the lab.

### Marine Litter

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

## Additional Samples and Miscellaneous Requests

A further 10 requests for additional samples were received for 0220S, these and their respective recipients are summarised below.

Tissue samples:

The following sets of tissue samples were collected, contributing to various studies on the genetic resolution of population structure with subsequent use in informing management decisions:

- Cod: 95 tissue samples (Marine Scotland Science (MSS)).
- Hake: 41 tissue samples (GECKA project, AZTI).
- Anglerfish (*Lophius piscatorius*): 37 tissue samples (GECKA project, AZTI).
- Common skate: (*Dipturus intermedius* and *D. flossada*): 16 skin swab samples (PhD, MSS/University of Aberdeen).
- Pilchard: 15 tissue samples (University of Lisbon).

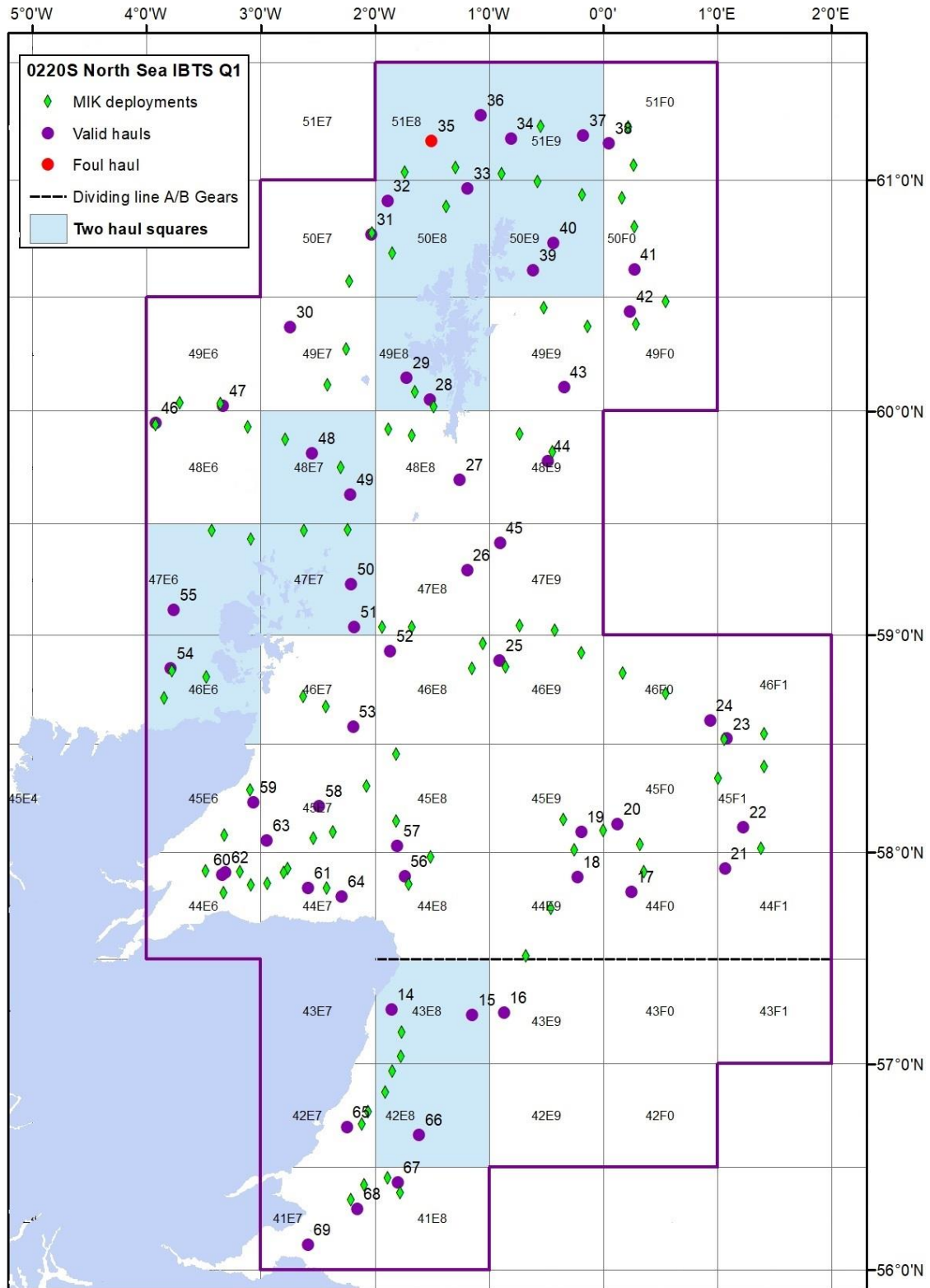
Further miscellaneous samples collected:

- Anglerfish (*L. piscatorius*): 10 sets of complete internal organs were frozen to support an MSc project (MSS/University of Aberdeen) studying parasite load in anglerfish as population markers.
- Mackerel: 50 juveniles were frozen whole for a study of the impact of temperature on capacity for growth (University of Southampton).
- Ascidians: Tissue samples were collected from 12 specimens with the remainder of each specimen preserved (MSS).
- Axinellid sponges: Tissue samples from 35 specimens of mainly *Phakellia ventilabrum* and *Axinella infundibuliformis* were collected for phylogenetic study (Natural History Museum).
- All shelled molluscs were collected and retained frozen for the Mackay reference collection.

Submitted:

J Drewery

12<sup>th</sup> Mar 2020



**Figure 1.** Scottish North Sea Q1 IBTS survey area along with completed trawl stations, station numbers and MIK deployments for 2020. All deployment symbols represent approximate midpoints. Dashed line represents dividing line at 57°30N between groundgears used (A – South of division line, B – North of division line).