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MRV Scotia

Survey 0219S

REPORT

24th January – 13th February 2019

Personnel

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Objectives

1. To complete Scotland's commitments to the Quarter 1 International Bottom Trawl Survey (Q1 IBTS) 2019 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 from the surface and seabed water at each trawling station.
4. To collect additional biological data in connection with the EU Data Collection Framework (DCF).

Out-turn days: 21 days, RV1901/20509

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 12:15 on 24th January with the GOV rigged with groundgear B and steamed north to undertake a shakedown haul in square 44E8. With all the fishing gear and net monitoring instrumentation working correctly the haul was considered valid for the survey and was subsequently worked up. Thereafter the survey proceeded as planned with the GOV trawl stations being undertaken during daylight hours then switching over to the MIK sampling during the hours of darkness.

Over the next two days Scotia surveyed in the Moray Firth and East of Orkney in good sea conditions however a weather warning prompted surveying north to be in the lee of Shetland for 27th of Jan. Thereafter good conditions prevailed and bar two foul hauls the survey carried on to the east and north of Shetland without incident before working down to the western side of Orkney on 1st Feb. On the evening of 2nd Feb Scotia steamed for Kirkwall for the half landing and staff change. On the morning of 4th Feb operations were recommenced in square 47E7 and the survey continued east and south into the central north sea over the next few days. On 7th Feb the change to groundgear A was made and all the stations to the

south of 57.5°N were completed without incident over the next three days bar one foul haul in square 43E8. The Scottish trawl commitments to IBTS Q1 were complete by the afternoon of 11th Feb and the change was made back to ground gear B before heading back north of 57.5° to square 45E8 to undertake some further sampling there and in adjacent squares on behalf of our partner nations. Another two squares were planned for additional trawling on 12th Feb, however the net was badly damaged on hauling station 76, and though the catch was valid there was no time available to effect repairs or change nets for further survey work. With the survey thus over Scotia made passage for Aberdeen harbour and was alongside at 1700. All scientific equipment was unloaded on 13th February and staff departed the vessel the same day

RESULTS

Demersal Trawl Survey

All demersal trawling was undertaken with the GOV trawl with ground gear B being used north of 57°30N (47 valid hauls) and ground gear A used for all stations south of that latitude (11 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 62 hauls were undertaken for 0219S. Overall 58 out of the 59 programmed stations were sampled successfully (Figure 1). All 48 rectangles in the survey area were surveyed with at least one valid haul. A total of 10 out of the 48 squares contained two valid hauls. These consisted of 5 squares (45E7, 45E8, 46E8, 47E8 and 48E8) to cover international commitments that arose towards the end of the planning process plus another 5 squares (45E7, 45E6, 48E7, 49E8 and 42E8) that are part of the standard survey plans for Scotland. Extra Scottish sampling originally planned in a further 5 squares (47E7, 50E8, 51E8, 51E9 and 43E8) originally planned was dropped to allow priority for the international commitments as agreed with the overall survey coordinator.

There were 4 occurrences of invalid hauls, all of which involved significant damage to the trawl. On 3 occasions the station was successfully repeated elsewhere within the rectangle. In the case of square 43E8 however the invalidation of haul 73 resulted in only one valid haul being undertaken in that square instead of the two that were initially planned.

Catches were found to be low overall. A total of 79 different species were observed with a total catch weight of 15335 kg for 28 hours combined valid trawl time. Of particular note were haul 21 which contained ~ 2.9 tonnes of haddock and the presence of an 87cm Dealfish (*Trachipterus arcticus*) in haul 58.

Table 1 shows the preliminary indices for all vessels participating in the 2019 Q1 North Sea international bottom trawl survey. The 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.

Table 1. Preliminary 1+ grp indices of selected species for Q1 IBTS 2019 (All countries).

Species	Final 2018	Preliminary 2019	Mean (Av. 1980-2018)
Cod	0.8	2.1	7

Haddock	47.1	183	501
Whiting	114.7	208	447
Norway pout	1161.5	3671	2902
Herring	777.9	828	1988
Sprat	3185.2	3858	1311
Mackerel	145.4	110	108

MIK Survey

A total of 99 MIK hauls covering all 48 rectangles each with at least 2 samples were completed. Squares 44E7, 45E7 and 45E8 all had 3 MIK hauls (Figure 1). 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 48 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 4212 biological samples 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. In addition hake and plaice otoliths were also retained from the survey, these will be aged at a later date (Table 2).

Table 2. Numbers of routine biological samples collected.

Species	No. Sampled	Whole Weight	Gutted Weight	No. Aged
Blue Skate (<i>Dipturus flossada</i>)	6	6	-	-
Cod (<i>Gadus morhua</i>)	363	363	363	363
Cuckoo Ray (<i>Leucoraja naevus</i>)	46	46	-	-
Flapper Skate (<i>Dipturus intermedia</i>)	12	12	-	-
Haddock (<i>Melanogrammus aeglefinus</i>)	1027	1027	1027	1027
Hake (<i>Merluccius merluccius</i>)	111	111	111	tba
Halibut (<i>Hippoglossus hippoglossus</i>)	1	1	1	-
Herring (<i>Clupea harengus</i>)	500	500	-	500
Lemon Sole (<i>Microstomus kitt</i>)	103	103	-	-
Mackerel (<i>Scomber scombrus</i>)	78	78	-	78
Norway Pout (<i>Trisopterus esmarkii</i>)	443	443	-	443
Plaice (<i>Pleuronectes platessa</i>)	148	148	-	tba
Saithe (<i>Pollachius virens</i>)	32	32	-	32
Spotted Ray (<i>Raja montagui</i>)	76	76	-	-
Sprat (<i>Sprattus sprattus</i>)	227	227	-	227

Spurdog (<i>Squalus acanthias</i>)	244	244	-	-
Starry Ray (<i>Amblyraja radiata</i>)	10	10	-	-
Starry Smooth Hound (<i>Mustelus asterias</i>)	34	34	-	-
Thornback Ray (<i>Raja clavata</i>)	4	4	-	-
Turbot (<i>Scophthalmus maximus</i>)	2	2	-	-
Whiting (<i>Merlangius merlangus</i>)	744	744	-	744

Hydrographic Data

The CTD and reverser bottle were successfully deployed at 55 out of a possible 58 valid GOV stations in order to obtain temperature/salinity data. Failures are attributable to equipment breakdown at station 15 and lack of time at stations 61 and 62. 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.

Invasive species

All hauls were checked for particular invasive marine species and their presence/absence recorded. These invasive species were absent from all hauls during 0219S.

Miscellaneous

The following miscellaneous tasks and sample collection were also undertaken:

- 15 anglerfish (*Lophius piscatorius*) were frozen whole to be examined for parasite load as part of an MSc project at Aberdeen University
- 28 tissue samples from anglerfish (*Lophius piscatorius* and *L. budegassa*) were frozen for genetic analysis at Durham University and isotope analysis at Southampton University.
- 3 tissue samples (fin clips) from flapper skate (*Dipturus intermedius*) were preserved in ethanol for molecular studies as part of a PhD at Aberdeen University.
- Tissue samples (gill clips) from selected species were preserved in ethanol for sequencing at Bangor University: garfish (*Belone belone*): 1 sample, common dab (*Limanda limanda*): 5 samples, striped red mullet (*Mullus surmuletus*): 5 samples, hooknose (*Agonus cataphractus*): 6 samples, common seasnail (*Liparis liparis*): 3 samples
- All shelled molluscs and selected haddock stomachs samples were collected and frozen for the McKay reference collection.
- One box of plaice and two boxes of mixed discard-equivalent fish were retained frozen for an otolith extraction and observer sampling workshop back at Marine Lab.
- One staff belonging to the Scottish Fisherman's Federation was trained in anglerfish (*Lophius* spp) otolith collection for observer duties.

Submitted:
J. Drewery
20th February 2019

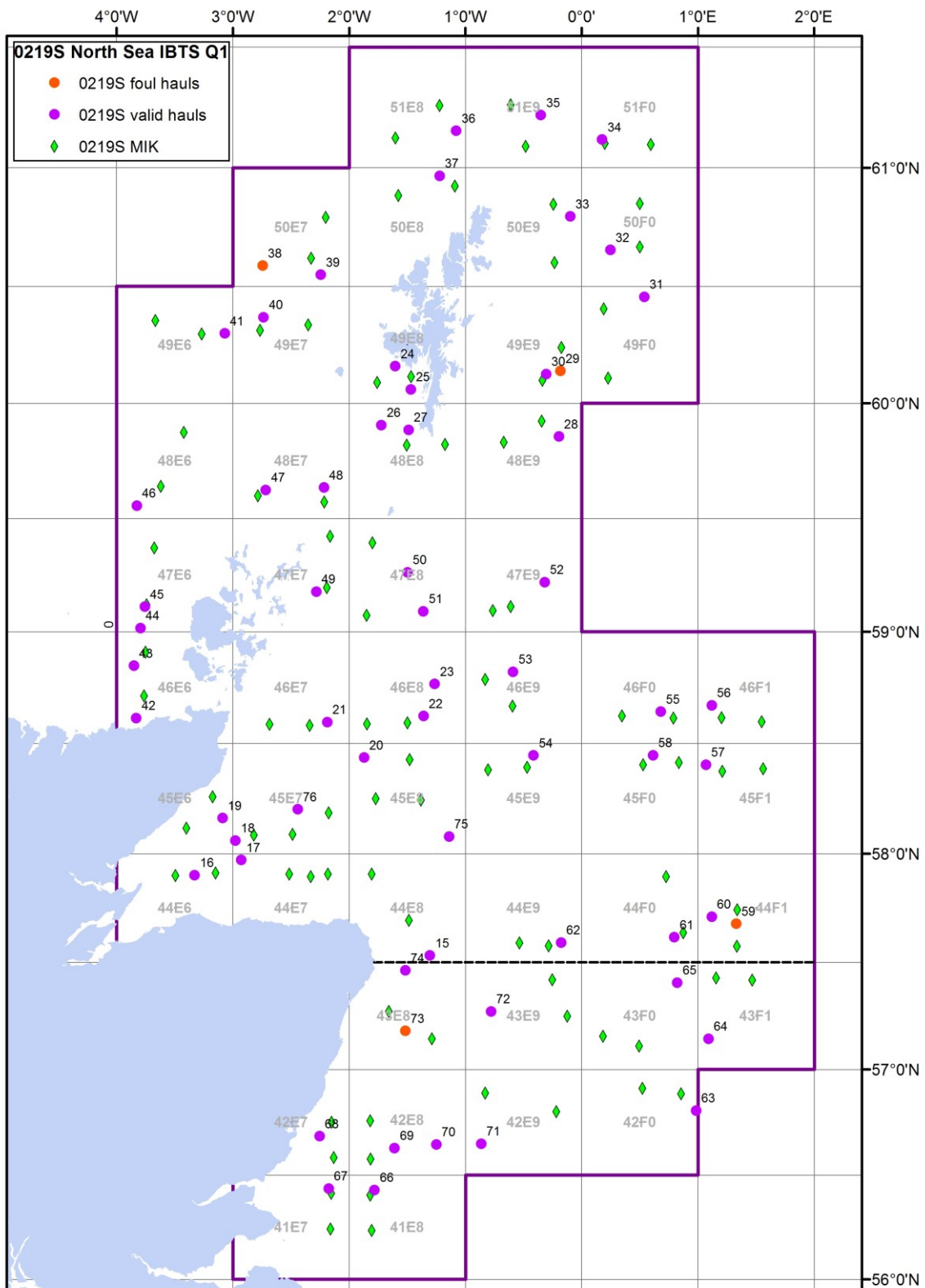


Figure 1. Scottish North Sea Q1 IBTS survey area along with completed trawl stations, station numbers and MIK deployments for 2019. All deployment symbols represent approximate midpoints. Dashed line represents dividing line at 57°30'N between groundgears used (A – South of division line, B – North of division line).