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

MRV *Scotia*

Survey 1118S

REPORT

Dates

28th July – 17th August 2018

Half-landing: Aberdeen, 8th August 2018

Personnel

R. Gillespie-Mules	(SIC)
M. Kinghorn	(Deck)
H. Holah	
G. McAllister	
A. Moutaftsi	(Visitor – ABU)
J. Wouters	(Visitor – ABU)
M. Smart	(Visitor – NOC)
L. Clayton	(Part 1)
C. Altass	(Part 1)
A. Duncan	(Visitor – SFF – Part 1)
F. Armstrong	(Part 2)
W. Spence	(Visitor – SFF – Part 2)

Out-turn days: 21 days – RV1810

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 surface and seabed 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. Opportunistic completion of ‘zero hours’ trawls to assess catches during unquantified time spent by the trawl on the seabed.

5. Deployment of 3 AUV gliders as part of the AlterEco project.

Narrative

Scotia sailed from Aberdeen at 05:00 on the 28th of July in good sea conditions. The first trawl station Northeast of Aberdeen in rectangle 44E8 doubled as a familiarisation tow and was completed successfully with the fishing gear, SCANMAR and bottom contact sensors performing well. A further three stations were successfully completed during daylight.

The following day the weather proceeded to freshen therefore 6 Moray Firth trawls were undertaken to utilise the lee from the land. All were completed successfully, with a small amount of damage to the trawl wing during the final tow. With the inner Moray Firth completed, Scotia made for West of Orkney for the following morning. The third day passed without incident, with 6 successful trawls completed.

On the 31st July, the first trawl was invalid due to net damage however repairs were completed quickly and allowed for 5 valid trawls. One additional trawl was invalid due to technical issues with the EDC system. A further 6 valid trawls were completed the following day with buoyancy tests conducted on one of the NOC Seagliders.

The following morning, 2 trawls were completed before an attempted deployment of a Seaglider. Unfortunately due to buoyancy issues resulting in communication failure, the deployment was aborted and the Seaglider recovered with the aim to redeploy the Seaglider after adjustments. Three further trawls were completed that day without incident.

Two more days passed without incident, a further 11 trawl stations being successfully completed. On the 5th of August, 6 trawls were successfully completed however due to the abundance of Herring on the ground 4 of the 6 trawls were cut short to avoid even greater catches of Herring, a total of 5.7 T of the species being caught during the day.

The first trawl station on the 6th August was completed for the German survey as mechanical issues hampered their attempts. The ground gear was then changed from B to A for the remainder of the survey with all core stations, north of 57° 30'N, successfully completed. Five further trawls were completed that day with the new ground gear, Herring encountered again on the final trawl resulting in a shortened tow. Remaining daylight was used to conduct buoyancy tests on the 2nd Seaglider.

Five successful trawls were conducted on the 7th August before Scotia made for Aberdeen for the scheduled half landing. Scotia sailed again on the morning of the 09th August with 3 trawls completed whilst daylight allowed. Further buoyancy tests were conducted on 2nd Seaglider with promising results, communication being successful.

The following two days passed without incident, 12 trawls being completed successfully. During the evening of the 11th August, buoyancy tests were conducted again on the faulty Seaglider after weight was added. This resulted in successful communication. On the 12th August during the second tow the net became entangled on an unknown item on the seafloor resulting in substantial damage. After quickly swapping the net for a partially rigged one on the top drum, 4 more trawls were completed successfully.

Following the first trawl on the 13th August, both the Seagliders and the Slocum glider were deployed successfully regardless of the freshened sea state. Eight more trawls were conducted successfully without incident until the 15th August. The first haul was invalidated due to EDC technical issues however after repeating, this brought an end to the core trawl stations, all having been completed successfully.

A set of experimental trawls for the IBTS inter-vessel calibration exercise, consisting of a 30 minute trawl followed by a 15 minute trawl and 3 'zero hour' trawls, were conducted that afternoon. After steaming overnight closer to Aberdeen another set of experimental trawls were conducted on the morning of the 16th before making towards Aberdeen for docking that evening. Staff and equipment departed the vessel on the morning of the 17th August in Aberdeen.

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. Data was downloaded from the on-board EDC system 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, 44 stations were completed successfully using groundgear A and 50 stations with groundgear B. All stations also used the West Coast GOV trawl design with strengthening strips to limit the damage that occurs on stations throughout the survey area.

The GOV was deployed on 104 occasions. A total of 94 valid trawls were achieved resulting in the coverage of 74 statistical rectangles. One rectangle was covered for the German survey. Of those rectangles where Scotland was the sole surveying nation (23), 16 were sampled twice (see Figure 1). There were 4 invalid trawls during the survey and all were repeated successfully. 14 trawls were of a non-standard duration of ≥ 15 minutes due to dense fish marks or to prevent gear damage. Two complete sets of experimental 'zero hour' trawls were conducted consisting of 2 30 minute trawls, 2 15 minute trawls and 6 'zero hour' trawls.

A total of 82 species were caught for an overall catch weight of 33,427.5 kg. Major components (tonnes) included: Herring (~9.35), Whiting (~3.65), Haddock (~3.6), Norway Pout (~3.28), Mackerel (~3.19) Common Dab (~1.81), Sprat (~1.15) and Cod (~1.1). Catch per unit effort (CPUE) for major species is illustrated in Table 1. A total of 6136 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 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 94 valid trawling stations in order to obtain a temperature and salinity profile.

Biological Sampling

Additional biological data were collected from species in support of EU Data Collection Framework (DCF). A summary of numbers collected by all 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 and uploaded upon return to the lab.

AlterEco Glider Deployment

All three AlterEco project oceanographic gliders (two Seagliders and one Slocum) were deployed successfully during the survey furthering the collection of physical and chemical oceanographic data in the North Sea to determine the effect on the marine ecosystem and ocean health.

Miscellaneous

Marine litter:

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

Seawater samples:

- 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'.

Icthyophonus Sampling:

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

Inter-vessel Variability:

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

Fish CCTV:

- Morphometric measurements of key demersal species were collected before exposing individually tagged fish to the Archipelago CCTV system along the conveyor belt. This footage will be reviewed back in lab to compare the precision and accuracy of the actual morphometric measurements with derived measurements using the Archipelago EMI Interpret Pro software package.
- Video clips of ungutted single species fish travelling along the conveyor belt were collected for the ongoing automated image analysis project contracted to the University of Norwich.

Species Collection:

- A variety of fish and invertebrate species were collected for outreach activities for both within the Marine Laboratory and externally at schools and public events.
- A variety of fish and invertebrate species were also collected for the Aberdeen University MSc practical on fish diversity, form and function. Haddock were also retained for the MSc course's practical on fish dissection.
- Whole fish (Cod, Haddock, Herring and Mackerel) were collected for a postgraduate research project into fatty acid comparisons in different size classes of fish.

Parasite examinations:

- Cod stomachs were retained and frozen for a redescription of the nematode parasite family taxonomy.
- Rockling species (mostly *Enchelyopus cimbrius*) were collected for investigating the phylogenetic relationships between myxozoan parasite families and assignment of *Ceratomyxoa* and *Pseudalataspora* myxozoan species.

Ruadhán *Gillespie-Mules* 27/09/2018

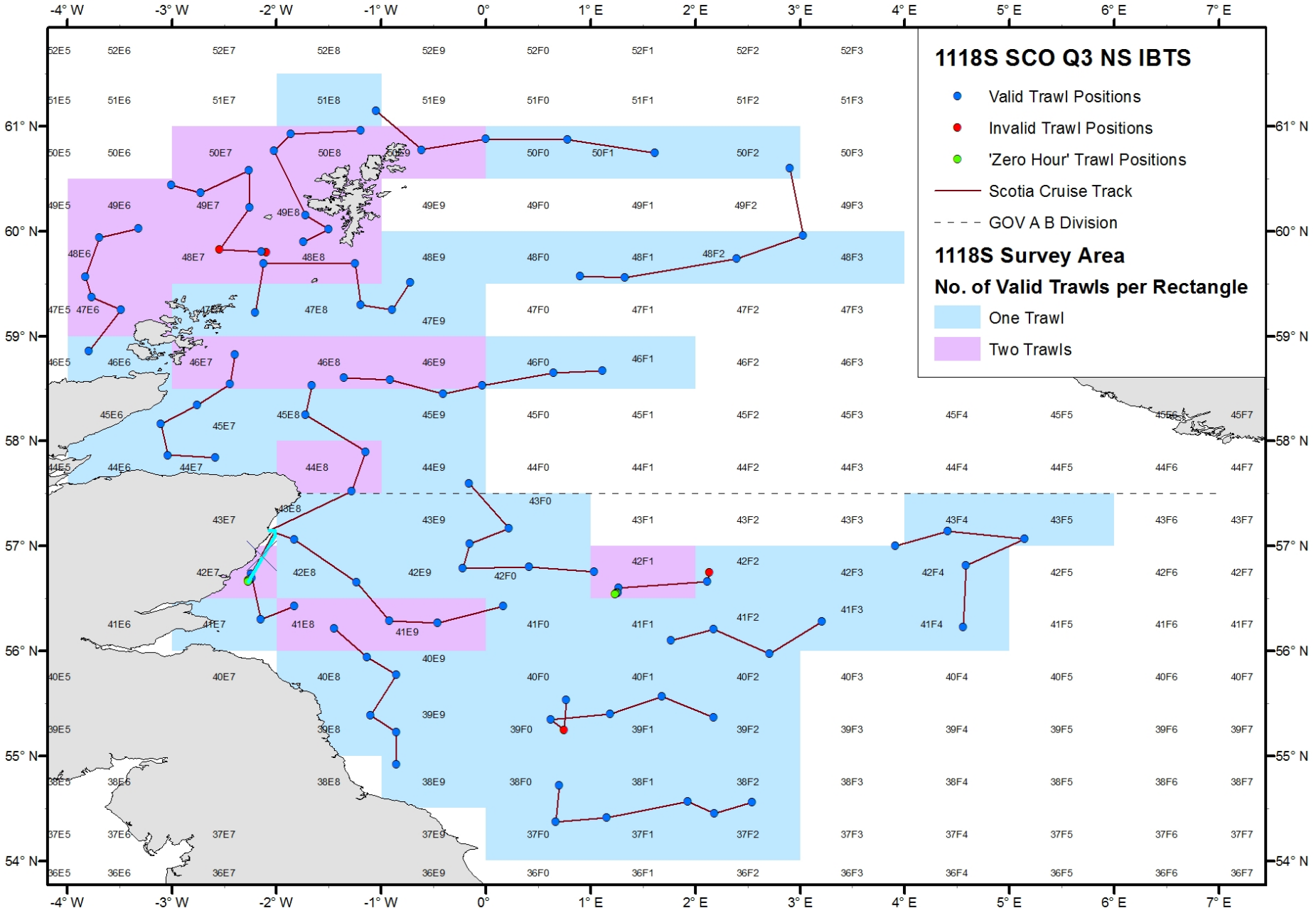

Figure 1: Survey map illustrating completed rectangles, valid hauls, invalid hauls and daily cruise track for 1118S.

Table 1: CPUE of major species observed during 1118S.

Species	CPUE no.s/h	CPUE kg/h
Herring (Clupea harengus)	1525.6	210.1
Whiting (Merlangius merlangus)	670	81.9
Haddock (Melanogrammus aeglefinus)	518	81
Norway Pout (Trisopterus esmarkii)	22177.4	73.7
Mackerel (Scomber scombrus)	203.8	71.6
Common Dab (Limanda limanda)	692.8	40.6
Sprat (Sprattus sprattus)	2481.5	25.9
Cod (Gadus morhua)	13.7	24.8
Saithe (Pollachius virens)	14.4	21.7
Blue Whiting (Micromesistius poutassou)	179.8	14.6
Grey Gurnard (Eutrigla gurnardus)	117.7	13.1
Plaice (Pleuronectes platessa)	66.1	12.3
Spurdog (Squalus acanthias)	6	11.8
Lesser Spotted Dogfish (Scyliorhinus canicula)	10.9	11.1
Hake (Merluccius merluccius)	10.1	7.8
Smooth Sandeel (Gymnammodytes semisquamatus)	506.4	7.8
Horse Mackerel (Scad) (Trachurus trachurus)	21.2	7.5
Long Rough Dab (Hippoglossoides platessoides)	177.3	6.4
Lemon Sole (Microstomus kitt)	43.6	5.6
Flapper Skate (Dipturus intermedia)	0.1	4.1
Angler (Monk fish) (Lophius piscatorius)	1	2.1
Ling (Molva molva)	1.1	1.8
Poor Cod (Trisopterus minutus)	58.3	1.5

Table 2: Numbers of biological observations per species collected during 1118S (length, weight, sex and age, * length, weight, sex, maturity and age, ** length, weight and age, *** length, weight, sex and maturity, **** length, weight, sex plus otoliths retained but not aged).

Species	No.	Species	No.
Melanogrammus aeglefinus	1353	Amblyraja radiata***	65
Merlangius merlangus	1204	Squalus acanthias***	51
Clupea harengus*	879	Leucoraja naevus***	36
Gadus morhua	544	Raja montagui***	35
Trisopterus esmarkii	442	Mullus surmuletus****	5
Scomber scombrus*	364	Dipturus intermedia***	3
Merluccius merluccius****	333	Dipturus flossada***	1
Pollachius virens	333	Leucoraja fullonica***	1
Pleuronectes platessa	243	Pollachius pollachius****	1
Sprattus sprattus**	243		