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MRV *Scotia*

Survey 0814S

Programme

28 June – 17 July 2014

Ports
Loading: Aberdeen, 25 June 2014
Departure: Aberdeen, 28 June 2014
Half-landing: Lerwick, 7 July 2014 (TBC)
Arrival and unloading: Aberdeen, 17 July 2014

In setting the cruise programme and specific objectives, etc the Scientist-in-Charge needs to be aware of the restrictions on working hours and the need to build in adequate rest days and rest breaks as set out in Marine Scotland's Working Time Policy (Lab Notice 34/03). In addition, the Scientist-in-Charge must formally review the risk assessments for the survey with staff on-board before work is commenced.

In the interest of efficient data management it is now mandatory to return the Survey Report, to I Gibb and the Survey Summary Report (old ROSCOP form) to M Geldart, within four weeks of a survey ending. In the case of the Survey Summary Report a nil return is required, if appropriate

Personnel

P Copland	(SIC)
S Lusseau	(SIC shadowing)
J Hunter	
M Inglis	
L Ritchie	
M Stewart	(Part 1)
J Rasmussen	(Part 1)
J Wilson	(Part 1, MSc student, University of Aberdeen,)
M O'Malley	(Part 2)
R Catarino	(Part 2)
R G-Mules	(Part 2)

Estimated days by project: 20 days – RV1406 (20253)

Sampling Gear

Midwater trawl PT160 x 3.
Multisampling pelagic cod-end with one fine mesh cod-end.
Seabird 911 CTD
1 metre vertical plankton sampling net 350µm mesh

Objectives

- To conduct an acoustic survey to estimate the abundance and distribution of herring in the north western North Sea and north of Scotland between 58º30'-62ºN and from the shelf edge to 2ºE, excluding Faroese waters.

- To obtain biological samples for echosounder trace identification using a pelagic trawl.

- To obtain samples of herring for biological analysis, including age, length, weight, sex, maturity and ichthyophonus infection.

- To obtain hydrographic data for comparison with the horizontal and vertical distribution of herring.

- To obtain dry weight estimates of macro zooplankton biomass throughout the study area for comparison with acoustically derived plankton biomass estimates and observed herring distribution.

Procedure

All fishing gear and scientific equipment will be loaded onto the vessel on 25 June. Marine Scotland staff will fit acoustic transducers for control of the multisampler net to the drop keel prior to sailing. The vessel will depart Aberdeen on 28 June and after required vessel drills head for Scapa Flow, Orkney Islands, where calibration of all echosounders will take place (approximately 8-12 hours at anchor). Crew training and trial deployments of fishing gear and the multi sampler will take place en route as required by the fishing master.

The survey will commence after calibration and follow a pattern of parallel transects running east/west, at normal steaming speed (10.5 knots), progressing northwards, along the east side of Orkney/Shetland, and southwards along the west side. The survey area is bounded by 58º30'-62ºN and 02ºE to the 250 m contour. Transect spacing is 15 nm for the entirety of the survey area. A pelagic vessel will be chartered to conduct an acoustic survey simultaneously with *Scotia* by interlacing between these transects giving an effective transect spacing for the combined surveys of 7.5 miles. The proposed *Scotia* survey design is shown in Figure 1. The charter vessel will not collect herring biological samples other than those obtained during its commercial tow(s).

A mid survey break will take place on approximately 7 July in Lerwick to allow for the transfer of staff and to comply with the WTD policy. A scientific crew change will take place with R Gillespie-Mules, R Catarino and M O'Malley joining the vessel and J Wilson, M Stewart and J Rasmussen leaving. A calibration will be conducted either East of Shetland at the mid cruise break or in Orkney at the end of the survey if time permits.

Acoustic data will be collected at four frequencies (18, 38, 120 and 200 kHz) between 03:00 and 23:00 hours. Fish shoals seen on the echosounder will be identified using a pelagic trawl (PT160). Survey trawling operations will be carried out between two and four times per day at anytime between 03:00 and 23:00. Fishing operations will be carried out using the multisampler cod end unless large aggregations are seen in the area. Samples of all species caught will be measured for length to partition the echo integral amongst species and size classes for target strength functions. Fish will also be weighed to establish a length-weight relationship. Otoliths

will be collected from a sub-sample of the herring according to the following length stratified scheme to determine age; two per 0.5 cm class below 22 cm, five per 0.5 cm class from 22.5-27.5 cm and ten per 0.5 cm class for 28.0 cm and above. For each herring in the subsample the state of maturity, gonad weight, liver weight, whole and gutted weight, presence of food in the stomach as well as the presence of Icthyophonus infection will be recorded. The maturity scale used throughout the survey will be the Scottish 8 stage scale.

In the area west of 4ºW, in addition to the above described sampling, random sampling of 120 fish above 24 cm length will be carried out for each haul with photographs taken for morphometric stock identification analysis. Otoliths from these fish will, subsequent to aging, be made available for morphometric analysis. After photographing them, and where possible, these randomly sampled fish will make up part of the standard sampling for herring. Additional fish will be collected to ensure the relevant numbers of fish are collected per strata for acoustic data analysis.

Where required, a vertical combined hydro and plankton dip will be carried out immediately following a pelagic trawl, this will require the vessel to use its DP system to remain on station. The decision to carry out vertical dips will be based on the requirement to achieve at least one station in each ICES rectangle. In addition to the vertical plankton hauls carried out at CTD stations, a small number of hauls may be conducted in the period between 23:00 and 03:00 hours to measure variability in the sampling method.

The ships thermosalinograph will be run continuously to obtain sea surface temperature and salinity throughout the survey area.

Normal contact will be maintained with the Marine Laboratory. Radio and e-mail contact will also be maintained with the other vessels taking part in the coordinated survey.

Submitted:
P Copland/S Lusseau
4 June 2014

Approved:
I Gibb
5 June 2014

Figure 1: Proposed survey track Scotia 0814S. Herring Acoustic Survey.