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MRV *Scotia*

Survey 0813S

PROGRAMME

10-29 July 2013

Ports

Departure: Aberdeen, 10 July 2013

Half-landing: Lerwick, 19 July 2013 (provisional)

Unloading: Aberdeen, 29 July 2013

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 cruise with staff on-board before work is commenced.

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

Personnel

| | |
|------------|------------------|
| P Copland | (SIC) |
| S Lusseau | (SIC, Shadowing) |
| J Hunter | |
| R Catarino | |
| M Inglis | |
| E Lowe | |
| L Ritchie | (Part 1) |
| R G-Mules | (Part 2) |

Estimated days by project: 20 days – RV1309 (20216)

Sampling Gear

Midwater trawl PT160 x 3.

Multisampling pelagic cod-end with one fine mesh cod-end.

Seabird 911 CTD

1 meter 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 58°30'-62°N and from the shelf edge to 2°E, 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 gear will be loaded onto the vessel on Sunday 7 July. 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 10 July and 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 58°30'-62°N and 02°E to the 250 m contour. This survey includes an additional area previously surveyed by the West Coast charter (V1a) (South). In order to cover the additional area, 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 biological samples other than those obtained during its commercial tow(s).

A half landing will take place on approximately 19 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 G-Mules joining the vessel and L Ritchie leaving. A calibration will be conducted either East of Shetland after the mid cruise break or in Orkney at the end of the cruise if time permits.

Acoustic data will be collected at four frequencies (18, 38, 120 and 200 kHz) between 0300 and 2300 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 0300 and 2300. Fishing operations will normally 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. In the survey area east of 4° W, otoliths will be collected from a sub-sample of the herring to determine age according to three length strata, 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. In the area west of 4° W, random sampling of 120 fish above 24 cm length will be carried out for each haul with photographs taken for maturity analysis. Where there are herring below 24 cm, or missing length classes, a further sample will be analysed to ensure there will be ages at all lengths. The maturity scale used throughout the survey will be the Scottish 8 stage scale.

Otoliths will be collected from a sub-sample of the herring to determine age following the above stratification scheme; the state of maturity and presence of *Ichthyophonus* infection will also be recorded.

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 achieving 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 2300 and 0300 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
3 June 2013

Approved:
I Gibb
27 June 2013.

Figure 1: Proposed survey track Scotia 0813S. Herring Acoustic Survey.

