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MRV *Scotia*

Survey 0823S

## **Programme**

29 June – 20 July 2023

## **Ports**

**Loading:** Aberdeen, 26 June 2023

**Departure:** Aberdeen, 29 June 2023

**Half-landing:** 8 July (TBC)

**Arrival and unloading:** Aberdeen, 20 July 2023

In setting the survey 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

**Estimated days by project:** 22 days – HERACO (20726)

## **Sampling Gear**

Midwater trawls PT160 x 3

BT 237 x 1

SIMRAD FS70 net sonde x 2

Scanmar trawl eye sensor

Scanmar door sensors

CTD & laptop and salinity bottles surface (50 bottles total).

Niskin bottle x 2

## **Objectives**

- To conduct an acoustic survey to estimate the abundance and distribution of herring in the northwestern 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 by trawling with pelagic for echosounder trace identification.
- To obtain samples of herring and sprat for biological analysis, including age, length, weight, sex, maturity and ichthyophonous infection throughout the survey area.
- Collect samples and data for stock identity determination of herring. Tissue samples for genetic analysis from herring throughout the survey area.

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

## Procedure

All fishing gear and scientific equipment will be loaded onto the vessel on 26 June in Aberdeen. The vessel will depart from Aberdeen on 29 June when crew training and trial deployments of fishing gear will take place if required by the fishing master. After required vessel drills and transducer calibration, the vessel will make passage to the start of the first transect to begin surveying (Figure 1). A series of parallel transects running east/west at normal steaming speed (10.5 knots), progressing northwards will be undertaken. The survey area is bounded by 58°30'-62°N and 02°E to the 200 m contour. Transect spacing is 15 nm. This may be adapted during the survey to maximize area coverage given the time available.

Calibration of all echosounders (requires 8-12 hours at anchor) will take place prior to commencing acoustic transects. A second confirmatory calibration will be conducted in a suitable location, most likely Scapa Flow 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 (BST). Fish shoals seen on the echosounder will be identified using a pelagic trawl (PT160) in consultation between fishing master and scientific staff. Survey trawling operations will be carried out between two and four times per day at any time between 03:00 and 23:00 hours.

Samples of all species caught will be measured for length to partition the echo integral amongst species and size classes for target strength functions. Individual herring, sprat and mackerel will also be weighed to establish a length-weight relationship. Otoliths will be collected from a subsample 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 *Ichthyophonus* infection will be recorded. The maturity scale used throughout the survey will be the Scottish 8 Stage Scale.

Genetic sampling of herring will be carried out on the first 30 aged fish in each sample collected east of the 4-degree line. In the area west of 4°W, in addition to the above-described sampling, up to 100 herring per haul that have otoliths taken for age reading will also have flesh samples taken for genetic analysis.

Where sprat is encountered three fish per 0.5 cm length class will be sampled for age, whole weight, sex and maturity, gutted weight.

A vertical hydro dip to collect temperature, salinity will be carried out immediately following trawls. This will require the vessel to use its Dynamic Positioning system to remain on station. The decision to carry out additional vertical dips will be based on the requirement to achieve one station in each ICES rectangle. Surface water samples will be collected from the continuous flow tap in Fish house while samples from depth will be taken using the Niskin bottle. The ships

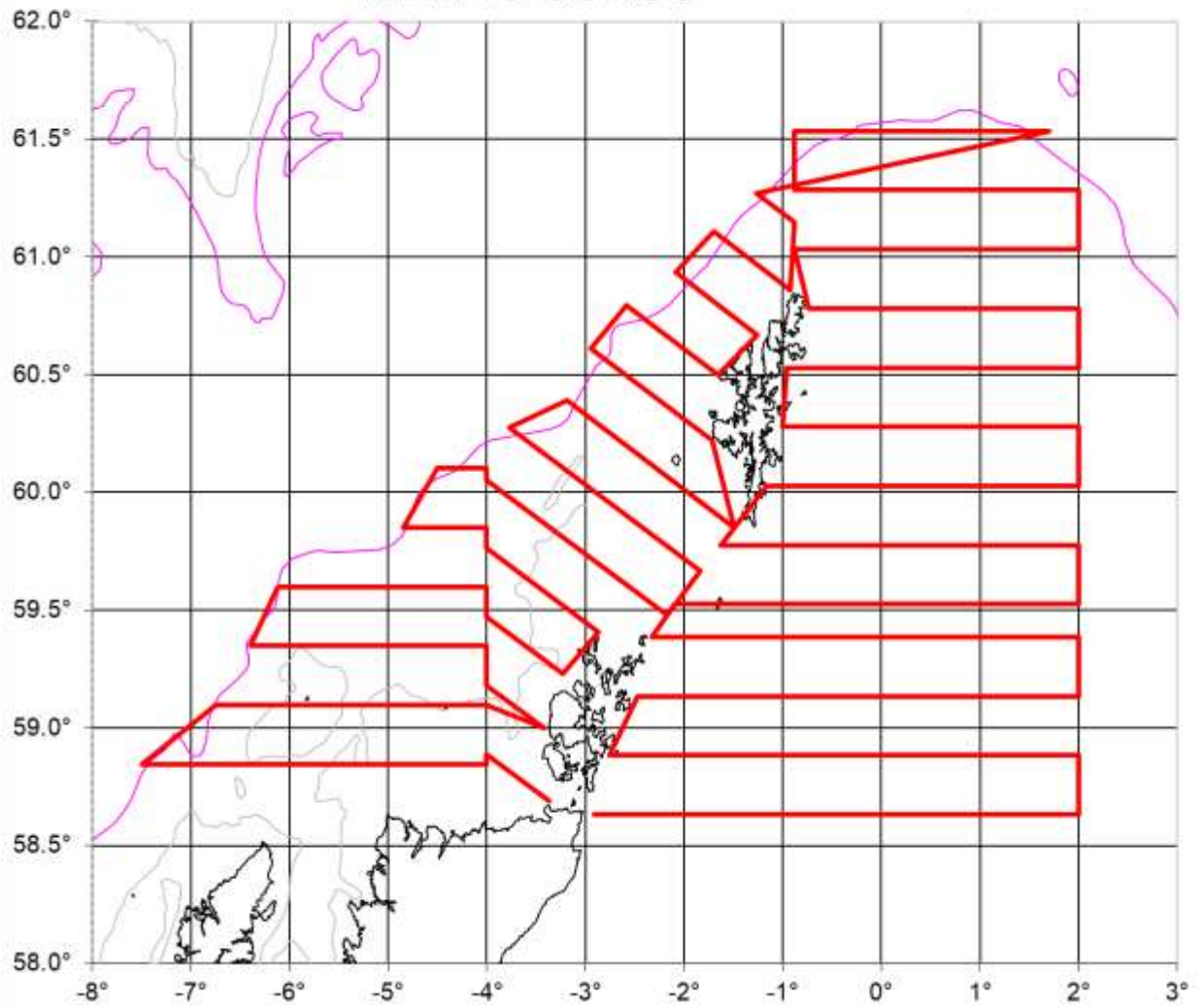
thermosalinograph will be run continuously to obtain sea surface temperature and salinity throughout the survey area.

Normal contact will be maintained with the Marine Laboratory. E-mail contact will also be maintained with the other vessels from Norway, Ireland, Denmark, Netherlands, and Germany taking part in the coordinated survey.

Submitted:  
S O'Connell  
13 June 2023

Approved:  
I Gibb  
22 June 2023

# HERAS 0823S



**Figure 1:** Transects to be completed by *Scotia* as part of the Herring Acoustic Survey (HERAS) 0823S. Additional transects may be added depending on available survey time.