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MRV *Scotia*

Survey 1415S

PROGRAMME

5-16 October 2015

Ports
Loading: Aberdeen, 2 October 2015
Departure: Aberdeen, 5 October 2015
Arrival and unloading: Aberdeen, 16 October 2015

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 (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)
E Armstrong	
R Catarino	
M Stewart	
M O'Malley	
R Gillespie-Mules	
P Fernandes	(Aberdeen University)
A Fenwick	(Aberdeen University) 05/10-TBC
J Lawrence	(Aberdeen University)
K Dworski	(Aberdeen University)

Estimated days by project: 12 days – SU02NP (20158)

Sampling Gear
Midwater trawl PT160 x 2
Edgetech broadband towed system
Seabird 911 CTD
Go-pro camera system(s) with additional sensors (depth, temp, attitude etc)
Towed hydrophone array
Lowrance echosounder system
Simrad WBAT autonomous broad band sounder system
Rod and line systems.
Electronic load shackle for weighing catch.
Scanmar trawl eye sensor

Overall Objectives

- To estimate mackerel density and abundance in the area of the Shetland Isles.
- To investigate the use of a broadband system as a means to determine mackerel size.
- To study distribution of cetaceans and their relationship to mackerel shoals.

Specific Objectives

1. Calibration of Edgetech Broadband system.
2. Calibrate Sv and TS gains on the Simrad EK60.
3. Obtain acoustic data from mackerel using the Edgetech broadband system.
4. Obtain biological samples of mackerel from schools by trawling.
5. Trial deployment options for the Edgetech broadband system.
6. Obtain acoustic data from mackerel using the Simrad WBAT autonomous broadband system.
7. Compare the echo returns from a low cost portable sounder system with those from the calibrated Simrad EK60 echo-sounder system.
8. Deploy a lightweight AU Go-Pro camera system into the mackerel schools to observe behaviour.
9. Deploy MSS Go-Pro system on PT160 net
10. Deploy MSS Go-Pro lander system onto the sea bed to identify fish traces on un-trawlable ground.
11. Visually observe marine mammal distribution and activity during daylight hours.
12. Obtain towed hydrophone acoustic recordings of mammal vocalisation during survey transects.
13. Compare netsonde traces of mackerel in the net with those seen using the cable less Scanmar trawl eye system.

Procedure

All gear will be loaded in Aberdeen on 2 October. The vessel will depart Aberdeen on 5 October and make passage for Loch Erribol, where a calibration of all drop keel mounted acoustic transducers will take place (approximately 8-12 hours at anchor). Crew training and trial deployments of fishing gear will take place en route to the calibration site as convenient for the fishing master. (Note that weather conditions may preclude this activity, in which case the survey transects will commence with acoustic calibrations taking place when conditions are suitable).

In addition, during calibration, an investigation of the acoustic output of the broadband system will be attempted using a standard target below the suspended towed body. In the event that there is insufficient depth for this exercise in the selected anchorage this may be done later in the open sea with the vessel drifting if weather conditions allow. Time period for the broadband system investigation is likely to be six to eight hours.

Scotia will make her way to the survey area after the calibration has been completed. The proposed survey area and possible survey track is shown in Figure 1. However, this is based on the expected position of the Scottish pelagic fleet which will be fishing for mackerel at this time. Contact will be maintained with the commercial fleet using email, cell phone and radio communication and the survey area/design may be altered to reflect any changes in the fish distribution. The survey design will consist of a combination of parallel transects running east/west, or zig-zags into and out from the coast at normal steaming speed (approximately

10.5 knots). When areas of suitable shoals are encountered work using the broadband system will then be concentrated in that area.

A small boat transfer or short port call may be made, as convenient, after 9 October to allow A Fenwick off the vessel. This is likely to be from Scalloway or Lerwick depending on the progress of the survey and position of the mackerel schools. Note this will not be a 24 hour port call.

Acoustic data will be collected at four frequencies (18, 38, 120 and 200 kHz) on a 24 hour basis. While transecting, a towed hydrophone array will be deployed over the stern of the vessel and will be recovered prior to any fishing operations. The towed hydrophone will not restrict the vessels movement when at survey speed.

Fish schools seen on the echosounder will be identified using a pelagic trawl (PT160). Trawling operations will be carried out at any time in a pre agreed period, probably between 09:00 and 21:00 hours. The vessels netsonde systems will be required to monitor catch density and position of schools in the water column during trawling. The SH80 sonar will be used to collect acoustic data and direct trawling operations.

Biological sampling of all species caught will be carried out as per standard sampling protocol with 5 otoliths per cm length for each haul plus required length and weight data.

A vertical CTD dip will be carried out immediately following a pelagic trawl or once a day if trawling has not taken place, this will require the vessel to use its DP system to remain on station.

Deployment into mackerel schools of the fishing rod mounted Go-Pro camera/sensor system will be done either from the hanger deck in DP or with vessel drifting depending on the conditions. The opportunity will be taken during some tows to deploy the MSS net mounted Go-Pro system on the net.

Go pro systems may be deployed onto the seabed if schools are seen in un-trawlable areas.

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

Scotia will be unloaded of fishing and scientific gear on her return to Aberdeen on 16 October.

Details of the equipment to be used and their deployment methods are given in a separate document.

Submitted:
P Copland
22 September 2015.

Approved:
I Gibb
25 September 2015.

Figure 1: Provisional Survey track 1415S.