Not to be cited without prior reference to Marine Scotland, Marine Laboratory, Aberdeen

MRV *Alba na Mara*

Survey 0923A

PROGRAMME

19 June – 05 July 2023

Loading: Fraserburgh, 16 June 2023
Gear change: Leith 27 June 2023
Unloading: Fraserburgh, 05 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 cruise ending. In the case of the Survey Summary Report a nil return is required, if appropriate.

Out-turn days per project: 20696 - 17 days

Equipment

Seabird CTD with FLNTU
International Young Gadoid Trawl PT154 with 6 mm Codend;
Jackson Rockhopper Trawl BT158 with 10 mm Codend
Prawn sorting table
Scanmar depth unit, trawl width and height units
Minilogger (or equivalent – i.e. DST). (x2)

Background and Objectives

0923A will conduct a survey of fish distributions within and around offshore windfarm development sites. This survey is part of the PrePARED (Predator and Prey Around Renewable Energy Development) project and aims at quantifying the fine and broad scale effects of OWF (Offshore Windfarm Development) on fish distributions and, indirectly, the effects of changes in prey distributions on marine top-predators.

Objectives

1. To conduct a fisheries acoustic survey to assess the distribution and abundance of pelagic fish in the Forth and Tay OWF development sites.

To undertake an acoustic survey of sandeels and clupeid fish in the water column using 38 and 120 kHz (Figure 1). Concentrations of fish will be sampled using the pelagic trawl. Species composition and length frequency distributions of fish caught will be determined. Subsamples will be weighed and their otoliths removed to establish length-weight relationships and age composition.

2. To conduct RoxAnn survey of the substrate along the acoustic survey track (Figure 1).

3. To conduct a demersal fishing survey in the Forth and Tay region.

3.1 Demersal fishing

To assess abundance, length-frequency-distribution, and weight-at-length of demersal fish at 26 fixed stations in the Forth and Tay region by demersal trawl survey. Samples will be retained for energy content analysis at a later date.

3.2 CTD and FLNTU

To sample variation in water temperature, conductivity, turbidity and chlorophyll-a through the water column using a Seabird CTD sampler and FLNTU at all demersal trawl stations and 2 additional sites within OWFs.

Procedure

Scientific equipment will be loaded onto *Alba na Mara* on 16 June at Fraserburgh harbour. Scientists will join the vessel in the early morning of Monday 19 June. *Alba na Mara* will make passage to the Forth and Tay study site the same morning. following the acoustic transect depicted in Figure 1. The Acoustic survey of the Forth and Tay will follow the transect depicted in Figure 1 and programme detailed in Table 1. The survey will take place between the 19 and 27 June.

Daily scientific sampling will occur between 0700 hours and 1900 hours. Concentrations of pelagic fish will be sampled using the PT154, aiming to fish twice each day if possible. Trawl samples will be worked up to determine the total catch at length of each species. Sub-samples of herring, sprats and sandeels will be weighed to determine length-weight relationships and will have their otoliths removed for age composition assessment back at the laboratory. RoxAnn data will be collected along the acoustic transect to enable the development of seabed sediment maps. *Alba na Mara* will keep contact with OWFs and enter/exit the sites at the locations described in Figure 2 and Tables 2,3 and 4.

It is expected that the vessel will berth in Leith docks on the morning of 27 June. Changes of sampling gear will take place at this time.

In the days that follow, *Alba* will sample as many of the demersal and CTD stations in the Forth and Tay indicated in Figure 1 as is possible. Demersal trawl stations will be fished using the BT158. Each catch will be worked up to determine numbers at length of all species caught. Trawl performance characteristics will be monitored using Scanmar equipment to enable swept area to be determined. Catch size will then be converted to point density estimates. Size stratified samples of cod, haddock and whiting will be weighed to determine their length-weight relationships. At each location a sample of approximately 50 whole fish across the species and size ranges will be retained and frozen for energy content. Prior to each demersal fishing operation, the Seabird CTD sampler will be deployed. In addition, a further deployment of the CTD will be made within Seagreen OWF.

The demersal survey will cease in time to arrive in Fraserburgh by the evening of 4 July. Scientific equipment will be offloaded at the earliest opportunity on 5 July, and the scientists will leave the vessel. An indicative programme is detailed in Table 1.

Normal contacts will be maintained with the Marine Laboratory.

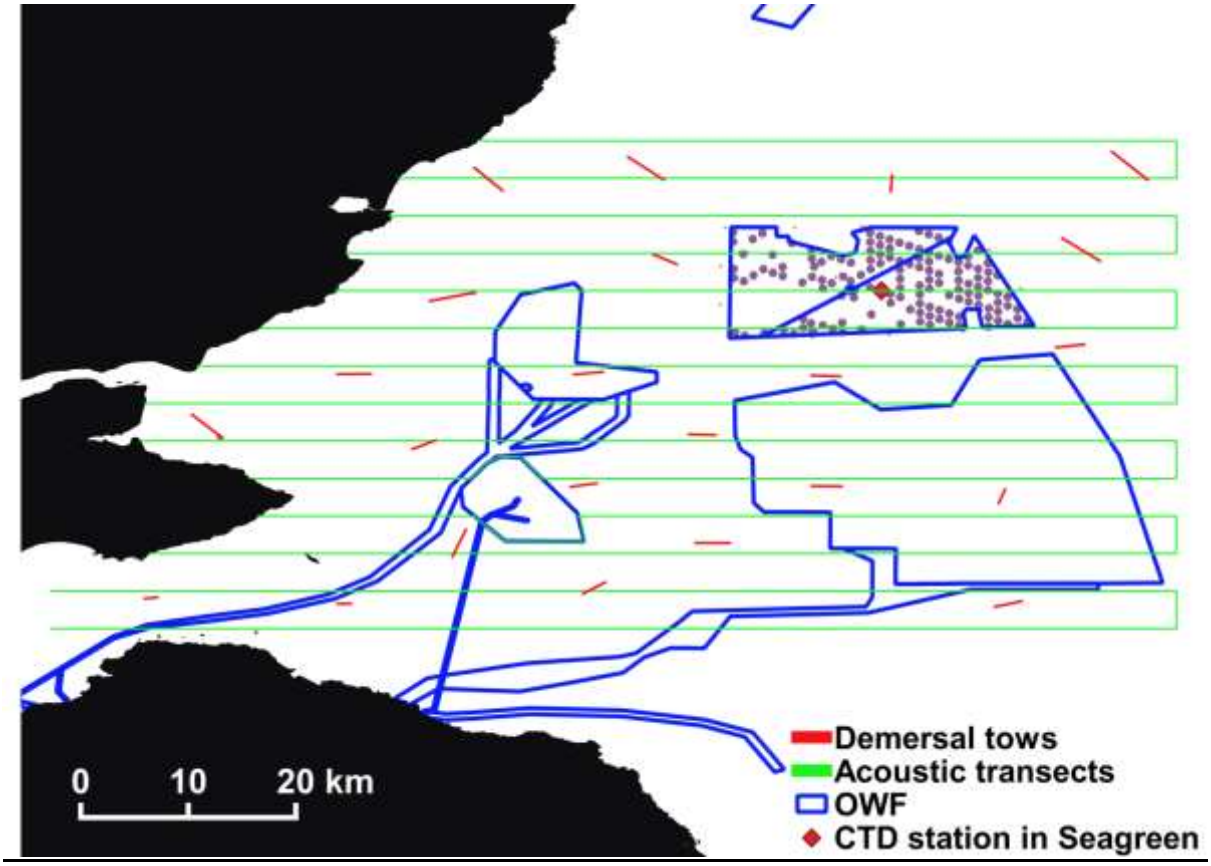

Figure 1: Map showing the acoustic transects in the Forth and Tay as well as the locations of the demersal tows (and CTD stations). The CTD station in Seagreen OWF has a different symbol as it is not associated with a demersal tow.

Date	Activity
19/6	Passage to FOF
20/6	Transect 1 (north of regional grid)
21/6 - PM	Transect 2 (Seagreen)
22/6	Transect 3 (Seagreen/Inch Cape)
23/6	Transect 4 (Inch Cape/Berwick bank)
24/6	Transect 5 (Berwick Bank)
25/6	Transect 6 (Berwick Bank)
26/6	Transect 7 (BB) & passage to harbour
27/6	Gear Change/Half Landing
28/6 – 1/7 (4 days)	Berwick Bank/Inch Cape South demersal tows
2 - 3/7 (2 days)	Berwick Bank/Inch Cape and near Seagreen-North demersal tows
4/7	Passage to Fraserburgh
5/7	unloading

Table 1: Indicative survey programme for 0923A.

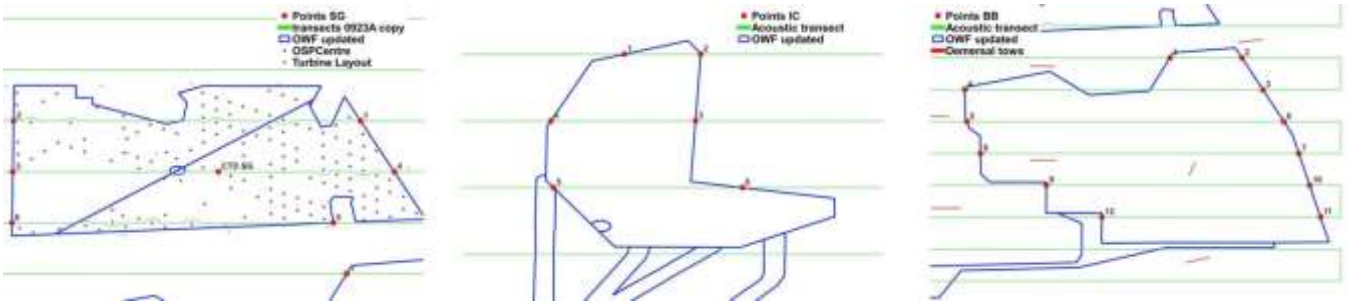

Figure 2: Map showing the entry and exit points for Seagreen, Inch Cape and Berwick Bank OWFs..

Point ID	Latitude	Longitude	Date	Estimated Time (TBC)
1	56°38.335N	1°33.569W	21/06/2023	13:30
2	56°38.336N	1°56.263W	21/06/2023	14:30
3	56°35N	1°56.313W	22/06/2023	10:10
4	56°35.002N	1°31.358W	22/06/2023	11:45
5	56°31.667N	1°35.352W	22/06/2023	13:55
6	56°31.667N	1°56.365W	22/06/2023	15:30
CTD	56°35.012N	1°42.872W	22/06/2023	10:30

Table 2: Indicative date and time for entry/exit from Seagreen OWF during 0923A.

Point ID	Latitude (decimal degree)	Longitude (decimal degree)	Date	Time
1	56°35.166N	2°12.551W	22/06/2023	08:00
2	56°35.167N	2°9.63W	22/06/2023	08:25
3	56°31.834N	2°9.753W	22/06/2023	16:15
4	56°31.828N	2°16.873W	22/06/2023	16:35
5	56°28.494N	2°17.021W	23/06/2023	08:40
6	56°28.501N	2°8.878W	23/06/2023	09:10

Table 3: Indicative date and time for entry/exit from Inch Cape OWF during 0923A.

Point ID	Latitude (decimal degree)	Longitude (decimal degree)	Date	Time
1	56°28.334N	1°34.478W	23/06/2023	11:00
2	56°28.334N	1°26.96W	23/06/2023	11:10
3	56°24.992N	1°24.776W	23/06/2023	13:00
4	56°25N	1°55.9W	23/06/2023	14:00
5	56°21.675N	1°55.682W	24/06/2023	10:00
6	56°21.662N	1°22.592W	24/06/2023	11:10
7	56°18.329N	1°21.025W	24/06/2022	13:00
8	56°18.339N	1°54.272W	24/06/2022	14:00
9	56°15.009N	1°47.391W	25/06/2022	10:10
10	56°14.996N	1°19.892W	25/06/2022	11:30
11	56°11.685N	1°18.761W	25/06/2022	13:00
12	56°11.667N	1°41.591W	25/06/2022	13:40

Table 4: Indicative date and time for entry/exit from Berwick Bank OWF during 0923A.

Submitted:
T Regnier
08 June 2023

Approved:
I Gibb
16 June 2023