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MRV *Scotia*

Survey 1322S

PROGRAMME

29 September – 11 October 2022

Loading: Aberdeen, 26 September 2022
Staff exchange: Ullapool, 02/05 October (TBC)
Unloading: Aberdeen, 11 October 2022

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

Out-turn days per project: 13 days ST05B
Gear

Sea-Bird CTDs (SBE 9, SBE25+), water filtering equipment, plankton nets, mooring equipment and dyneema rope, chemistry sampling equipment, weeHoloCam. ROV x 2

Objectives

1. Test the SBE911 and CTD carousel (main CTD crane) and take water samples in the Buchan deep on route to the Faroe-Shetland Channel (Priority 1).

2. Perform hydrographic sampling along the long term monitoring Faroe-Shetland Channel Nolso – Flugga (NOL) section – priority stations will most likely be visited only (Priority 1).

3. Perform hydrographic sampling along the long term monitoring Faroe-Shetland Channel Fair Isle – Munken (FIM) section (Priority 1).

4. Pick-up B. Ruck and ROVs from Ullapool and conduct ROV search and recovery for ADCP moorings in Little Minch and Linne Crowlin (Priority 1).

5. Recover and re-deploy steel frame ADCP mooring in the summer isles (Priority 1).

6. Carry out CTD transect in Loch Ewe and collect water and zooplankton samples between the mouth of the loch and the metocean buoy position (Priority 1).

7. Deploy the weeHoloCam at all Loch Ewe CTD transect stations.

8. If time allows, carry out a grid of CTD stations in Loch Ewe (Priority 2).

9. Take salinity, chlorophyll, and dissolved oxygen samples along all standard lines,

heavily reduced sampling strategy.

10. Conduct CTD sections on the west coast, from the coastline up to the edge of the continental shelf (Priority 2, “Shelf” sections, prioritise shelf sections 2 and 4).

11. Perform hydrographic sampling along the JONSIS long term monitoring section in the northern North Sea (Priority 1).

12. Run the thermosalinograph throughout the survey.

13. Run the VMADCP on all the standard sections.

14. Take water samples for long term storage on Fair Isle – Munken or Nolso – Flugga section stations.

15. If weather/time permits, perform CTD deployments along the AlterECO line (offshore from Aberdeen) (Priority 2).

16. If weather/time permits repeat the JONSIS line at the end of the cruise and extend to 001° 30’ east (Priority 3).

17. If weather/time permits perform fine scale VMADCP/CTD survey work on the JONSIS line (around 59° 17' N, 001° 15' W) (Priority 3).

18. If weather/time permits, perform VMADCP/CTD survey work in the Moray Firth and/or Aberdeen Bay (Priority 3).

19. Install new FLNTU in the water sampling lab.

20. Submit CTD data to Met Office at regular (6-8 hour) intervals and for early morning model runs (3 am deadline).

Procedure

The order of science objectives may change depending on conditions and forecast. Assuming we have reasonably fair conditions from the outset, the following programme (going straight to the FSC on departure) will be followed. We plan to pick up Bill Ruck and ROV equipment from Ullapool on the evening of Sunday 2 October, so that we can start using the ROV to search for moorings (CRO2110 and MIN2110) on Mon 3 October – Wed 5 October (neap tides). Returning to Ullapool early evening on Wed 5 October. If the forecast is not good enough for us to go straight to the FSC, then we will most likely do JONSIS first, before heading to the west coast.

Faroe Shetland Channel (FSC):

On sailing from Aberdeen *Scotia* will make passage to the Buchan deep to test the CTD and carousel water sampler on the main CTD crane. On completion of these tests *Scotia* will sail to the North-east end of the Nolso – Flugga (NOL) section to collect water samples and take CTD profiles. Depending on conditions, we may choose to not sample from stations on the Faroes side of the line. Passage will then be made to the north west (Faroes) end of the Fair Isle – Munken (FIM) section to carry out standard CTD and water sampling along that line. We will aim to deploy the weeHoloCam at one of the deepest stations in the FSC.

West coast (all mooring recovery and deployments during daylight hours):

Scotia will then make way to Ullapool to collect Bill Ruck and ROVs (evening 2 October). Attempts will be made to recover ADCP moorings in Little Minch (west Skye) and Linn Crowlin (east Skye) using an ROV. Using the ROV we will attempt to find moorings and attach dyneema recovery line(s).

After dropping off Bill, *Scotia* will make way to the Summer Isles to recover and re-deploy the steel frame ADCP mooring on the seabed. The Loch Ewe CTD section, including bongo net and WeeHolocam, will then be carried out, and if time allows a CTD grid within Loch Ewe will be completed. The CTD sections Shelf 2 and Self 4 will then be carried out.

North Sea:

Scotia will then make way to the JONSIS line to carry out sampling with the CTD and carousel water sampler. On completion of the JONSIS section *Scotia* will then make way to the east end of the AlterEco line (56° N). We will choose a starting position on the line to ensure that we get back to Aberdeen in good time.

Mooring Positions (Recover)

SI	58°	30.471” N	05°	28.900” W (steel frame)
CRO2110	57°	19.208” N	05°	52.232” W (AL-200)
MIN2110	57°	28.801” N	06°	57.601” W (AL-200)

Mooring Positions (Deploy)

SI	58°	30.471” N	05°	28.900” W (steel frame)

Scientific Procedures

It is expected that deployments of hydrographic equipment will be carried out with the CTD crane whilst the vessel is on station. The plankton crane will be used for the deployment of most moorings from the hanger deck, including ADCP moorings in trawl-resistant frames (AL-200s), the steel frame ADCP, short single-string moorings. An acoustic release will be used to release the frames once they are on/close to the seabed.

Plankton net samples and weeHoloCam deployments will be carried out using the plankton crane and wire.

Three container laboratories will be required (one for water filtering, one for working on electronic equipment and a dry container for communications with sampling equipment). Chlorophyll samples will be stored frozen in the freezer in the Fish House.

(NOTE: The position of the CTD sampling station in the Goldeneye oil field will be adjusted for any exclusion zones and oil infrastructure).

(NOTE: The survey will take *Scotia* into the Foinaven Development Area. This is now standard practice and normal on-site communications will be established with the Foinaven co-ordinating officer).

(NOTE: Hydrographic stations at NOL and FIM have been amended to avoid entering Faroese territorial waters).

Normal contacts will be maintained with the laboratory.

Submitted:
R O'Hara Murray & H. Smith
22 September 2022

Approved:
I Gibb
27 September 2022

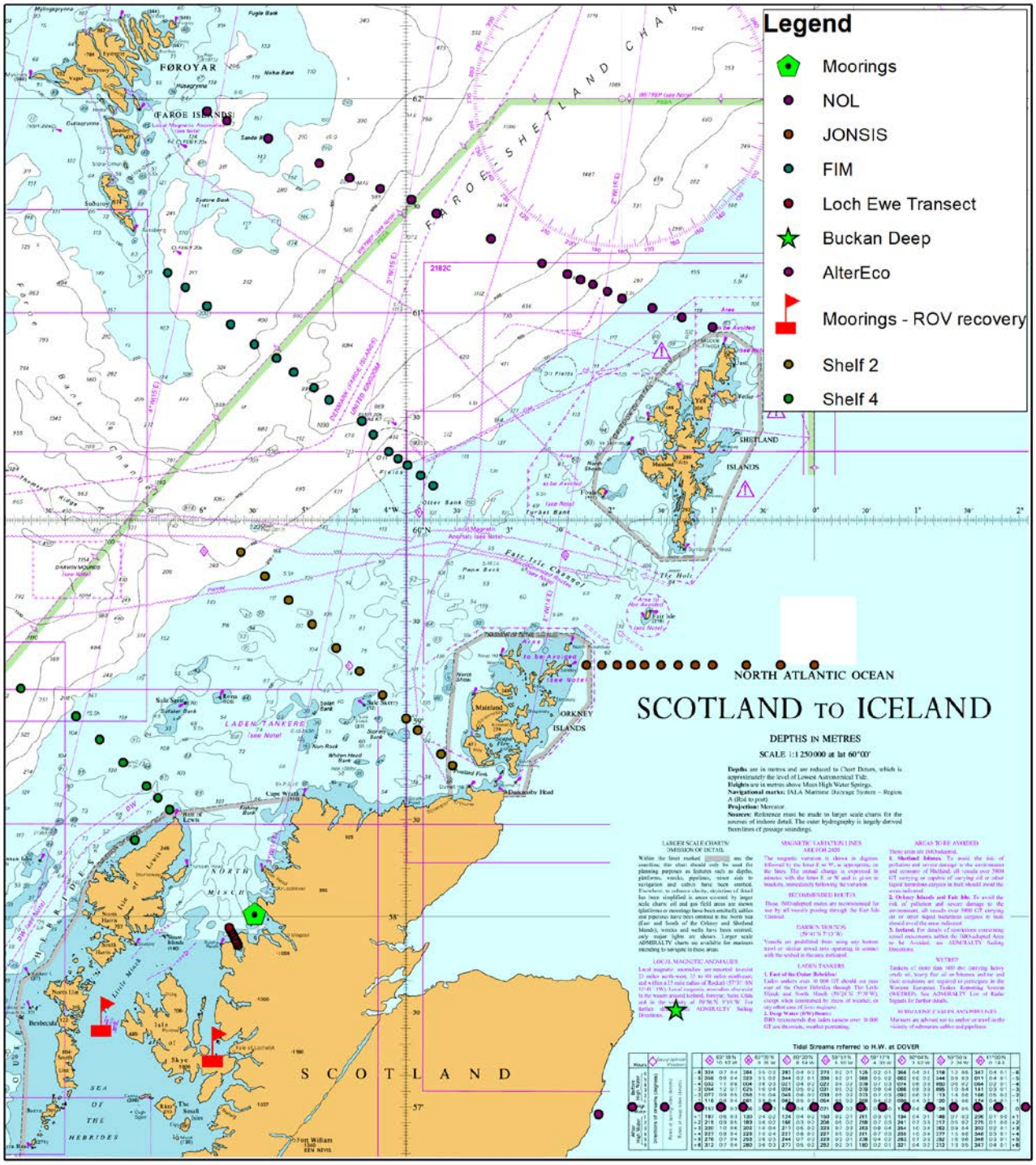
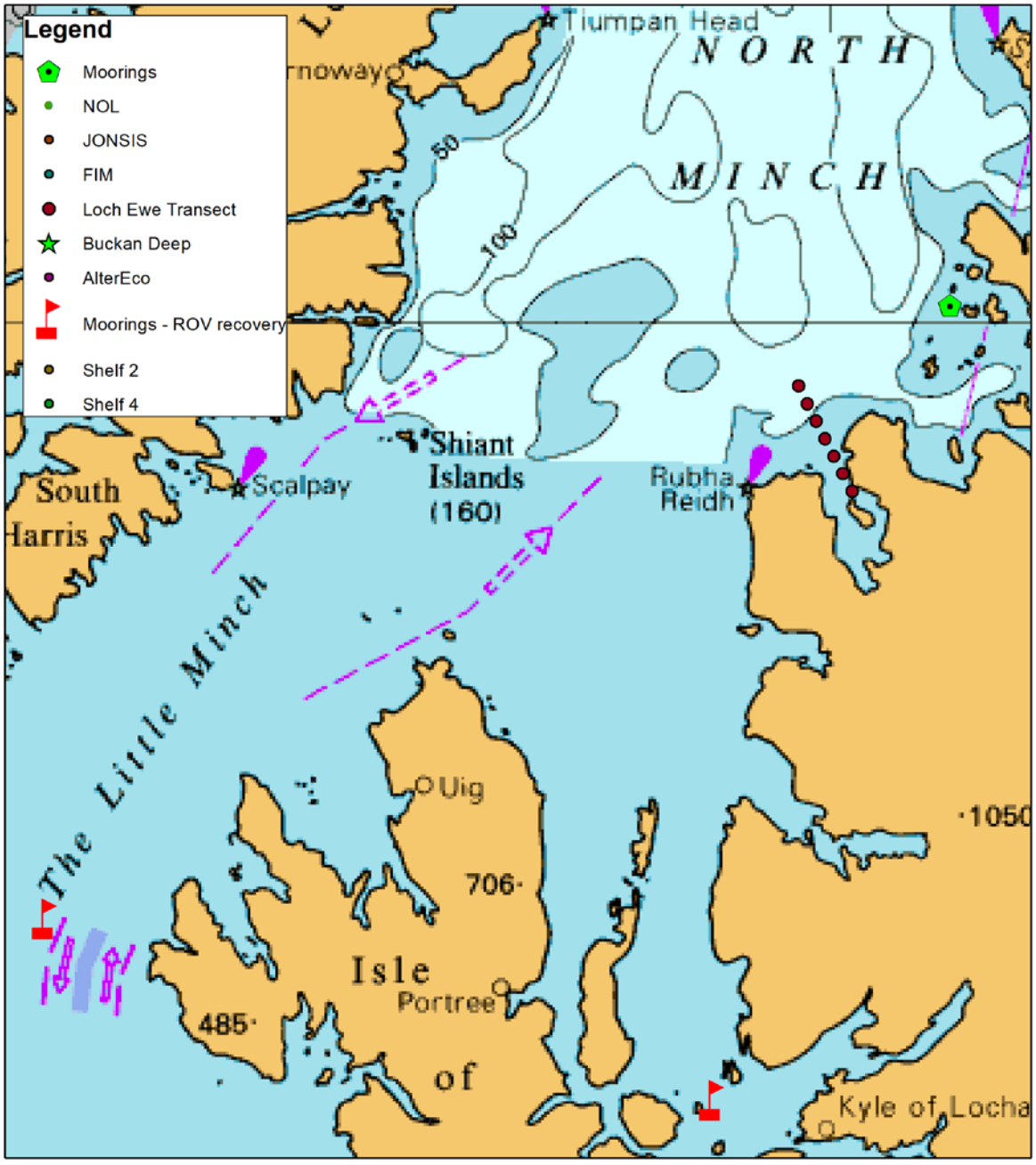


Chart showing key activities on 1322S.



Zoomed chart showing the west coast planned activities, including the Loch Ewe CTD transect.

JONSIS

#	Name	Latitude	Longitude	Depth	Spacing
01	JO 1	59° 17.00' N	02° 14.00' W	75 m	
02	JO 1A	59° 17.00' N	02° 5.00' W	90 m	4.59 nm
03	JO 2	59° 17.00' N	01° 56.00' W	100 m	4.59 nm
04	JO 3	59° 17.00' N	01° 48.00' W	80 m	4.08 nm
05	JO 4	59° 17.00' N	01° 40.00' W	90 m	4.08 nm
06	JO 5	59° 17.00' N	01° 30.00' W	95 m	5.10 nm
07	JO 6	59° 17.00' N	01° 20.00' W	110 m	5.10 nm
08	JO 6A	59° 17.00' N	01° 10.00' W	120 m	5.10 nm
09	JO 7	59° 17.00' N	01° 0.00' W	125 m	5.10 nm
10	JO 8	59° 17.00' N	00° 40.00' W	120 m	10.20 nm
11	JO 9	59° 17.00' N	00° 20.00' W	140 m	10.20 nm
12	JO10	59° 17.00' N	00° 0.00' W	135 m	10.20 nm
			Totals	1180 m	68.36 nm

Nolso-Flugga (NOL)

#	Name	Latitude	Longitude	Depth	Spacing
01	NOL-01	60° 56.00' N	01° 00.00' W	110 m	
02	SEFN1	60° 58.70' N	01° 17.70' W	125 m	9.00 nm
03	SEFN2	61° 01.40' N	01° 35.40' W	155 m	8.99 nm
04	NOL-02	61° 04.00' N	01° 53.00' W	270 m	8.91 nm
05	SEFN3	61° 06.00' N	02° 01.50' W	440 m	4.57 nm
06	NOL-03	61° 08.00' N	02° 10.00' W	550 m	4.57 nm
07	SEFN4	61° 09.30' N	02° 17.50' W	630 m	3.85 nm
08	NOL-3a	61° 11.00' N	02° 25.00' W	730 m	3.98 nm
09	NOL-04	61° 14.00' N	02° 40.00' W	1080 m	7.82 nm
10	NOL-05	61° 21.00' N	03° 10.00' W	1370 m	16.03 nm
11	NOL-06	61° 28.00' N	03° 42.00' W	1235 m	16.84 nm
12	FARN2	61° 32.00' N	03° 57.00' W	1200 m	8.18 nm
13	NOL-07	61° 35.00' N	04° 15.00' W	990 m	9.08 nm
14	FARN1	61° 38.00' N	04° 33.00' W	530 m	9.07 nm
15	NOL-08	61° 42.00' N	04° 51.00' W	235 m	9.44 nm
16	NOL-09	61° 49.00' N	05° 21.00' W	180 m	15.84 nm
17	NOL-10	61° 54.00' N	05° 45.00' W	290 m	12.37 nm
18	NOL-11A	61° 56.50' N	05° 57.00' W	159 m	7.0 nm
			Totals	10245 m	162.60 nm

Fair Isle - Munken (FIM)

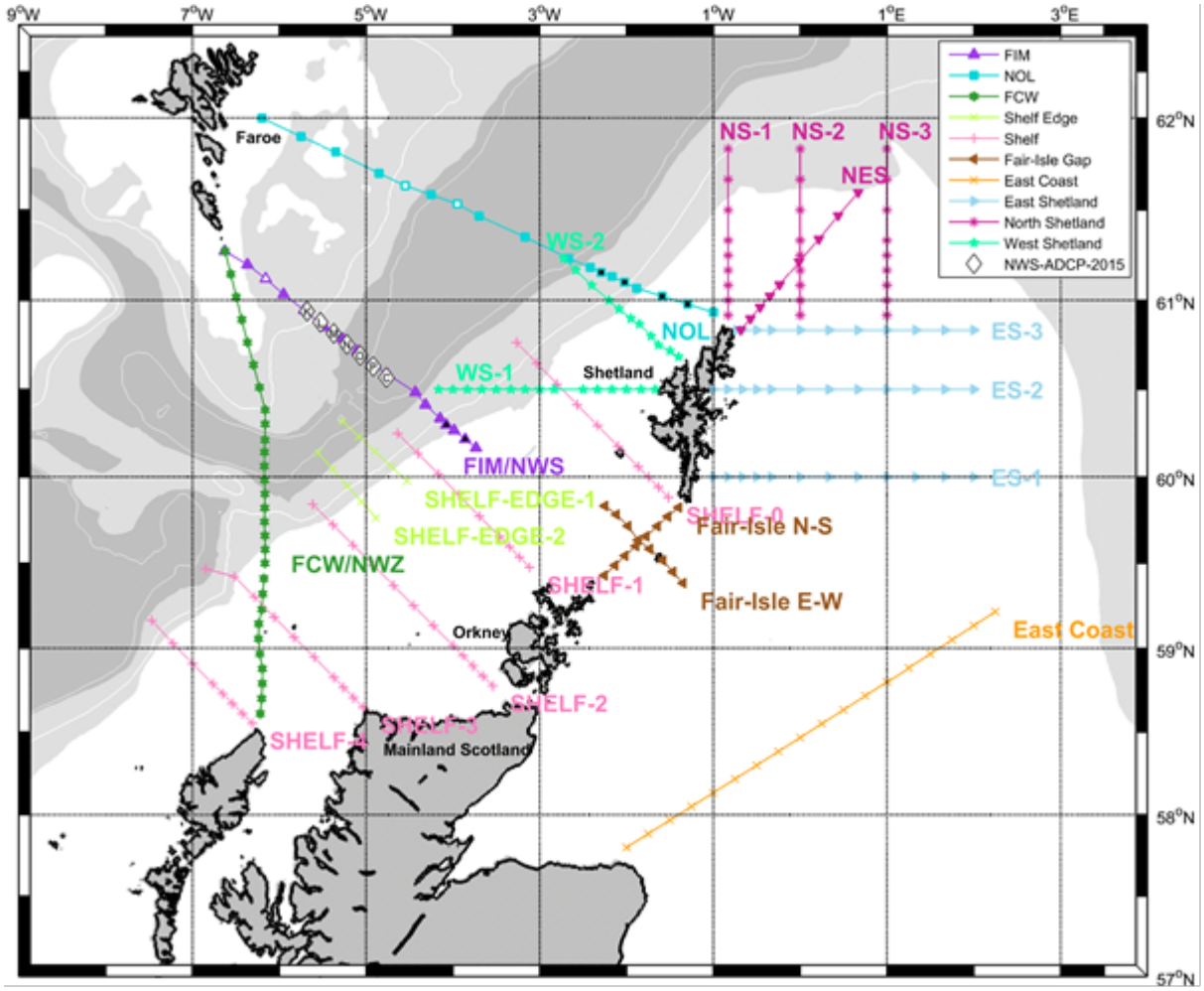
#	Name	Latitude	Longitude	Depth	Spacing
01	FIM-01	60° 10.00' N	03° 44.00' W	150 m	
02	SEFF1	60° 13.00' N	03° 51.50' W	170 m	4.74 nm
03	FIM-02	60° 16.00' N	03° 59.00' W	200 m	4.84 nm
04	SEFF2	60° 18.00' N	04° 04.50' W	330 m	3.36 nm
** 05*	*FIM-03*	*60° 20.00' N*	*04° 10.00' W*	*390 m*	*3.03 nm*
06	FIM-04	60° 25.00' N	04° 19.00' W	655 m	6.88 nm
07	FIM-05	60° 29.00' N	04° 26.00' W	995 m	5.45 nm
08	FIM-06	60° 35.00' N	04° 45.00' W	1090 m	11.15 nm
09	FIM-6a	60° 38.00' N	04° 54.00' W	1030 m	5.33 nm
10	FIM-07	60° 43.00' N	05° 06.00' W	915 m	7.70 nm
11	FIM-08	60° 47.00' N	05° 16.00' W	830 m	6.34 nm
12	FIM-09	60° 51.00' N	05° 29.00' W	600 m	7.36 nm
13	FARF3	60° 56.70' N	05° 42.80' W	333 m	8.90 nm
14	FIM-10	61° 02.00' N	05° 57.00' W	280 m	8.68 nm
15	FARF2	61° 07.20' N	06° 09.40' W	250 m	7.95 nm
16	FIM-11A	61° 11.30' N	06° 20.00' W	242 m	7.0 nm
			Totals	8,558 m	108.18 nm

AlterEco

#	Name	Latitude	Longitude	Depth [m]	Spacing
01	AlterEco1	57° 00.00' N	02° 04.00' E	92	
02	AlterEco2	57° 00.00' N	01° 48.00' E	94	8.72 nm
03	AlterEco3	57° 00.00' N	01° 36.00' E	99	6.54 nm
04	AlterEco4	57° 00.00' N	01° 22.00' E	104	7.63 nm
05	AlterEco5	57° 00.00' N	01° 08.00' E	85	7.63 nm
06	AlterEco6	57° 00.00' N	00° 54.00' E	102	7.61 nm
07	AlterEco7	57° 00.00' N	00° 40.00' E	92	7.61 nm
08	AlterEco8	57° 00.00' N	00° 27.00' E	89	7.09 nm
09	AlterEco9	57° 00.00' N	00° 14.00' E	84	7.09 nm
10	AlterEco10	57° 00.00' N	00° 00.00' E	83	7.61 nm
11	AlterEco11	57° 00.00' N	00° 14.00' W	79	7.61 nm
12	AlterEco12	57° 00.00' N	00° 28.00' W	82	7.63 nm
13	AlterEco13	57° 00.00' N	00° 42.00' W	68	7.63 nm
14	AlterEco14	57° 00.00' N	00° 55.00' W	75	7.07 nm
15	AlterEco15	57° 00.00' N	01° 08.00' W	67	7.07 nm
16	AlterEco16	57° 00.00' N	01° 28.00' W	68	10.91 nm
17	AlterEco17	57° 00.00' N	01° 47.00' W	98	10.56 nm
18	*AlterEco18*	*56° 57.80' N*	*02° 06.80' W*	*47*	*10.78 nm*
			Totals	1508 m	136.83 nm

Loch Ewe Transect

stn	lat		lon			Depth	distance
0	57	50.982	5	39.010	W	46	
1	57	52.104	5	39.674	W	32	1
2	57	53.061	5	40.245	W	37	1
3	57	53.977	5	41.118	W	55	1
4	57	54.893	5	41.992	W	62	1
5	57	55.810	5	42.865	W	82	1
6	57	56.726	5	43.739	W	104	1
7	57	57.642	5	44.612	W	95	1
8	57	58.559	5	45.486	W	123	1
						640	**8**


9°W
7°W
5°W
3°W
1°W
1°E
3°E
62°N
61°N
60°N
59°N
58°N
57°N
FIM
NOL
FCW
Shelf Edge
Shelf
Fair-Isle Gap
East Coast
East Shetland
North Shetland
West Shetland
NWS-ADCP-2015
Faroe
NS-1
NS-2
NS-3
NES
WS-2
NOL
ES-3
ES-2
ES-1
WS-1
Shetland
FIM/NWS
SHELF-EDGE-1
SHELF-0
Fair-Isle N-S
SHELF-EDGE-2
FCW/NWZ
SHELF-1
Fair-Isle E-W
East Coast
Orkney
SHELF-2
SHELF-3
SHELF-4
Mainland Scotland