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MRV *Scotia*

Survey 1914S

PROGRAMME

7-22 December 2014

Loading: Aberdeen, 4 December 2014
Unloading: Aberdeen, 22 December 2014

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

B Rabe (SIC)
J Dunn
M Geldart
D Lee
J Hindson
N Collie

Estimated days by project: 16 days: ST03P

Gear

Sea-Bird CTD/Carousel, sledge with OPC and CTD, day grab, Hammon grab

Objectives

1. Perform routine hydrographic sampling at stations along the long term monitoring JONSIS section in the northern North Sea.

2. Perform routine hydrographic sampling at stations along the long term monitoring Faroe-Shetland Channel sections: Fair Isle-Munken and Nolso-Flugga.

3. Conduct combined plankton/hydrographic observations by deploying the sledge with OPC/CTD at previous Aries stations in the Faroe-Shetland-Channel.

4. Take nutrient, chlorophyll, TA/DIC samples along standard lines.

5. Make CDOM fluorometry measurements for hydrocarbons along the monitoring lines and take up to 20 HC samples of calibration.

6. Take water samples for bacterial analysis by Heriot Watt University at locations along the long term monitoring sections.

7. Take microplastics samples at standard stations including full depth profile along the long term monitoring sections.

8. Take grab samples at selected stations along the Nolso-Flugga line using the day grab and test the Hammon grab.

9. If sheltering in a suitable location (around Shetland, Orkney, Pentland Firth) due to bad weather conduct VMADCP survey.

10. In case that there is time conduct sampling along the following sections (in order of priority):

    - Fair-Isle-Munken FASTNET stations ("J-line");
    - Faroe-Cape Wrath Z (FCW, possibly with extension);
    - Shelf edge lines 1-4 in the Faroe-Shetland-Channel.

General Procedure

After departing Aberdeen and completing appropriate drills, the vessel will proceed to the eastern end of the JONSIS line and complete hydrographic stations in a westerly direction (Table 1, Figure 1).

The vessel will then proceed to the Faroe-Shetland Channel. Depending on weather conditions we will commence hydrographic sampling and OPC measurements at selected stations along the Fair Isle-Munken survey line (Table 2, Figure 1).

On completion of the Fair Isle-Munken line the vessel will proceed to conduct hydrographic sampling and OPC measurements at selected stations on the Nolso Flugga survey line (Table 3, Figure 1). Towed deployments of the OPC sampler will be carried out only at selected stations along the two lines in the Faroe-Shetland-Channel. In addition grab samples will be taken at selected stations along the Nolso Flugga line. Additional sampling (HC, microplastics, etc.) will occur along the standard stations.

In case we are sheltering in a suitable location (around Shetland, Orkney, Pentland Firth) we will use the opportunity to conduct VMADCP surveys.

After completing the above three main priority monitoring lines, we will sample along other sections listed as options above (Tables 4-10).

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 sledge (OPC/CTD) deployments from the trawl deck will use the plankton crane.

The day grab will get deployed over the side deck with the plankton crane.

Two container laboratories will be required (two dry containers for electronics work and communications with sampling equipment).

The thermo-salinograph will be run throughout the survey.

The pCO2 system will be run throughout the survey.

(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).

Normal contacts will be maintained with the laboratory.

Submitted:
B Rabe
07 November 2014

Approved:
I Gibb
13 November 2014

Figure 1: The three main monitoring lines Jonsis, FIM and NOL (including FCW line).

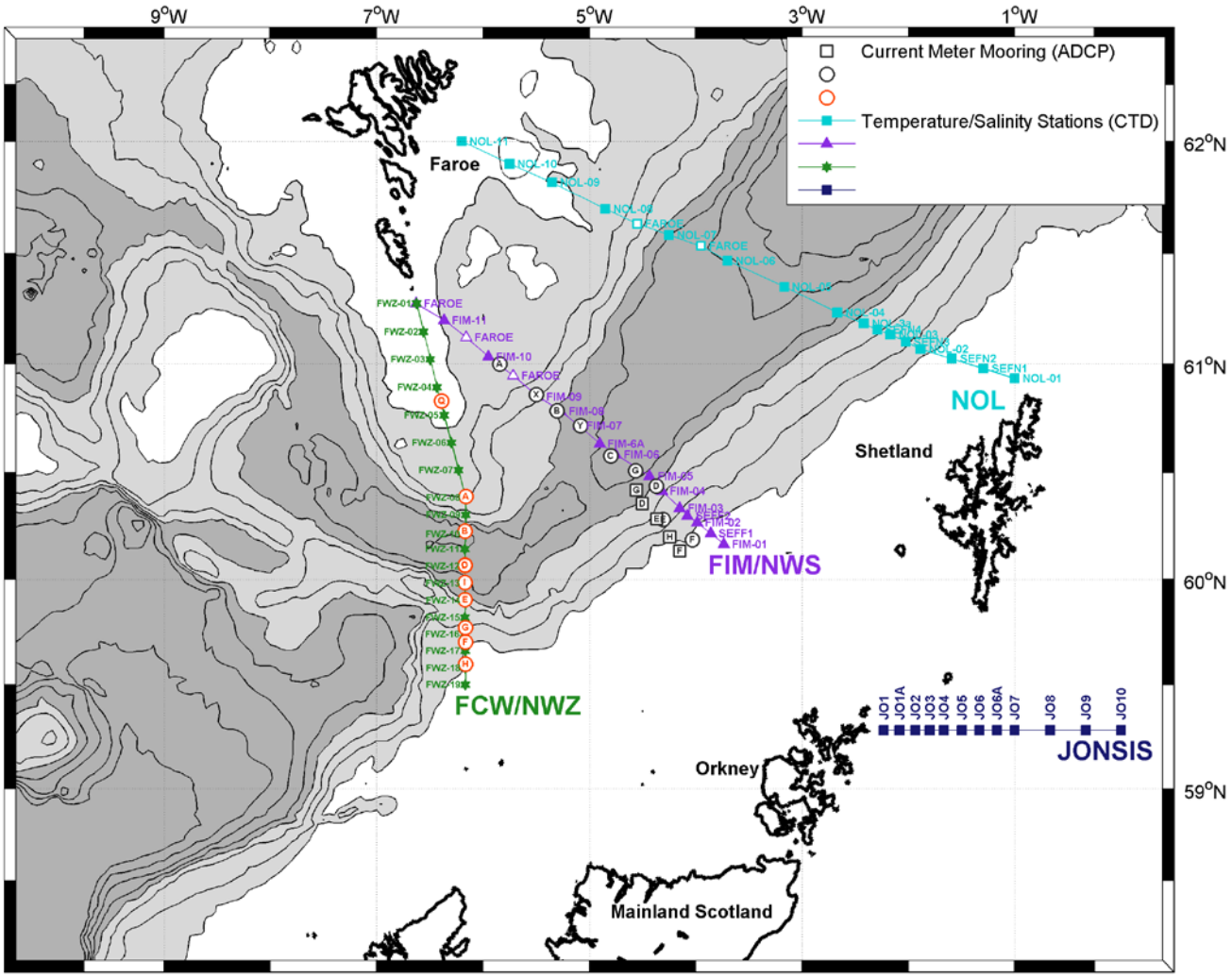

Table 1
JONSIS Line

	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	8.5 km
03	JO 2	59° 17.00' N	01° 56.00' W	100 m	8.5 km
04	JO 3	59° 17.00' N	01° 48.00' W	80 m	7.6 km
05	JO 4	59° 17.00' N	01° 40.00' W	90 m	7.6 km
06	JO 5	59° 17.00' N	01° 30.00' W	95 m	9.5 km
07	JO 6	59° 17.00' N	01° 20.00' W	110 m	9.5 km
08	JO 6A	59° 17.00' N	01° 10.00' W	120 m	9.5 km
09	JO 7	59° 17.00' N	01° 0.00' W	125 m	9.5 km
10	JO 8	59° 17.00' N	00° 40.00' W	120 m	18.9 km
11	JO 9	59° 17.00' N	00° 20.00' W	140 m	18.9 km
12	JO10	59° 17.00' N	00° 0.00' W	135 m	18.9 km
			Totals	1180 m	126.9 km

Table 2

Fair Isle - Munken (Amended for presence of Foinaven oil platform).

	Name	Latitude	Longitude	Depth	Spacing	
01	FIM-01	60° 10.00' N	03° 44.00' W	150 m		CTD
02	SEFF1	60° 13.00' N	03° 51.50' W	170 m	4.78 nm	CTD
03	FIM-02	60° 16.00' N	03° 59.00' W	200 m	4.77 nm	CTD
04	SEFF2	60° 18.00' N	04° 04.50' W	330 m	3.38 nm	CTD, Sledge
05	*FIM-03*	*60° 20.00' N*	*04° 10.00' W*	*390 m*	*3.37 nm*	*CTD*
06	FIM-04	60° 25.00' N	04° 19.00' W	655 m	6.68 nm	CTD
07	FIM-05	60° 29.00' N	04° 26.00' W	995 m	5.28 nm	CTD, Sledge
08	FIM-06	60° 35.00' N	04° 45.00' W	1090 m	11.09 nm	CTD, Sledge
09	FIM-6a	60° 38.00' N	04° 54.00' W	1030 m	5.33 nm	CTD
10	FIM-07	60° 43.00' N	05° 06.00' W	915 m	7.71 nm	CTD, Sledge
11	FIM-08	60° 47.00' N	05° 16.00' W	830 m	6.31 nm	CTD
12	FIM-09	60° 51.00' N	05° 29.00' W	600 m	7.49 nm	CTD
13	FIM-10	61° 02.00' N	05° 57.00' W	280 m	17.47 nm	CTD, Sledge
14	FIM-11	61° 12.00' N	06° 22.00' W	240 m	15.66 nm	CTD
			Totals	7,875 m	99.00 nm	

FIM-03 - Use 60 20.25’N 004 09.00’W if above position is occupied.

Table 3

Nolso-Flugga.

	Name	Latitude	Longitude	Depth	Spacing	
01	NOL-01	60° 56.00' N	01° 00.00' W	110 m		CTD
02	SEFN1	60° 58.70' N	01° 17.70' W	125 m	9.00 nm	CTD, Sledge
03	SEFN2	61° 01.40' N	01° 35.40' W	155 m	8.98 nm	CTD
*04	NOL-02	61° 04.00' N	01° 53.00' W	270 m	8.90 nm	CTD
05	SEFN3	61° 06.00' N	02° 01.50' W	440 m	4.56 nm	CTD, Sledge
*06	NOL-03	61° 08.00' N	02° 10.00' W	550 m	4.56 nm	CTD
07	SEFN4	61° 09.30' N	02° 17.50' W	630 m	3.84 nm	CTD
08	NOL-3a	61° 11.00' N	02° 25.00' W	730 m	3.99 nm	CTD
*09	NOL-04	61° 14.00' N	02° 40.00' W	1080 m	7.81 nm	CTD, Sledge
10	NOL-05	61° 21.00' N	03° 10.00' W	1370 m	16.00 nm	CTD, Sledge
11	NOL-06	61° 28.00' N	03° 42.00' W	1235 m	16.82 nm	CTD, Sledge
12	NOL-07	61° 35.00' N	04° 15.00' W	990 m	17.20 nm	CTD, Sledge
13	NOL-08	61° 42.00' N	04° 51.00' W	235 m	18.45 nm	CTD, Sledge
14	NOL-09	61° 49.00' N	05° 21.00' W	180 m	15.81 nm	CTD
15	NOL-10	61° 54.00' N	05° 45.00' W	290 m	12.36 nm	CTD
16	NOL-11	62° 00.00' N	06° 12.00' W	125 m	14.02 nm	CTD
			Totals	8250 m	161.92 nm	

* Grab samples at or nearby these stations (to be confirmed)

Table 4

Fair Isle-Munken (Additional stations for FASTNET).

	Name	Latitude	Longitude	Depth	Spacing
01	FIM-14	60° 31.26' N	04° 42.35' W	1072m	
02	FIM-15	60° 26.82' N	04° 36.33' W	1006m	5.33 nm
03	FIM-16	60° 22.86' N	04° 30.59' W	808m	4.86 nm
04	FIM-17	60° 18.09' N	04° 23.51' W	544m	5.91 nm
05	FIM-18	60° 13.77' N	04° 17.13' W	308m	5.35 nm
06	FIM-19	60° 9.96' N	04° 11.55' W	168m	4.71 nm
07	FIM-20	60° 6.00' N	04° 5.73' W	154m	4.90 nm
			Totals	m	31.06 nm

Standard depths of water bottles:

No water sampling.

Table 5

Faroe-Cape Wrath

	Name	Latitude	Longitude	Depth	Spacing
01	FWZ-19	59° 30.00' N	06° 10.00' W	152 m	
*02	FWZ-18	59° 34.82' N	06° 10.00' W	196 m	4.81 nm
03	FWZ-17	59° 39.64' N	06° 10.00' W	220 m	4.81 nm
04	FWZ-16	59° 44.45' N	06° 10.00' W	277 m	4.80 nm
*05	FWZ-15	59° 49.27' N	06° 10.00' W	457 m	4.81nm
06	FWZ-14	59° 54.09' N	06° 10.00' W	600 m	4.81 nm
07	FWZ-13	59° 58.91' N	06° 10.00' W	970 m	4.81 nm
*08	FWZ-12	60° 03.73' N	06° 10.00' W	1082 m	4.81 nm
09	FWZ-11	60° 08.54' N	06° 10.00' W	1195 m	4.80 nm
10	FWZ-10	60° 12.76' N	06° 10.00' W	1212 m	4.21 nm
*11	FWZ-09	60° 18.18' N	06° 10.00' W	616 m	5.41 nm
12	FWZ-08	60° 23.00' N	06° 10.00' W	423 m	4.81 nm
13	FWZ-07	60° 30.63'N	06° 13.88'W	302 m	7.86 nm
*14	FWZ-06	60° 38.26'N	06° 17.77'W	275 m	7.86 nm
15	FWZ-05	60° 45.89'N	06° 21.69'W	184 m	7.86 nm
16	FWZ-04	60° 53.52'N	06° 25.65'W	138 m	7.86 nm
*17	FWZ-03	61° 01.14'N	06° 29.63'W	142 m	7.85 nm
18	FWZ-02	61° 08.76'N	06° 33.65'W	125 m	7.85 nm
19	FWZ-01	61° 16.38' N	06° 37.70' W	100 m	7.86 nm
			Totals	m	107.12 nm

Standard depths of water bottles:

5,50,100,200,300,400,500,600,700,800,900,1000, 1100 and 1200

Note:

*Salinities at all depths except 5, 50, 500, 600
*Chlorophyll at 5 and 50 (1 Litre)

Table 6

Faroe-Cape Wrath (extended).

	Name	Latitude	Longitude	Depth	Spacing
01	FWZ-29	58° 36.60' N	06° 13.09' W	112	
02	FWZ-28	58° 42.06' N	06° 12.18' W	116	5.5 nm
03	FWZ-27	58° 47.42' N	06° 11.72' W	116	5.4 nm
04	FWZ-26	58° 52.75' N	06° 11.71' W	113	5.4 nm
05	FWZ-25	58° 58.02' N	06° 13.41' W	74	5.3 nm
06	FWZ-24	59° 03.36' N	06° 14.34' W	63	5.4 nm
07	FWZ-23	59° 08.61' N	06° 14.18' W	106	5.3 nm
08	FWZ-22	59° 13.84' N	06° 12.02' W	113	5.3 nm
09	FWZ-21	59° 19.21' N	06° 11.39' W	148	5.4 nm
10	FWZ-20	59° 24.58' N	06° 10.58' W	155	5.4 nm
			Totals	m	48.4 nm

Table 7:

P**rincipal Name:** Shelf Line 1

Additional Names:

	Name	Latitude	Longitude	Depth	Spacing
01	S1_1	59° 28.61' N	03° 07.08' W	m	
02	S1_2	59° 32.14' N	03° 14.02' W	m	4.99 nm
03	S1_3	59° 35.75' N	03° 20.95' W	m	5.03 nm
04	S1_4	59° 39.41' N	03° 27.89' W	m	5.06 nm
05	S1_5	59° 46.46' N	03° 41.96' W	m	9.99 nm
06	S1_6	59° 53.74' N	03° 55.93' W	m	10.10 nm
07	S1_7	60° 00.88' N	04° 09.99' W	m	10.01 nm
08	S1_8	60° 08.01' N	04° 24.25' W	m	10.06 nm
09	S1_9	60° 14.96' N	04° 38.22' W	m	9.81 nm
			Totals	m	65.05 nm

Standard depths of water bottles:

- 0, 10, 20, 30, 50, 75, 100, bottom

Table 8

Principal Name: Shelf Line 2

Additional Names:

	Name	Latitude	Longitude	Depth	Spacing
01	S2_1	59° 50.57' N	05° 36.97' W	574 m	
02	S2_2	59° 43.49' N	05° 23.04' W	144 m	9.95 nm
03	S2_3	59° 36.37' N	05° 08.97' W	142 m	10.05 nm
04	S2_4	59° 29.33' N	04° 54.91' W	143 m	10.00 nm
05	S2_5	59° 22.21' N	04° 41.13' W	112 m	9.98 nm
06	S2_6	59° 15.11' N	04° 27.34' W	94 m	9.99 nm
07	S2_7	59° 07.99' N	04° 13.65' W	79 m	9.98 nm
08	S2_8	59° 00.90' N	03° 59.95' W	73 m	9.98 nm
09	S2_9	58° 57.34' N	03° 53.18' W	85 m	4.98 nm
10	S2_10	58° 53.75' N	03° 46.32' W	88 m	5.04 nm
11	S2_11	58° 50.14' N	03° 39.34' W	85 m	5.10 nm
12	S2_12	58° 46.60' N	03° 32.56' W	70 m	5.12 nm
			Totals	m	90.16 nm

Standard depths of water bottles:

- 0, 10, 20, 30, 50, 75, 100, bottom

Table 9

Principal Name: Shelf Line 3

Additional Names:

	Name	Latitude	Longitude	Depth	Spacing
01	S3_1	58° 38.83' N	05° 02.09' W	51 m	
02	S3_2	58° 42.42' N	05° 08.79' W	81 m	5.00 nm
03	S3_3	58° 46.03' N	05° 15.69' W	79 m	5.08 nm
04	S3_4	58° 49.65' N	05° 22.48' W	100 m	5.04 nm
05	S3_5	58° 56.83' N	05° 35.98' W	104 m	10.00 nm
06	S3_6	59° 03.90' N	05° 49.81' W	93 m	10.02 nm
07	S3_7	59° 11.04' N	06° 03.57' W	115 m	10.03 nm
08	S3_8	59° 18.23' N	06° 17.29' W	162 m	10.03 nm
09	S3_9	59° 25.32' N	06° 31.02' W	222 m	9.95 nm
10	S3_10	59° 28.00' N	06° 51.00' W	m	10.49 nm
			Totals	m	75.64 nm

Standard depths of water bottles:

- 0, 10, 20, 30, 50, 75, 100, bottom

Table 10

Principal Name: Shelf Line 4

Additional Names:

	Name	Latitude	Longitude	Depth	Spacing
01	S4_1	59° 09.98’ N	07° 28.20' W	736 m	
02	S4_2	59° 01.62' N	07° 13.40' W	190 m	11.29 nm
03	S4_3	58° 54.50' N	06° 59.81' W	176 m	9.98 nm
04	S4_4	58° 47.41' N	06° 46.12' W	148 m	10.01 nm
05	S4_5	58° 43.85' N	06° 39.27' W	132 m	5.02 nm
06	S4_6	58° 40.34' N	06° 32.43' W	116 m	4.99 nm
07	S4_7	58° 36.72' N	06° 25.58' W	93 m	5.07 nm
08	S4_8	58° 33.15' N	06° 18.74' W	68 m	5.04 nm
			Totals	m	51.38 nm

Standard depths of water bottles:

- 0, 10, 20, 30, 50, 75, 100, bottom