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MRV *Scotia*

Survey 1815S

PROGRAMME

10-23 December 2015

Loading: Aberdeen, 8 December 2015
Unloading: Aberdeen, 23 December 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

B Rabe	(SIC)
M Geldart	
D Lee	
J Hindson	
N Collie	
J Hunter	
A Taylor	
A Lechtenboerger	(Visitor – University of Kiel)

Out-turn days per project: 14 days: ST03P

Gear

Sea-Bird CTD/Carousel, Plankton Nets (ARIES)

Objectives

1. Test the CTD in the Buchan Deep off Peterhead and test plankton crane, winch system and ARIES at an appropriate location before its first use.

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

3. Perform routine hydrographic sampling at stations along the long term monitoring Faroe-Shetland Channel sections: Fair Isle-Munken and Nolso-Flugga (Priority 1).

4. Conduct combined plankton/hydrographic observations by deploying Aries in the Faroe-Shetland-Channel at selected stations on the Fair Isle-Munken and Nolso-Flugga lines.

5. Take nutrient, chlorophyll, TA/DIC, oxygen samples along all standard lines.

6. Take oxygen isotope samples along the Faroe-Shetland-Channel sections.

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

8. Take water samples to investigate the formation of Marine Oil Snow in incubations with Schehallion crude oil by Heriot Watt University along the long term monitoring sections.

9. Run the thermosalinograph throughout the survey.

10. Run the pCO2 system throughout the survey.

11. If time allows, conduct sampling along any of the following sections (in order of priority, no water sampling):

    - Priority 2: Shelf 0, Shelf 1, Fair Isle N-S, NS-1
    - Priority 3: FCW/NWZ, Shelf 2
    - Priority 4: WS-1, Fair Isle E-W, ES-1, ES-2, ES-3, WS-2
    - Priority 5: East Coast

12. Conduct VMADCP survey if sheltering in a suitable location around Shetland, Orkney or Pentland Firth due to bad weather.

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). On route to JONSIS, test deployments of the CTD carousel, crane, winch system and ARIES will take place around the Buchan Deep.

The vessel will then proceed to the Faroe-Shetland Channel. Depending on weather conditions we will commence hydrographic sampling and ARIES sampling 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 ARIES sampling at selected stations on the Nolso Flugga survey line (Table 3, Figure 1). Towed deployments of the ARIES sampler will be carried out only at selected stations along the two lines in the Faroe-Shetland-Channel.

After completing the above three main priority monitoring lines, we will sample along other sections listed as options above (Tables 4-16).

Opportunistic VMADCP sampling will be undertaken around Shetland, Orkney or the Pentland Firth if poor weather requires the vessel to seek shelter.

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 ARIES deployments from the trawl deck will use the plankton crane.

Three container laboratories will be required (one wet chemical analysis laboratory, two dry containers for electronics work and communications with sampling equipment). Plankton sample sorting and processing will be carried out in the fish laboratory.
Hydrophones for receiving data from the plankton samplers will be installed on the drop keel before the start of the survey.

All plankton samples will be preserved in formaldehyde solution and ethanol.

CTD, Optical Plankton Counter and ARIES data will be analysed at sea.

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
17 November 2015

Approved:
I Gibb
18 November 2015

Figure 1: Map including the three main monitoring lines Jonsis, FIM and NOL and other potential sampling lines.

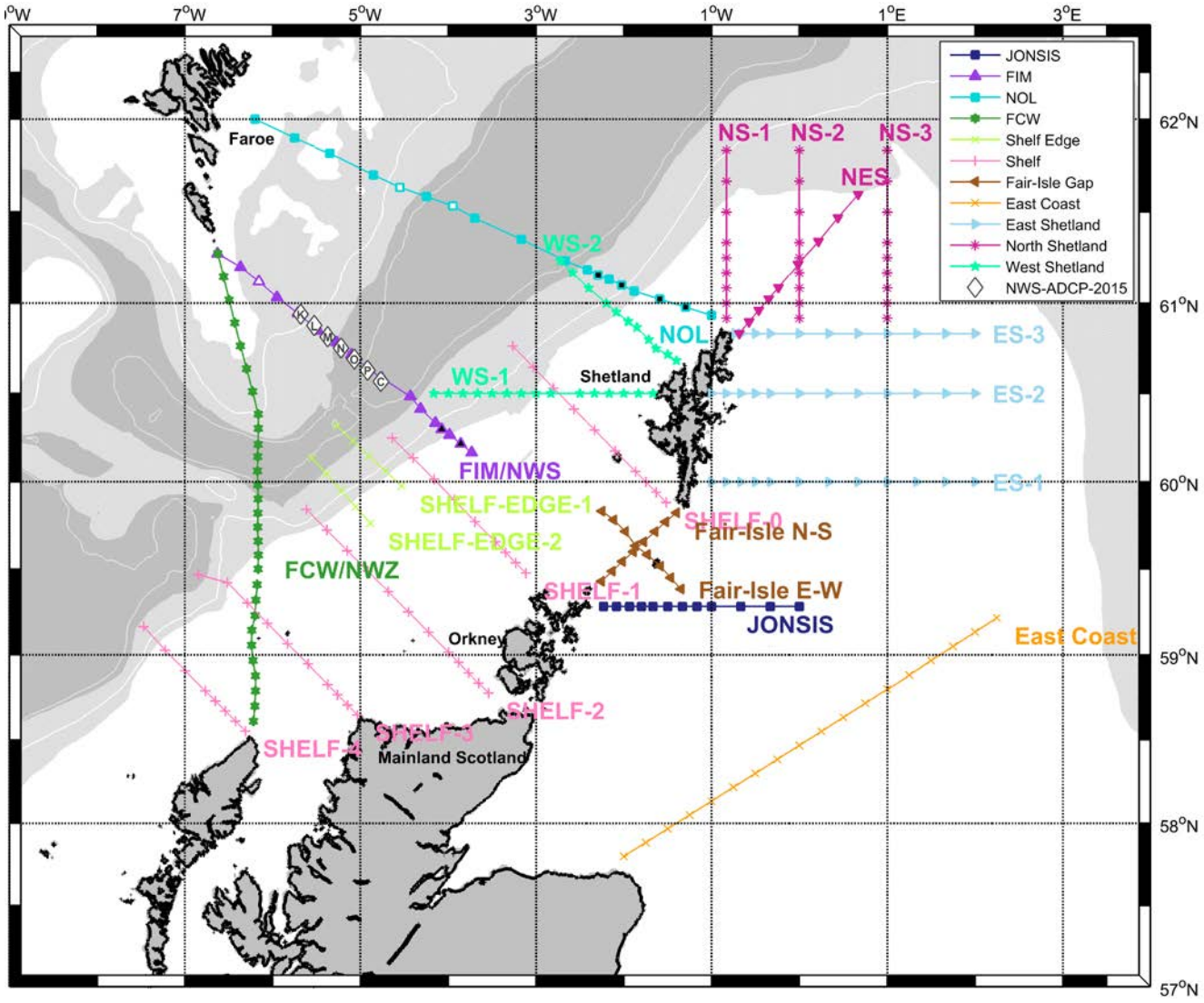

Table 1

JONSIS Line

CODES	#	Name	Latitude	Longitude	Depth	Spacing
N, T,O,CH, DS	01	JO 1	59° 17.00' N	02° 14.00' W	75 m	
N,CH,DS	02	JO 1A	59° 17.00' N	02° 5.00' W	90 m	4.59 nm
N,CH,DS	03	JO 2	59° 17.00' N	01° 56.00' W	100 m	4.59 nm
N, T,O,CH, DS	04	JO 3	59° 17.00' N	01° 48.00' W	80 m	4.08 nm
N,CH,DS	05	JO 4	59° 17.00' N	01° 40.00' W	90 m	4.08 nm
N,CH,DS	06	JO 5	59° 17.00' N	01° 30.00' W	95 m	5.10 nm
N,CH,DS	07	JO 6	59° 17.00' N	01° 20.00' W	110 m	5.10 nm
N, T,O,CH, DS	08	JO 6A	59° 17.00' N	01° 10.00' W	120 m	5.10 nm
N,CH,DS	09	JO 7	59° 17.00' N	01° 0.00' W	125 m	5.10 nm
N,CH,DS	10	JO 8	59° 17.00' N	00° 40.00' W	120 m	10.20 nm
N,CH,DS	11	JO 9	59° 17.00' N	00° 20.00' W	140 m	10.20 nm
N, T,O,CH, DS	12	JO10	59° 17.00' N	00° 0.00' W	135 m	10.20 nm
				Totals	1180 m	68.36 nm

Priority Stations are JO-01, JO-03 and JO-06a, JO-10

Standard depths of water bottles:

5, 10, 20, 30, 50, 75, 100 and bottom*

*Fire a ‘bottom’ bottle if seabed is more than 20m below the lowest standard bottle

JONSIS Sampling Strategy

Seasonal Variations

In May and December, the sampling strategy is **full**. Nutrients are taken at all stations, Ta-DIC and Oxygen samples are also taken.

In October, the sampling strategy is **reduced.** Nutrients are taken at a limited set of stations, Oxygen samples are taken but no Ta-DIC samples are taken.

Methods/Codes

[S] Salinity and chlorophyll [CH+] (2 litre) to be taken from the thermosalinograph supply at all stations

[DS] Duplicate salinities at all stations at depths of 50m, 75m and 100m

[CH] Chlorophyll (1 litre) to be taken at all stations at 10m, 20m, 30m, 50m and 75m

Nutrients to be taken using plastic tubes. These are analysed for silicate/nitrate/phosphate. Samples should be stored in a fridge in the chemistry container or in a cleaned (fish free!) freezer below if they are not analysed on board.

[N] Nutrients to be taken at all depths/ Oxygen Isotopes taken at same depths/locations

[T] TA-DIC to be taken at all depths

[O] Oxygen to be taken at 10m, 30m and 75m

Table 2

Fair Isle - Munken

(Amended for presence of Foinaven oil platform; SEFOS naming changed Nov-2014**,** Updated for 2015 to include additional Faroese Stations).

CODE	#	Name	Latitude	Longitude	Depth	Spacing
N, CH, DS	**01**	**FIM-01**	**60° 10.00' N**	**03° 44.00' W**	**150 m**	
N, CH, DS	**02**	**SEFF1**	**60° 13.00' N**	**03° 51.50' W**	**170 m**	**4.74 nm**
N, T, O, CH, DS	**03**	**FIM-02**	**60° 16.00' N**	**03° 59.00' W**	**200 m**	**4.84 nm**
N, CH, DS ARIES	**04**	**SEFF2**	**60° 18.00' N**	**04° 04.50' W**	**330 m**	**3.36 nm**
N, CH, DS	**** 05***	***FIM-03***	***60° 20.00' N***	***04° 10.00' W***	***390 m***	***3.03 nm***
N, CH, DS	**06**	**FIM-04**	**60° 25.00' N**	**04° 19.00' W**	**655 m**	**6.88 nm**
N, CH, DS ARIES	**07**	**FIM-05**	**60° 29.00' N**	**04° 26.00' W**	**995 m**	**5.45 nm**
N,T,O,CH, DS ARIES (Priority)	**08**	**FIM-06**	**60° 35.00' N**	**04° 45.00' W**	**1090 m**	**11.15 nm**
		*FIM-06**	*60° 35.00' N*	*04° 45.00' W*	*1090 m*	
N, CH, DS	**09**	**FIM-6a**	**60° 38.00' N**	**04° 54.00' W**	**1030 m**	**5.33 nm**
N, CH, DS ARIES	**10**	**FIM-07**	**60° 43.00' N**	**05° 06.00' W**	**915 m**	**7.70 nm**
N, T, O, CH, DS	**11**	**FIM-08**	**60° 47.00' N**	**05° 16.00' W**	**830 m**	**6.34 nm**
N, CH, DS	**12**	**FIM-09**	**60° 51.00' N**	**05° 29.00' W**	**600 m**	**7.36 nm**
nil	13	FARF3	60° 56.70' N	05° 42.80' W	333 m	8.90 nm
N, CH, DS ARIES	**14**	**FIM-10**	**61° 02.00' N**	**05° 57.00' W**	**280 m**	**8.68 nm**
nil	15	FARF2	61° 07.20' N	06° 09.40' W	250 m	7.95 nm
N, T, O, CH, DS	**16**	**FIM-11**	**61° 12.00' N**	**06° 22.00' W**	**240 m**	**7.67 nm**
nil	17	FARF1	61° 16.40' N	06° 37.70' W	100 m	8.80 nm
				Totals	8,558 m	108.18 nm

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

Standard depths of water bottles:
5, *50*, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000 and bottom
If all 12 bottles used drop 50m depth.
Fire a bottom bottle if seabed is more than 50m below the lowest standard bottle

If stations need to be missed they should be dropped in this order
[Priority 4: FARF1, FARF2. FARF3], [Priority 3: SEFF1, SEFF2]
[Priority 2, FIM-04, FIM-06a] [Priority 2, FIM-04, FIM-06a, ARIES at FIM-10]

Fair Isle - Munken Sampling Strategy

Notes

Standard stations (FIM* and SEFF*) taken by Marine Scotland are marked in **bold**.

Additional Faroese stations (FARF*) were incorporated in 2015, NO water sampling is required at these stations

Seasonal Variations

In May and December, the sampling strategy is **full**. Nutrients are taken at all stations, Ta-DIC and Oxygen samples are also taken.

In October, the sampling strategy is **reduced.** Nutrients are taken at a limited set of stations, Oxygen samples are taken but no Ta-DIC samples are taken.

Methods/Codes

[S] Salinity and chlorophyll [CH+] (2 litre) to be taken from the thermosalinograph supply at all **standard** stations (i.e not FAR*)

[DS] Duplicate salinities at all **standard** stations and all depths **except** at 5m, 50m, 400m, 500m and 600m.

[CH] Chlorophyll (1 litre) to be taken at all **standard** stations at 5m and 50m

Nutrients to be taken using plastic tubes. These are analysed for silicate/nitrate/phosphate. Samples should be stored in a fridge in the chemistry container or in a cleaned (fish free) freezer below if they are not analysed on board.

[N] denotes Nutrients to be taken at all depths/ Oxygen Isotopes taken at same depths/locations

[N*] denotes Nutrients to be taken at 5, 100, 300, 500, 700, 900, 1100 and bottom.

[T] denotes TA-DIC to be taken at all depths.

[O] denotes Oxygen to be taken at 5, 100, 300, 700, 900, 1100 and bottom [exclude 500m!]

FIM-01 4 replicate samples at 50m and 100m
FIM-06 4 replicate samples at 200m, 500m, 800m, 1000m
Use former IAPSO Standard Sea Water bottles. Crimp sealed and labelled

Table 3

Nolso-Flugga

(SEFOS naming changed Nov-2014, Updated for 2015 to include additional Faroese Stations).

CODES	#	Name	Latitude	Longitude	Depth	Spacing
N, CH, DS	**01**	**NOL-01**	**60° 56.00' N**	**01° 00.00' W**	**110 m**	
N, CH, DS ARIES	**02**	**SEFN1**	**60° 58.70' N**	**01° 17.70' W**	**125 m**	**9.00 nm**
N, CH, DS	**03**	**SEFN2**	**61° 01.40' N**	**01° 35.40' W**	**155 m**	**8.99 nm**
N, T, O, CH, DS	**04**	**NOL-02**	**61° 04.00' N**	**01° 53.00' W**	**270 m**	**8.91 nm**
N, CH, DS ARIES	**05**	**SEFN3**	**61° 06.00' N**	**02° 01.50' W**	**440 m**	**4.57 nm**
N, CH, DS	**06**	**NOL-03**	**61° 08.00' N**	**02° 10.00' W**	**550 m**	**4.57 nm**
N, CH, DS	**07**	**SEFN4**	**61° 09.30' N**	**02° 17.50' W**	**630 m**	**3.85 nm**
N, CH, DS	**08**	**NOL-3a**	**61° 11.00' N**	**02° 25.00' W**	**730 m**	**3.98 nm**
N, T, O, CH, DS ARIES	**09**	**NOL-04**	**61° 14.00' N**	**02° 40.00' W**	**1080 m**	**7.82 nm**
N, CH, DS ARIES(Priority)	**10**	**NOL-05**	**61° 21.00' N**	**03° 10.00' W**	**1370 m**	**16.03 nm**
	10	*NOL-05**	*61° 21.00' N*	*03° 10.00' W*	*1370 m*	*16.03 nm*
N, T, O, CH, DS ARIES(Priority)	**11**	**NOL-06**	**61° 28.00' N**	**03° 42.00' W**	**1235 m**	**16.84 nm**
nil	12	FARN2	61° 32.00' N	03° 57.00' W	1200 m	8.18 nm
N, CH, DS ARIES	**13**	**NOL-07**	**61° 35.00' N**	**04° 15.00' W**	**990 m**	**9.08 nm**
nil	14	FARN1	61° 38.00' N	04° 33.00' W	530 m	9.07 nm
N, T, O, CH, DS ARIES	**15**	**NOL-08**	**61° 42.00' N**	**04° 51.00' W**	**235 m**	**9.44 nm**
N, CH, DS	**16**	**NOL-09**	**61° 49.00' N**	**05° 21.00' W**	**180 m**	**15.84 nm**
N, CH, DS	**17**	**NOL-10**	**61° 54.00' N**	**05° 45.00' W**	**290 m**	**12.37 nm**
N, T, O,CH, DS	**18**	**NOL-11**	**62° 00.00' N**	**06° 12.00' W**	**125 m**	**14.04 nm**
				Totals	10245 m	162.60 nm

Standard depths of water bottles:

5, *50*, 100, *200*, 300, *400*, 500, 600, 700, 800, 900, 1000, 1100, 1200 and bottom
If all 12 bottles used drop 50m, 200m and 400m depths in this order.
Fire a bottom bottle if seabed is more than 50m below the lowest standard bottle

If stations need to be missed they should be dropped in this order
[Priority 4: FARN1, FARN2], [Priority 3: SEFN1, SEFN2, SEFN3, SEFN4]
[Priority 2, NOL-3a, NOL-10, ARIES at NOL-08]

Nolso-Flugga Sampling Strategy

Notes

Standard stations (NOL* and SEFN*) taken by Marine Scotland are marked in **bold**.

Additional Faroese stations (FARN*) were incorporated in 2015, NO water sampling is required at these stations

Seasonal Variations

In May and December, the sampling strategy is **full**. Nutrients are taken at all stations, Ta-DIC and Oxygen samples are also taken.

In October, the sampling strategy is **reduced.** Nutrients are taken at a limited set of stations, Oxygen samples are taken but no Ta-DIC samples are taken.

Methods/Codes

[S] Salinity and chlorophyll [CH+] (2 litre) to be taken from the thermosalinograph supply at all **standard** stations (i.e not FAR*)

[DS] Duplicate salinities at all **standard** stations and all depths **except** at 5m, 50m, 400m, 500m and 600m.

[CH] Chlorophyll (1 litre) to be taken at all **standard** stations at 5m and 50m

Nutrients to be taken using plastic tubes. These are analysed for silicate/nitrate/phosphate. Samples should be stored in a fridge in the chemistry container or in a cleaned (fish free) freezer below if they are not analysed on board.

[N] Nutrients to be taken at all depths/ Oxygen Isotopes taken at same depths/locations

[N*] Nutrients to be taken at 5, 100, 300, 500, 700, 900, 1100 and bottom

[T] TA-DIC to be taken at all depths

[O] Oxygen to be taken at 5, 100, 300, 700, 900, 1100 and bottom [exclude 500m!]

Table 4

Shelf 0 (Priority 2).

	Name	Latitude	Longitude	Depth	Spacing
01	**S0_1**	**59° 52.93' N**	**01° 31.00' W**	**111 m**	
02	**S0_2**	**59° 59.99' N**	**01° 45.00' W**	**109 m**	10 nm
03	**S0_3**	**60° 06.54'N**	**01° 58.00' W**	**54 m**	9.2 nm
04	**S0_4**	**60° 14.11' N**	**02° 13.00' W**	**119 m**	10.6 nm
05	**S0_5**	**60° 17.64' N**	**02° 19.94' W**	**118 m**	4.9 nm
06	**S0_6**	**60° 21.25' N**	**02° 26.87' W**	**133 m**	5.0 nm
07	**S0_7**	**60° 24.91' N**	**02° 33.81' W**	**158 m**	5.0 nm
08	**S0_8**	**60° 31.96' N**	**02° 47.88' W**	**156 m**	9.9 nm
09	**S0_9**	**60° 39.27' N**	**03° 2.00' W**	**303 m**	10.0 nm
10	S0_10	60° 45.88' N	03° 16.00' W	**m**	9.83 nm
			Totals	m	74.20 nm

No water sampling.

Table 5

Shelf 1 (Priority 2)

	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

No water sampling.

Table 6

Fair Isle N-S (Priority 2).

	Name	Latitude	Longitude	Depth	Spacing
01	FI_NS1	59° 49.40' N	01° 24.00' W	67 m	
02	FI_NS2	59° 46.30' N	01° 31.50' W	99 m	4.88 nm
03	FI_NS3	59° 42.90' N	01° 38.70' W	121 m	4.97 nm
04	FI_NS4	59° 39.40' N	01° 46.40' W	106 m	5.22 nm
05	FI_NS5	59° 36.00' N	01° 53.50' W	90 m	4.94 nm
06	FI_NS6	59° 32.60' N	02° 01.00' W	109 m	5.09 nm
07	FI_NS7	59° 29.20' N	02° 08.00' W	86 m	4.91 nm
08	FI_NS8	59° 25.70' N	02° 15.30' W	56 m	5.09 nm
			Totals	m	35.10 nm

Note: FI_NS8 may have to be canceled if arriving on position outside of +/- 1 hours either side of slack water due to up to 3 knot tide.

No water sampling.

Table 7

NS-1 (Priority 2).

	Name	Latitude	Longitude	Depth	Spacing
01	NS1_1	61° 50.00' N	00° 50.00' W	m	
02	NS1_2	61° 40.00' N	00° 50.00' W	m	9.99 nm
03	NS1_3	61° 30.00' N	00° 50.00' W	m	9.99 nm
04	NS1_4	61° 20.00' N	00° 50.00' W	m	9.99 nm
05	NS1_5	61° 15.00' N	00° 50.00' W	m	4.99 nm
06	NS1_6	61° 10.00' N	00° 50.00' W	m	4.99 nm
07	NS1_7	61° 05.00' N	00° 50.00' W	m	4.99 nm
08	NS1_8	61° 00.00' N	00° 50.00' W	m	4.99 nm
09	NS1_9	60° 55.00' N	00° 50.00' W	m	4.99 nm
			Totals	m	54.92 nm

No water sampling.

Table 8

FCW/NWZ (Priority 3)

	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

	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

No water sampling.

Table 9

Shelf 2 (Priority 3).

	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

No water sampling.

Table 10

WS-1 (Priority 4).

	Name	Latitude	Longitude	Depth	Spacing
01	WS1_01	60° 30.00' N	01° 40.00' W	90 m	
02	WS1_02	60° 30.00' N	01° 50.00' W	120 m	4.92 nm
03	WS1_03	60° 30.00' N	02° 00.00' W	133 m	4.92 nm
04	WS1_04	60° 30.00' N	02° 10.00' W	146 m	4.92 nm
06	WS1_06	60° 30.00' N	02° 30.00' W	144 m	9.84 nm
08	WS1_08	60° 30.00' N	02° 50.00' W	169 m	9.84 nm
10	WS1_10	60° 30.00' N	03° 10.00' W	230 m	9.84 nm
12	WS1_12	60° 30.00' N	03° 30.00' W	377m	9.84 nm
14	WS1-14	60° 30.00' N	03° 50.00' W	480 m	9.84 nm
16	WS1-16	60° 30.00' N	04° 10.00' W	665 m	9.84 nm
			Totals	m	73.77 nm

No water sampling.

Table 11

Fair Isle E-W (Priority 4).

	Name	Latitude	Longitude	Depth	Spacing
01	FI_1	59° 23.00' N	01° 21.00' W	m	
02	FI_2	59° 27.00' N	01° 28.00' W	m	5.35 nm
03	FI_3	59° 31.00' N	01° 35.00' W	m	5.34 nm
04	FI_4	59° 35.00' N	01° 44.00' W	m	6.06 nm
05	FI_5	59° 38.00' N	01° 52.00' W	m	5.03 nm
06	FI_6	59° 43.00' N	01° 59.00' W	m	6.12 nm
07	FI_7	59° 47.00' N	02° 07.00' W	m	5.67 nm
08	FI_8	59° 50.00' N	02° 15.00' W	m	5.01 nm
			Totals	m	38.58 nm

No water sampling.

Table 12

ES-1 (Priority 4).

	Name	Latitude	Longitude	Depth	Spacing
01	*ES1_0*	*60° 00.00' N*	*01° 07.08' W*	*78 m*	
02	*ES1_0A*	*60° 00.00' N*	*00° 02.26' W*	*92 m*	*1 nm*
03	**ES1_1**	**60° 00.00' N**	**00° 00.00' W**	**106 m**	**2 nm**
04	*ES1_1A*	*60° 00.00' N*	*00° 55.00' W*	*130 m*	*2.45 nm*
05	**ES1_2**	**60° 00.00' N**	**00° 50.00' W**	**130 m**	**4.99 nm**
06	**ES1_3**	**60° 00.00' N**	**00° 40.00' W**	**125 m**	**4.99 nm**
07	**ES1_4**	**60° 00.00' N**	**00° 30.00' W**	**125 m**	**4.99 nm**
08	**ES1_5**	**60° 00.00' N**	**00° 20.00' W**	**150 m**	**4.99 nm**
09	**ES1_6**	**60° 00.00' N**	**00° 00.00' E**	**150 m**	**9.99 nm**
10	**ES1_7**	**60° 00.00' N**	**00° 20.00' E**	**130 m**	**9.99 nm**
11	**ES1_8**	**60° 00.00' N**	**00° 40.00' E**	**125 m**	**9.99 nm**
12	**ES1_9**	**60° 00.00' N**	**01° 00.00' E**	**125 m**	**9.99 nm**
13	ES1_10	60° 00.00' N	01° 20.00' E	120 m	9.99 nm
14	ES1_11	60° 00.00' N	01° 40.00' E	120 m	9.99 nm
			Totals	1410 m	79.90 nm

No water sampling.

Table 13

ES-2 (Priority 4).

	Name	Latitude	Longitude	Depth	Spacing
01	ES_2M1	60° 30.00' N	01° 00.00' W	97 m	
02	ES_2M2	60° 30.00' N	00° 50.00' W	107 m	4.92 nm
03	*ES_2M2A*	*60° 30.00' N*	*00° 45.00' W*	*89 m*	*2.45 nm*
04	**ES_2M3**	**60° 30.00' N**	**00° 40.00' W**	**136 m**	**2.45 nm**
05	*ES_2M3A*	*60° 30.00' N*	*00° 35.00' W*	*129 m*	*2.45 nm*
06	**ES_2M4**	**60° 30.00' N**	**00° 30.00' W**	**104 m**	**2.45 nm**
07	*ES_2M4A*	*60° 30.00' N*	*00° 25.00' W*	*89 m*	*2.45 nm*
08	**ES_2M5**	**60° 30.00' N**	**00° 20.00' W**	**79 m**	**4.92 nm**
09	*ES_2M5A*	*60° 30.00' N*	*00° 10.00' W*	*111 m*	*4.92 nm*
10	**ES_2M6**	**60° 30.00' N**	**00° 00.00' E**	**117 m**	**4.92 nm**
11	*ES_2M6A*	*60° 30.00' N*	*00° 10.00' E*	*134 m*	*4.92 nm*
12	**ES_2M7**	**60° 30.00' N**	**00° 20.00' E**	**145 m**	**9.84 nm**
13	**ES_2M8**	**60° 30.00' N**	**00° 40.00' E**	**148 m**	**9.84 nm**
14	**ES_2M9**	**60° 30.00' N**	**01° 00.00' E**	**147 m**	**9.84 nm**
15	ES_2M10	60° 30.00' N	01° 20.00' E	129 m	9.84 nm
16	ES_2M11	60° 30.00' N	01° 40.00' E	121 m	9.84 nm
			Totals	m	78.69 nm

No water sampling.

Table 14

ES-3 (Priority 4).

	Name	Latitude	Longitude	Depth	Spacing
*01**	*ES3_1*	*60° 50.00' N*	*00° 44.00' W*	*75 m*	
02	**ES3_2**	**60° 50.00' N**	**00° 40.00' W**	**95 m**	**1.95 nm**
03	**ES3_3**	**60° 50.00' N**	**00° 30.00' W**	**110 m**	**4.87 nm**
04	**ES3_4**	**60° 50.00' N**	**00° 20.00' W**	**140 m**	**4.87 nm**
05	**ES3_5**	**60° 50.00' N**	**00° 00.00' E**	**160 m**	**9.73 nm**
06	**ES3_6**	**60° 50.00' N**	**00° 20.00' E**	**140 m**	**9.73 nm**
07	**ES3_7**	**60° 50.00' N**	**00° 40.00' E**	**150 m**	**9.73 nm**
08	**ES3_8**	**60° 50.00' N**	**01° 00.00' E**	**155 m**	**9.73 nm**
09	**ES3_9**	**60° 50.00' N**	**01° 20.00' E**	**145 m**	**9.73 nm**
10	ES3_10	60° 50.00' N	01° 40.00' E	130 m	9.73 nm
11	ES3_11	60° 50.00' N	02° 00.00' E	125 m	9.73 nm
12	ES3_12	60° 50.00' N	02° 20.00' E	120 m	9.73 nm
13	ES3-13	60° 50.00' N	02° 40.00' E	190 m	9.73 nm
14	ES3_14	60° 50.00' N	03° 00.00' E	250 m	9.73 nm
			Totals	1985 m	109.00 nm

No water sampling.

Table 15

WS-2 (Priority 4.

Number	Station name	Latitude	Longitude	Depth
1	WSM_1	61.233	-2.725	1094
2	WSM_2	61.167	-2.583	804
3	WSM_3	61.083	-2.400	592
4	WSM_4	61.000	-2.200	374
5	WSM_5	60.950	-2.083	218
6	WSM_6	60.900	-1.950	124
7	WSM_7	60.867	-1.850	140
8	WSM_8	60.800	-1.717	110
9	WSM_9	60.750	-1.633	95
10	WSM_10	60.717	-1.500	95
11	WSM_11	60.683	-1.400	96

No water sampling.

Table 16

East Coast (Priority 5)

	Name	Latitude	Longitude	Depth	Spacing
01	EC18	59° 13.00' N	02° 15.00' E	220 m	
02	EC17	59° 8.00' N	02° 00.00' E	75 m	17.0 km
03	EC16	59° 3.00' N	01° 45.00' E	95 m	17.0 km
04	EC15	58° 58.00' N	01° 30.00' E	125 m	17.0 km
05	EC14	58° 53.00' N	01° 15.00' E	120 m	17.1 km
06	EC13	58° 48.00' N	01° 00.00' E	120 m	17.1 km
07	EC12	58° 43.00' N	00° 45.00' E	140 m	17.1 km
08	EC11	58° 38.00' N	00° 30.00' E	140 m	17.1 km
09	EC10	58° 33.00' N	00° 15.00' E	150 m	17.2 km
10	EC9	58° 28.00' N	00° 00.00' W	140 m	17.2 km
11	EC8	58° 23.00' N	00° 15.00' W	130 m	17.2 km
12	EC7	58° 18.00' N	00° 30.00' W	120 m	17.3 km
13	EC6	58° 13.00' N	00° 45.00' W	105 m	17.3 km
14	EC5	58° 08.00' N	01° 00.00' W	115 m	17.3 km
15	EC4	58° 03.00' N	01° 15.00' W	110 m	17.3 km
16	EC3	57° 58.00' N	01° 30.00' W	95 m	17.4 km
17	EC2	57° 53.00' N	01° 45.00' W	75 m	17.4 km
18	EC1	57° 48.00' N	02° 00.00' W	185 m	17.4 km
			Totals	2260 m	292.4 km

Comments:

- Designed to meet extended JONSIS line
- Stations EC1, EC2 and EC3 in Norwegian waters

No water sampling.