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FRV *Alba na Mara*

Cruise 1409A

REPORT

26 August – 11 September 2009

Loading: Fraserburgh, 21 August
Unloading: Fraserburgh, 11 September

Personnel

M Gubbins	(In charge)
D Lichtman	
L Morley	26 August – 4 September
G Hermann	26 August – 4 September
J Graham	26 August – 4 September
M Rose	4 September – 11 September

Project codes: AE11q 7 days AE11s 10 days out-turn

Equipment

Proteus workboat and 100 L unleaded fuel
Sealogger CTD/Rosette
Nutrient analyzer (4 – 11 September)
Passive sampling frames and moorings x 10
Plankton auto-sampler buoy
Plankton sampling nets
Day grab / wooden table

Objectives

1) To collect water column hydrographic data from approximately 20 sea lochs in the North Minch and Voes in Shetland to provide validation / forcing data for models of fish farming carrying capacity.

2) To deploy passive samplers for hydrophobic contaminants (silicone rubber) and algal toxins (SPATT bags) at key locations around Shetland and the Western Isles, including an auto-sampling buoy in Busta Voe.

3) Attempt to locate *Alexandrium* dinoflagellates in Shetland waters using rosette and plankton net sampling and deploy passive samplers (resin bags) locally to sample algal toxins.

4) To continuously monitor T&S and chlorophyll a in surface waters and surface irradiance during the cruise.

5) Complete the CSEMP 2009 benthos sampling North of Bressay Sound that was missed by Scotia in January.

Narrative

After loading on 21 August, scientific staff boarded the vessel on 26 August and made passage for Shetland, arriving off St Magnus Bay on the morning of 27 August. A transect of 6 CTD and plankton sampling stations was conducted working into St Magnus Bay, followed by 3 stations in Swarbacks Minn and Busta Voe. Following communication with collaborating shellfish farm company Blue Shell Marine a location was agreed for deployment of the Autosampler mooring and it was deployed from the Alba na Mara on the West side of Busta Voe. Alba na Mara then anchored overnight in Busta Voe.

The following morning hydrographic and plankton sampling was completed in Olna Firth and two moorings were deployed in the area with SPATT passive sampling bags attached at different depths. These were deployed adjacent to the Park Gate shellfish farm and near the entrance to the Voe on the North side. Passage was then made to Vaila Sound, but increasing W winds meant that the narrow confines of the Sound were unworkable, so Gruting Voe was surveyed by CTD and plankton samples instead. Due to a worsening forecast, Alba na Mara made for safe harbour in Scalloway.

On 29 August SW winds prevented Alba na Mara leaving Scalloway, but the Proteus workboat was launched from the harbour and used to gain access under the bridge to the sheltered waters of Clift Sound. Here two SPATT moorings were deployed adjacent to shellfish farms 'Booth' and 'Stream Sound' before recovering the Proteus onto the Alba na Mara. Poor weather continued to prevent work from the Alba na Mara on 30 August.

Calmer conditions on 31 August allowed Alba na Mara to make passage for Vaila Sound where 3 hydrographic and plankton sampling stations were surveyed and two SPATT moorings deployed in the vicinity of the Riskness shellfish site. Hydrostations in Gruting Voe were then repeat sampled by CTD and plankton net and 2 SPATT moorings deployed in the custody of shellfish farmers associated with the 'Browness' site at the top of the Voe. A further 3 hydrostations were completed in Sandsound Voe and Clift Sound and SPATT moorings deployed at 'Sandsound' shellfish site. Alba na Mara anchored overnight in Clift Sound before making passage round Sumburgh Head for Bressay Sound the next day.

Benthos samples were taken by Day grab in the area just North of Bressay Sound on 1 September. PSA samples were taken from the first grabs and benthos samples from the second grab in each location sieved to 1 mm before preservation. Five sites were sampled in this manner. Hydrostations (and associated plankton sampling) were completed in Dury Voe and Swinister Voe, before making way for Basta Voe. Here 3 hydrographic and plankton stations were sampled prior to deploying SPATT moorings associated with the 'Outer Basta' shellfish site. The Alba na Mara anchored overnight in Basta Voe.

The following day passage was made through Bluemull Sound and West to Ronas Voe where a single hydrostation was surveyed. The 6 station transect in St Magnus Bay was then repeated and the Autosampler mooring recovered from Busta Voe. Staff from Blue Shell Marine delivered shellfish samples that had been taken daily from the adjacent farm during the period of deployment, to the Alba na Mara in a workboat. Hydrostations were then sampled in both Olna Firth and Busta Voe and the SPATT moorings deployed the previous week recovered from Olna Firth. A final SPATT mooring was deployed in Busta Voe before Alba na Mara left Shetland on passage for Lochinver at 18:30.

Alba na Mara arrived in Lochinver at 15:30 the following day. A transfer of kit and staff took place on the morning of 4 September and the vessel left for Little Loch Broom at luchtime. Three hydrographic stations were surveyed by CTD in Little Loch Broom and then Loch Ewe before anchoring overnight in Loch Ewe. Lochs Torridon and Ainort were similarly surveyed on 5 September and the Alba na Mara anchored in Loch Kishorn overnight.

Loch Kishorn, Duich, Hourn and Nevis were surveyed (3 hydrostations per loch) on 6 September. Due to a dental condition of one of the scientific staff, Alba na Mara put into Mallaig harbour on the night of 6 September and an emergency dental appointment was sought in Fort William the following morning. None being available and with Southerly gales on the forecast, plans to cross the Minch were abandoned and the Alba na Mara made way for sheltered anchorage on the East shore of Skye. En route, hydrostations were surveyed in Lochs Sligachan and Portree, before anchoring in Loch Portree.

Extreme winds prevented any work on 8 September.

On 9 September Alba na Mara made passage for Loch Snizort on the North side of Skye, where 3 hydrostations were completed by CTD. Similarly Loch Greshornish was surveyed by CTD at 3 stations. A silicone rubber passive sampling frame was deployed on a mooring adjacent to the shellfish farm in Loch Greshornish before making passage North to Loch Eriboll. After rounding Cape Wrath, Alba na Mara anchored just outside Loch Eriboll during the night.

Work started the following morning at first light, with 3 hydrostations being completed in the Loch and a silicone rubber passive sampling mooring being deployed at the South end of the Loch. Passage was then made through the Pentland Firth and back to Fraserburgh, arriving back in the evening of 10 September. Scientific staff and equipment were offloaded on 11 September.

Results

Full surveys by CTD were conducted in 23 lochs as shown in the table below. Plankton sampling and mooring deployments were undertaken where indicated in the table.

Loch	Date	Hydro-stations	Surface phytoplankton	Full depth phytoplankton	Moorings deployed
St Magnus Bay	27/08/09 02/08/09	6 6	6 6	- -	- -
Busta Voe	27/08/09 02/08/09	3 3	3 3	1 1	Autosampler 1 x SPATT
Olna Firth	28/08/09 02/08/09	3 1	3 1	1 -	2 x SPATT Recovered
Gruting Voe	28/08/09 31/08/09	3 2	3 2	1 1	- 2 x SPATT
Clift Sound	29/08/09 31/08/09	- 3	- 3	- 1	2 x SPATT -
Vaila Sound	31/08/09	3	3	1	2 x SPATT
Sandsound Voe	31/08/09	3	3	1	2 x SPATT
Dury Voe	01/09/09	2	2	-	-
Swinister Voe	01/09/09	2	2	-	-
Basta Voe	01/09/09	3	3	1	2 x SPATT
Ronas Voe	02/09/09	1	1	-	-
Little Loch Broom	04/09/09	3	-	-	-
Loch Ewe	04/09/09	3	-	-	-
Loch Torridon	05/09/09	3	-	-	-
Loch Ainort	05/09/09	3	-	-	-
Loch Kishorn	06/09/09	3	-	-	-
Loch Duich	06/09/09	3	-	-	-
Loch Hourn	06/09/09	3	-	-	-
Loch Nevis	06/09/09	3	-	-	-
Loch Sligachan	07/09/09	2	-	-	-
Loch Portree	07/09/09	3	-	-	-
Loch Snizort Beag	09/09/09	3	-	-	-
Loch Greshornish	09/09/09	3	-	-	1 x silicone rubber
Loch Eriboll	10/09/09	3	-	-	1 x silicone rubber

Progress against objectives:

1) Hydrographic data were collected from the 23 lochs indicated above and will be made available for model development and validation purposes in due course.

2) The autosampler mooring was deployed in Busta Voe and recovered after 7 days. 13 moorings with attached SPATT passive samplers were deployed in the vicinity of collaborating shellfish farms. Two of these were recovered after 6 days (Olna Firth). The rest were left for shellfish farmers to recover at later dates after departure from Shetland. Due to poor weather, Alba na Mara was not able to cross the Minch to deploy moorings in the Western Isles. However, 2 silicone rubber passive samplers on moorings were deployed adjacent to shellfish farms in Lochs Greshornish and Eriboll and will be recovered during cruise 1709A.

3) A comprehensive phytoplankton sampling programme was completed in Shetland Voes during the first half of the cruise. Although no evidence of toxic *Alexandrium* dinoflagellates was detected by JRT Rapid test kits, light microscopy revealed the presence of several dinoflagellate species in water samples and it is hoped that the combination of autosampler, passive samples, direct phytoplankton samples and hydrography in these areas will provide some insight into dinoflagellate dynamics in these parts of Shetland.

4) Continuous logging of surface salinity and chlorophyll during the cruise from the on-board TSG and fluorometer was successful and will provide additional regional background data for modelling purposes.

5) Benthos samples were obtained by Day grab from 5 sites North of Bressay Sound and sieved to 1 mm. Preserved samples will be passed to SEPA for analysis.

Submitted:
M Gubbins
05/10/09

Approved:
I Gibb
12/10/09.