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

MRV *Alba na Mara*

Survey 1616A

PROGRAMME

26 August – 4 September 2016

Ports

Loading: Fraserburgh, 23 August 2016
Sailing: Fraserburgh, 26 August 2016
Unloading: Fraserburgh, 04 September 2016

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 survey ending. In the case of the survey summary report a nil return is required, if appropriate.

Personnel

K Summerbell (SIC)
J Hunter
N Aldridge

Costs to Project: 10 days – 20119

Equipment:

BIGG sledge (Benthic Interactions with Ground Gear)
Ground gear elements and weights
Rubber matting
Load cells
Sequoia LISST 100X particle size analyser
Aquatec 210TY turbidity meter
Video Cameras and Flashback recorders
Scanmar units
Flowmeters
Water sampler
Day grab (including table)

Objectives

- To estimate horizontal drag forces (hydrodynamic and geotechnical drag) for cylindrical objects towed on a variety of sea bed types.
- To measure the quantity of sediment remobilised by cylindrical objects towed on a variety of sea bed types.

- To obtain water samples from the sediment plume to examine the relationship between suspended sediment load and nutrient concentration, from a variety of sea bed types.

Protocols:

Equipment will be loaded onto MRV *Alba na Mara* at Fraserburgh on 23 August 2016, where the sledge will be connected with the towing bridle to the central warp. Instrumentation will be prepared ready for attachment to the sledge on the sailing day. *Alba* will leave Fraserburgh on 26 August and steam towards one of the work sites (Figure 1). If weather and sea state permit, the Banff site will be sampled first, then Lossiemouth, Hollows, Dornoch offshore and then finally Findhorn. Nine sediment samples will be taken with the day grab at each work site before commencing sledge sampling. Once sampling is complete at a site, *Alba* will move onto the next work site. *Alba* will return to Fraserburgh on the 03 September, and the scientific personnel and equipment will be unloaded on the 04 September.

The BIGG Sledge sampling:

The BIGG sledge was designed to measure the horizontal drag (hydrodynamic and geotechnical drag) of various objects via load cells mounted within the framework. During this survey three objects will be tested (200, 300 and 400 mm diameter HDPE cylinders measuring 600 mm in length). These will be mounted onto a 63 mm diameter pole measuring 1376mm in length and attached to the two load cells via brackets.

The sledge will have a LISST 100X mounted 1.9 m behind the ground gear and 0.35 m above the seabed. This will enable particle size and quantity to be measured within the sediment plume created by the gear shapes. The Aquatec 210TY turbidity sensor will also be fitted 0.35 m above the seabed close to the LISST, to allow a comparison of the two method of measuring the plume. An acoustically triggered water sampler will be mounted adjacent to the LISST. This will take five water samples in each tow. Four in the plume at heights of 0.2, 0.35, 0.55 and 0.75 m above the seabed and one outside the plume for a control sample approximately 0.75 m above the seabed and inline with the test cylinder. Two video cameras will be mounted on the framework of the sledge, one will be angled to verify the ground gear is in contact with the seabed, and the other will show if the LISST, turbidity meter and water sampler is within the sediment plume.

The sledge will be towed off the central warp, with a wire bridle. A dyneema rope will lift the sledge in and out of the water by the deck winch through a block on the gamma frame. Each tow will last 30-40 min. During the tow the speed will be altered at 10 minute intervals (2.5, 3.0 and 3.5 knots). The water sampling bottles will be triggered in the middle of the three knot speed block. Once the sledge is back aboard, samples will be taken from the water bottles before being reset for the next deployment. The turnaround time between hauls will be approximately 15-20 minutes. The hauls will be conducted ~150 m apart in parallel so that clean ground and water are sampled. At each site the three cylinders to be tested will be towed three times to obtain replicate samples. An additional short 10 minute control haul will be carried out with nothing attached to the load cells and towed at 3 knots.

Normal contacts will be maintained with the laboratory.

Submitted:
K Summerbell, 2 August 2016

Approved:
I Gibb, 24 August 2016

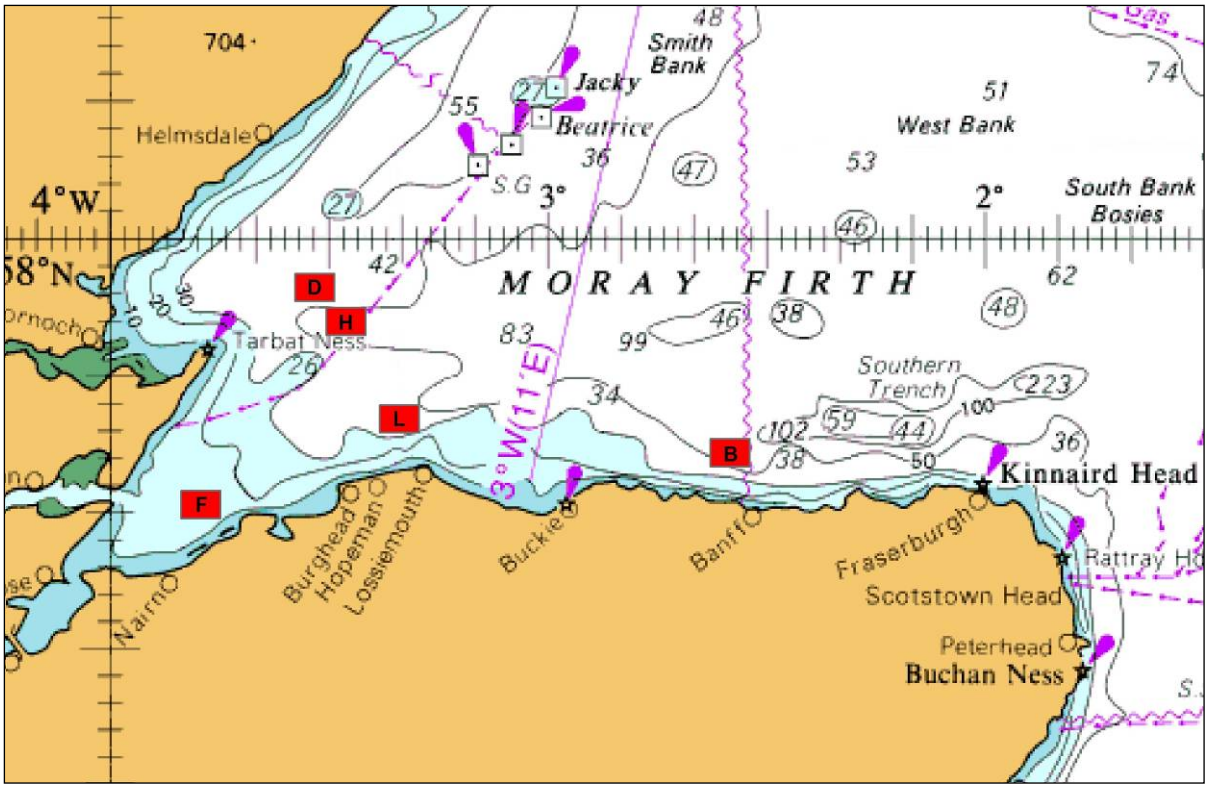

Figure 1: Chart of the Moray Firth indicating the approximate locations of the sampling sites (B = Banff, L = Lossiemouth, H = Hollows, D = Dornoch offshore and F = Findhorn).