



**JNCC Report  
No. 636**

**Cruise report Survey 1013S: MRV Scotia - Survey of Pobie Bank Reef cSAC  
22 August – 7 September 2013**

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**October 2019**

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**marinescotland**  
**science**



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**EQA**

This report has been internally reviewed to comply with the JNCC Evidence Quality Assurance Policy <https://jncc.gov.uk/about-jncc/corporate-information/evidence-quality-assurance/>

## Summary

The Joint Nature Conservation Committee (JNCC) and Marine Scotland Science (MSS) undertook an offshore seabed survey of Pobie Bank Reef candidate SAC on the Marine Research Vessel Scotia (survey code 1013S) from 23 August 2013 to 5 September 2013.

The aim of the 1013S survey was to gather high quality evidence to characterise and describe seabed habitats and communities within Pobie Bank Reef. This data will improve understanding of habitat distribution and sensitivity across the site and facilitate fisheries management discussions with industry.

All survey objectives were met, with 40 0.1m<sup>2</sup> Hamon grab infaunal and Particle Size samples collected, and 76 drop-frame camera transects within the site boundary. Full coverage side-scan sonar data was acquired within Box 1,2 and 3 and most of Box 4.

Please note that observations made in this Cruise Report represent preliminary field observations. These observations have not been subject to Quality Assurance procedures. Please refer to the Monitoring Report for this survey for Quality Assured evidence. This disclaimer should be included when referencing this Cruise Report.

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# 1 Introduction

Pobie Bank Reef is located in the North Sea, approximately 20km east of Unst, Fetlar and Whalsey in Shetland (Scotland), and is separated from Shetland by the Unst Basin. Pobie Bank Reef cSAC was selected due to the presence of Annex I rocky reef - see SAC Selection Assessment Document for details<sup>1</sup>. This survey will gather further evidence to supplement previous results from the Strategic Environmental Assessment (SEA) 5 (2003) and SEA 6 (2006) surveys undertaken in the area.

## 1.1. Survey Details

**Mobilisation:** 20<sup>th</sup> – 22<sup>nd</sup> August, Aberdeen

**Sailing:** 22<sup>nd</sup> August, Aberdeen

**Demobilisation:** 2<sup>nd</sup> October, Aberdeen

**Vessel:** *MRV Scotia* (Marine Scotland Science)

**Equipment on board:** TV Drop frame and VMUX controller  
Konsberg OE14-366 colour zoom (TV) camera (x2)  
Konsberg Simrad OE14-208 digital stills camera (x2)  
High definition video  
oe1234 download box  
miniDV recorder  
HDD/DVD recorder  
Day grab  
Hamon grab  
Rock dredge  
RESON Seabat 7125 swath bathymetry system  
Edgetech sidescan sonar  
Autoseiver

**Size of survey area:** 70 x 21km

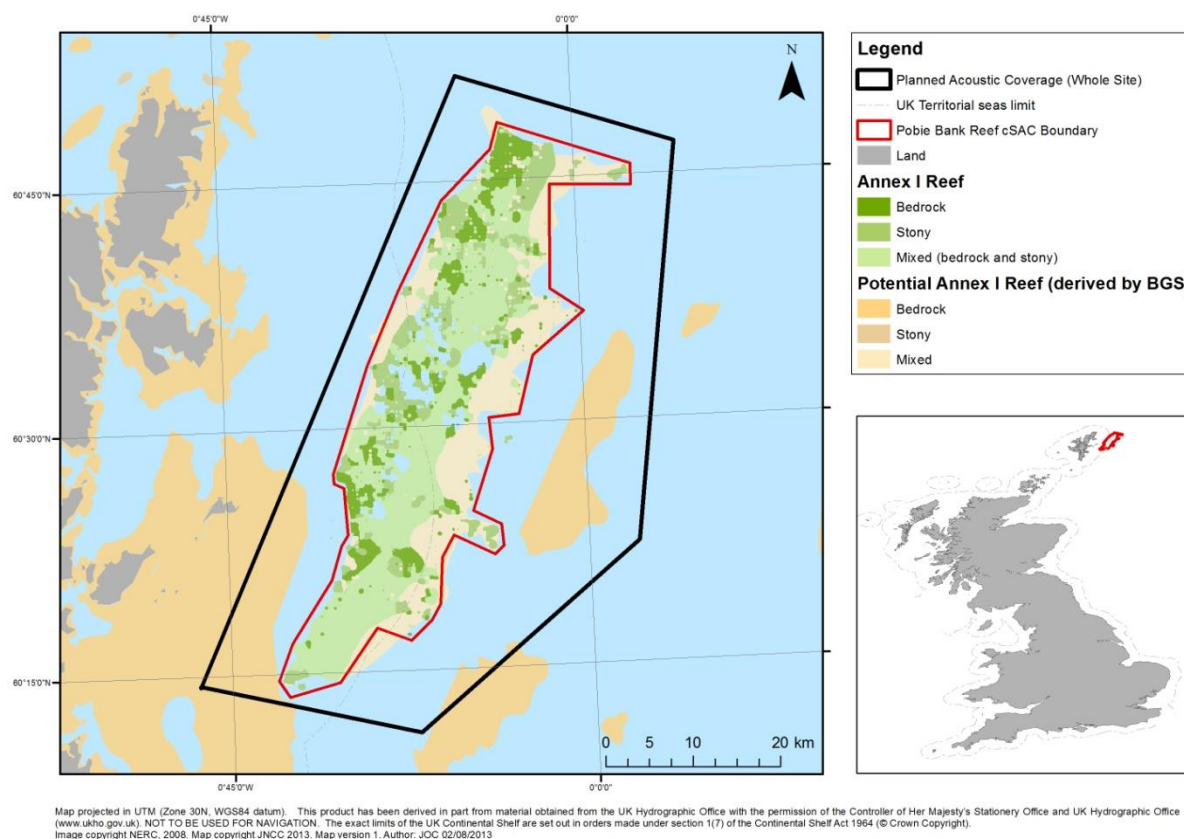
**Depth range:** 60 – 140m

- a) Scientific personnel:**  
Scientist in Charge (MSS)  
Client Rep (JNCC)  
Engineer (MSS)  
Survey Scientist (MSS)  
Survey Scientist (MSS)  
Survey Scientist (JNCC)  
Survey Scientist (JNCC)  
Survey Scientist (JNCC)  
BGS Rep (BGS)

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<sup>1</sup> [http://jncc.defra.gov.uk/pdf/PobieBankReef\\_SACSAD\\_v3\\_0.pdf](http://jncc.defra.gov.uk/pdf/PobieBankReef_SACSAD_v3_0.pdf).

## b) Location map



**Figure 1:** Showing location of Pobie Bank Reef cSAC.

## 2 Aims and Objectives

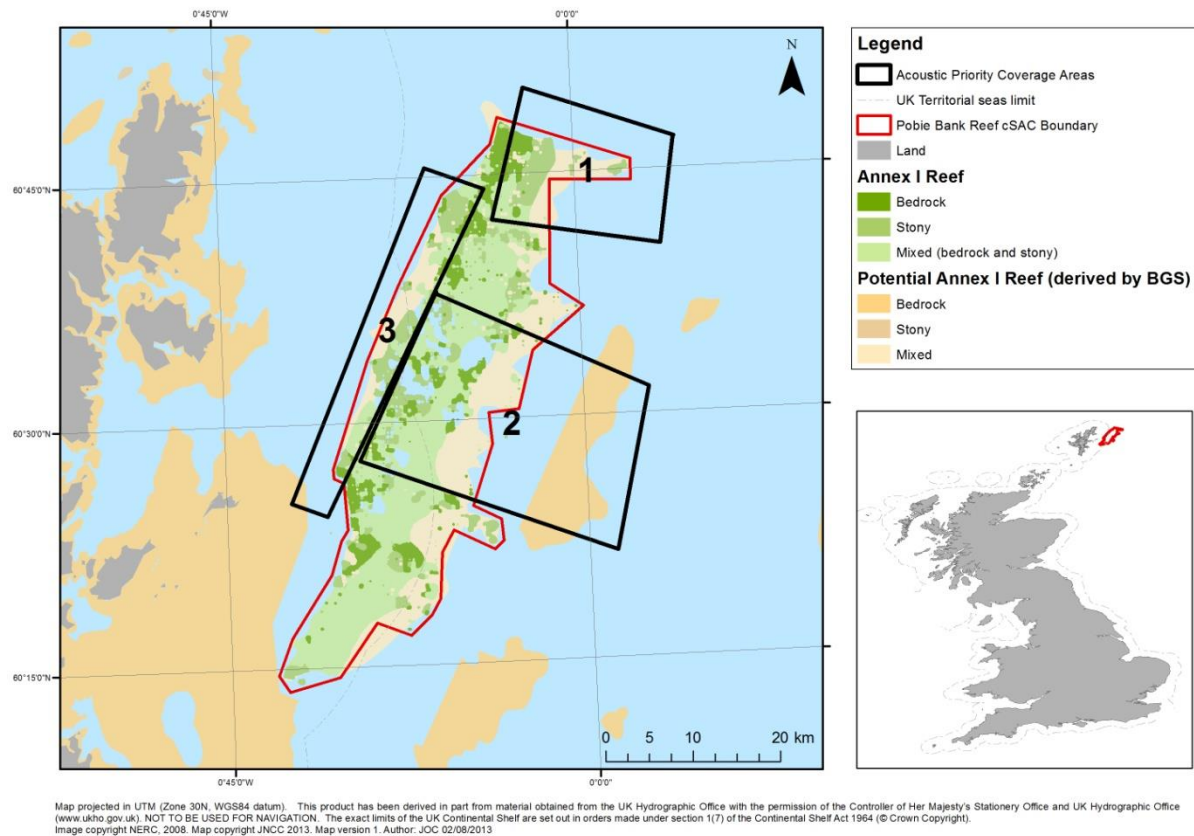
The aim of the survey was to gather high quality evidence of seabed habitats and communities in order to better characterise the distribution of seabed habitats within the Pobie Bank Reef cSAC, in order to:

- Improve our understanding of habitat distribution and sensitivity across the site
- Facilitate fisheries management discussions with industry

### 2.1. Survey design

The original survey strategy as outlined in survey plan gave two options:

- Option A) 100% acoustic coverage over the entire site and an area surrounding the site of interest to fishers with a triangular grid of groundtruthing stations, or
- Option B) 100% acoustic coverage over priority blocks with groundtruthing (Figure 2.1).



**Figure 2.1:** Original Pobie Bank survey strategy.

The survey strategy was revised whilst offshore as calculations undertaken by the acoustic scientist, and time taken for the first line, indicated that it would not be possible to complete all of the priority areas within the time available. The priority boxes outlined in the original survey plan were reduced in size to focus on areas within the site boundary (Figure 2.2). The boxes were numbered sequentially as they were completed during the survey so the most westerly box (priority 2 in the original survey plan) was named 'Box 1', the central box (priority 1 in the plan) was 'Box 2' and the eastern box (priority 3 in the plan) was 'Box 3'. A fourth area 'Box 4' was added at the end of the survey, but there was only enough time to acquire acoustic data, not undertake ground-truthing. The ground-truthing stations were selected based roughly on a 3km grid. Some stations were repositioned to cover features of interest and ensure all substrate types were covered. Where no nearby regular grid station could be adjusted to cover a feature of interest an additional station was proposed. Both grab and camera were proposed at each station, dependent on substrate type recorded. During the survey grabs could only be taken where the video showed sediment was present.

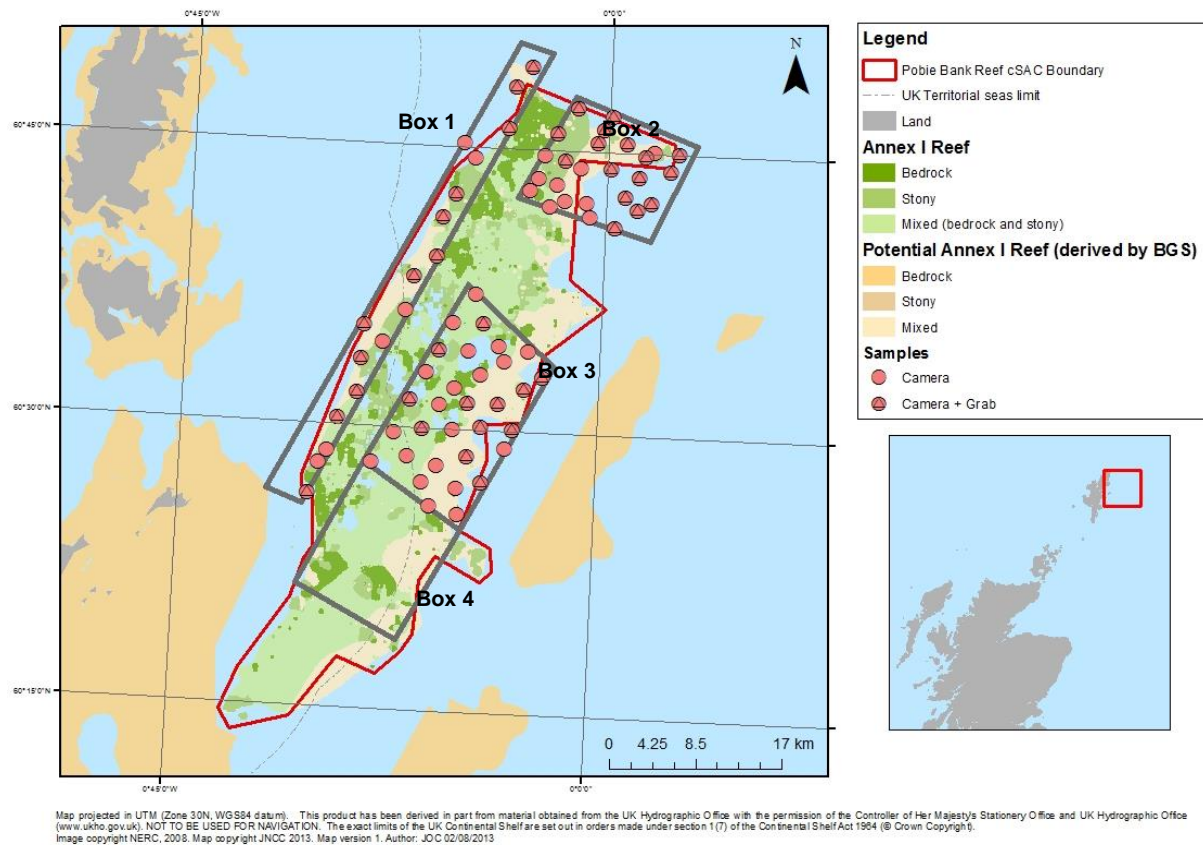


Figure 2.2: Actual Pobie Bank survey strategy.

## 2.2. Methodology

### 2.2.1. Acoustic operations

Multibeam, side-scan sonar and AGDS data were recorded simultaneously. The line plan was arranged to ensure full coverage SSS, but the Multibeam coverage had gaps in between lines as the swath was narrower. It was decided that there was not enough time available to get full coverage Multibeam. MSS acoustic scientists and deck crew rotated on 8-hour shifts. The deck crew helped the acoustic scientist to recover and redeploy the SSS fish between lines. The acoustic scientist was in charge of flying the sonar fish approximately 20m from the seabed and monitoring SSS data. JNCC scientists assisted with logging HiPAP, recording deck logs and monitoring Multibeam data. The acoustic data was partially processed during the survey to provide information for survey planning – see processing report for details. Final image files showing fully processed multibeam and side scan will be available at a later date after the survey.

### 2.2.2. Positioning

The position of the USBL on the side scan fish was logged for each line but not during line turns. HiPAP was also logged continuously along the video transect. These data were initially recorded to floppy disk and then copied across to the survey laptop. It was not possible to tell if data were logging correctly until they were uploaded so there were a number of occasions where no HiPAP was logged due to user error. The ship's position was also fixed for each still using GPS feed into the survey laptop. The times on these fixes were matched to the nearest HiPAP record to get actual position. Both the ship's position and USBL position are logged for each still in the survey metadata spreadsheet, where both were recorded. Just the ship's position was logged for each grab.



### **2.2.3. Grab sampling**

The grab was usually taken at the end of line as video was often purposely stopped in a patch of suitable substrate. Grabs were taken at all stations where substrate was suitable. A Hamon grab was used. Samples were retained if they were 2l or greater. Some smaller samples were accepted where there had been several no samples in order to obtain some information. It should be noted that sample size may affect infaunal analysis results. For each grab a PSA sample was taken and frozen. Remaining sample was sieved using a 1mm sieve and fixed in formalin. A photograph was taken showing the whole sample and the sieve sample for most grabs. Grab photograph files were renamed to show cruise code, survey code and station number. Deck logs were kept to record details on whether a good sample was retained, sample size and substrate type. These have been typed up and saved in the 'GrabLogsheet' spreadsheet, and appropriate columns have been copied into the survey metadata spreadsheet.

There was the option to deploy a rock dredge at some rock stations to get faunal samples, but it was decided that the rocks in the site were generally too large to sample in the rock dredge and that it was unlikely that epifauna could be dredged from the surface.

### **2.2.4. Seabed imagery**

The ship was positioned before the proposed station location and then the equipment was deployed to the seabed and the transect started. The ship then moved slowly across the station with the current at approximately 0.5 knots. The camera frame position was controlled by winch and the camera system was held roughly at a set distance from the seabed using a plumb line in the field of view as a guide. The camera was fitted with a four-spot laser-scaling device to provide a reference scale in the video image. The video was recorded for 10 minutes, or long if the station had not yet been crossed. Stills were taken at approximately every 1 minute and when interesting fauna was spotted. Video was recorded onto DVD and digital mini cassettes. In addition, digital high definition video was recorded from a separate camera system. Stills and video were downloaded or copied across to the survey laptop after each block of ground-truthing. Stills and video files were renamed to show cruise code, survey code, station number and, where applicable, sample number. Deck logs were taken to record metadata and general information about substrate and fauna present. Relevant fields were copied into the central 'SamplingMetadata\_1013S\_PobieBank' spreadsheet. Details of the video specifications and settings can be found in the spreadsheet 'camera\_metadata'.

### **2.2.5. Logs**

Metadata such as time and position were written down in deck logs, but the most accurate information comes from the HiPAP or ship's position fixes taken so these should be used for any maps or analysis. In order to avoid confusion by having multiple logs, all required information on benthic sampling has been centralised into the 'SamplingMetadata\_1013S\_PobieBank' spreadsheet, but electronic copies of the original deck logs, GPS fix logs, and HiPAP data are saved as a back up.

## **3 Cruise Narrative**

22<sup>nd</sup> August

The MSS crew completed the mobilisation and set up of the equipment. JNCC staff arrived on the vessel around 17:00 bringing consumables, deck camera, survey laptops, hard drives

and a back-up video recorder. The equipment was checked to ensure everything was present.

#### 23<sup>rd</sup> August

The ship was due to leave port at 04:00 but was delayed due to heavy fog. The Scotia finally set sail at midday and cruised to a calibration site at the Southern Trench. An SVP was taken at 17:30 and then the acoustic equipment was deployed and a test line was run. After this the video was deployed and some test footage taken. The side scan was deployed for a second test after settings were revised. The ship then continued towards the Pobie Bank Reef site.

#### 24<sup>th</sup> August

Transit to site continued. The ship arrived on site at Box 1 (the closest box to the west of the site) at 12:20 then the crew launched the side scan sonar fish and started recording lines of SSS, multibeam and AGDS data approximately 50km long running N-S. During the morning the acoustic scientist provided JNCC with estimates the amount of amount of time it would take to complete acoustic coverage in the boxes outlined in the survey plan. These indicated that there would not be sufficient time to complete the original survey plan. The JNCC lead discussed this issue with the survey manager in the office and revised the survey plan to focus on areas of interest to the fisheries team within the SAC site boundary.

#### 25<sup>th</sup> August

Acoustic data acquisition continued in Box 1 throughout the day. The SSS malfunctioned during the night shift at 08:00 and could not be fixed until the more experienced acoustic scientist came on shift at 12:00 so 1 and a half lines had to be run without SSS.

#### 26<sup>th</sup> August

Acoustic data acquisition continued in Box 1 until 14:00 when operations were stopped to steam to the coast of Shetland where the second video operator was picked up. The ship then returned to Box 1 to continue acoustic work. The line which was missing SSS was rerun logging SSS only to ensure full coverage. JNCC lead began to plan the location of benthic stations using Multibeam displayed on the navigation screen and AGDS data collected to date.

#### 27<sup>th</sup> August

Acoustic data acquisition in Box 1 was completed at 01:15. JNCC finalised the survey strategy and provided the bridge with locations. The MSS SIC decided that ground-truthing should begin in daylight hours to ensure safety, so the ship transited to Box 2 and began acoustic data acquisition there running lines of approximately 11.5 km N-S. At 10:20 the ship returned to Box 1 to commence ground-truthing. The stations were completed roughly sequentially starting at the last station (44). Video transects were run first followed by a grab if the substrate was not too rocky. The first deployments of the Hamon grab did not retain a good sample so the Day grab was tried to test whether the Hamon grab was not working or if the substrate simply wasn't suitable at that station. The Day grab also retained only a very small sample, so it was assumed that there was only a thin veneer of sediment at that site. The Hamon grab was used successfully at the next station so it continued to be used for the rest of the survey.

28<sup>th</sup> August

Benthic sampling in Box 1 was completed. Acoustic data acquisition began in Box 2.

29<sup>th</sup> August

Acoustic data acquisition in Box 2 was completed and data used to revise the benthic strategy. Benthic sampling began in Box 2.

30<sup>th</sup> August

Benthic sampling in Box 2 was completed. Acoustic data acquisition began in Box 3.

31<sup>st</sup> August

Acoustic data acquisition in Box 3 continued. Operations were halted for half an hour to fix the SSS software.

1<sup>st</sup> September

Acoustic data acquisition in Box 3 continued. Operations were halted from 06:00 – 15:00 due to bad weather. The ship remained near to the site and did not try contingency stations as it was estimated that the bad weather would pass quite quickly.

2<sup>nd</sup> September

Acoustic data acquisition in Box 3 completed and data used to revise the benthic strategy. Benthic sampling began in Box 3. Benthic sampling stopped from 20:30 – 23:45 to download data from the high definition camera as the memory was full. The video scientist estimated this would take 2 hours which was not long enough to deploy the side scan. An additional multibeam line was run during this time to investigate an area of potential rock to the east of the site which was identified as of interest by the fisheries team.

3<sup>rd</sup> September

Benthic sampling in Box 3 was completed. As some survey time remained an additional box was selected joining on to the southern end of Box 3. Acoustic data acquisition began in Box 4.

4<sup>th</sup> September

Acoustic data acquisition continued in Box 4 until approximately 8pm when the operations had to stop to begin transit back to Aberdeen. The majority of Box 4 was completed.

5<sup>th</sup> September

Transit back to port at Aberdeen.

6<sup>th</sup> September

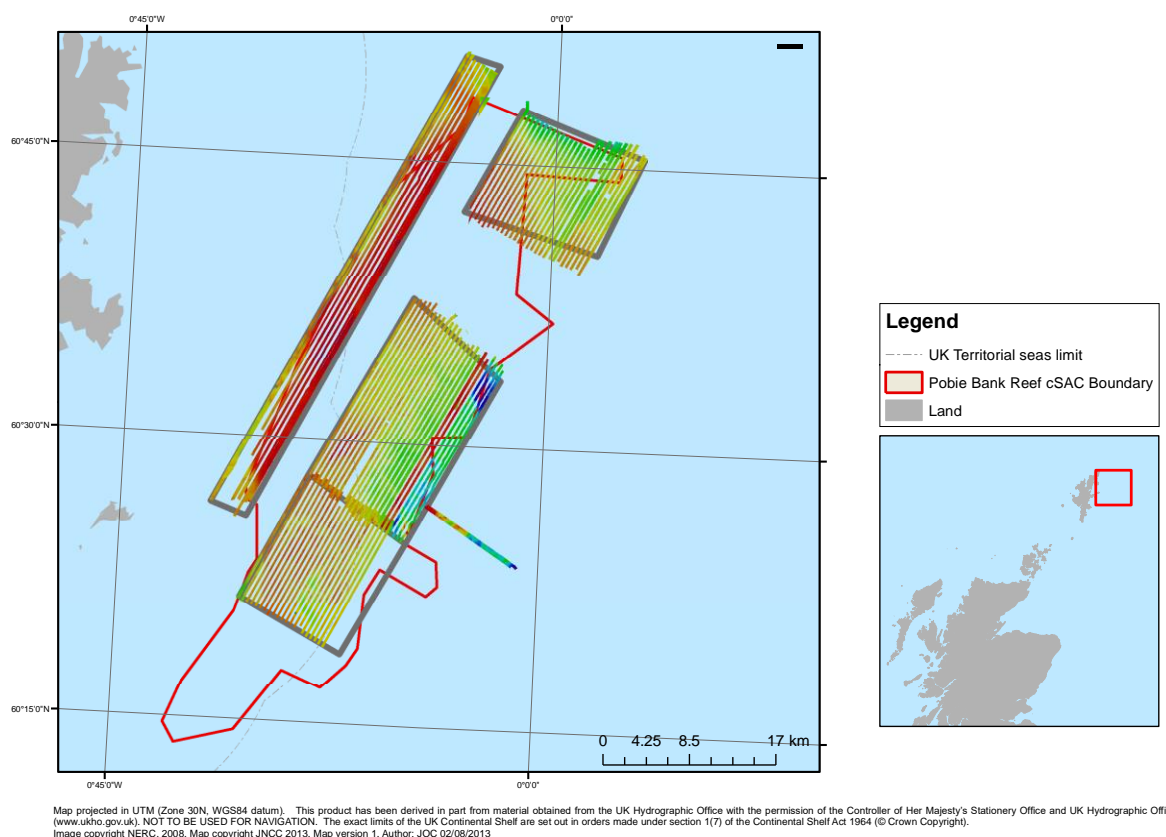
Demob of equipment and samples.

## 4 Preliminary Results

### 4.1. Acoustic data

Full coverage side scan sonar was acquired in Box 1, 2 and 3, and most of Box 4, with the exception of number of short sections in Box 3 where a software error caused the data to stop logging briefly. Multibeam data was acquired simultaneously, but as the swathe width is smaller there are gaps between lines. Roxann AGDS data was also acquired simultaneously, although data was not logged at the start of Box 2 due to user error.

Preliminary Multibeam data is displayed in Figure 4.1. This is a draft version with limited processing produced offshore. Note that half a line in Box 3 is not displayed as this was logged in a separate file not included in the draft tiff, but the data here was recorded. A final complete version with better resolution will be supplied by BGS after the survey. ADGS hardness data is displayed in Figure 4.2. Roughness can also be displayed in the PostSurvey GIS. Side scan sonar data was not fully processed offshore so it is not displayed in this report, but a mosaic will be produced by BGS following the survey.



**Figure 4.1:** Preliminary image of Multibeam data produced offshore.

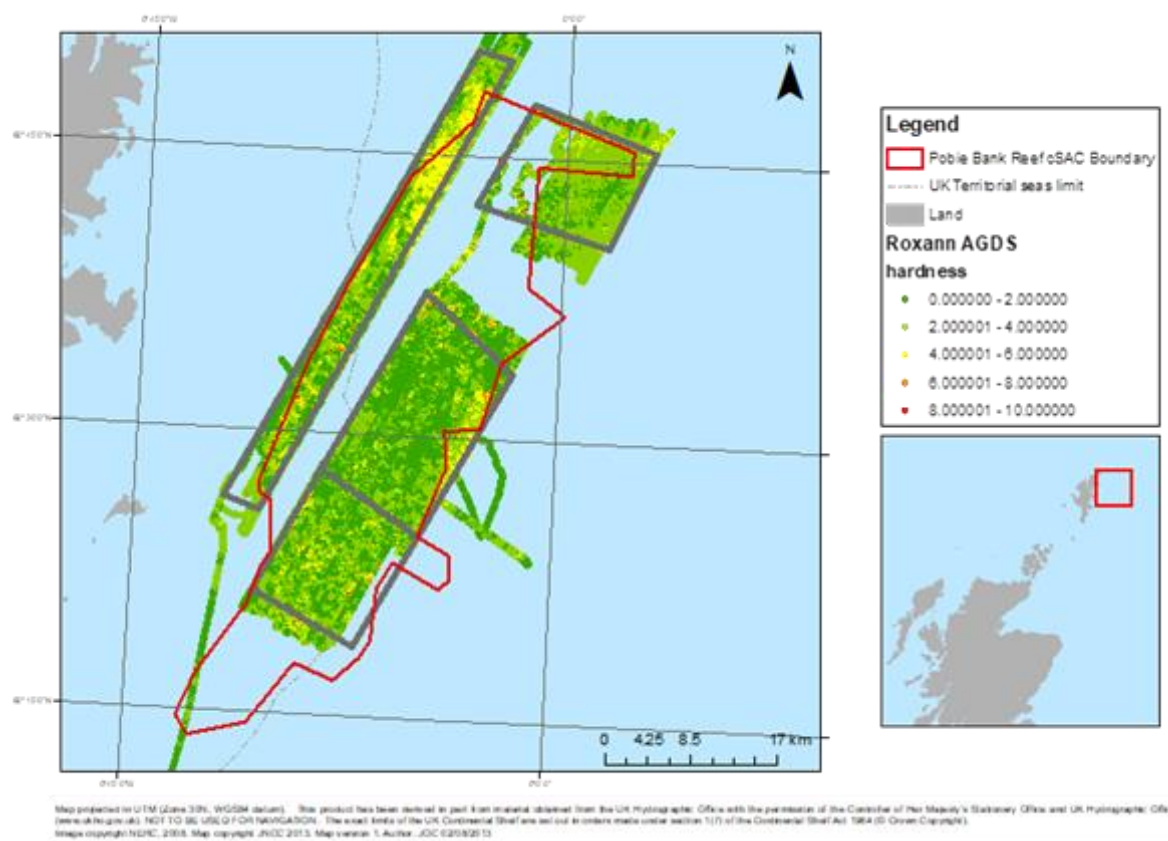


Figure 4.2: ADGS points showing hardness.

## 4.2. Benthic sampling summary

Benthic sampling was undertaken at a total of 76 stations in Box 1, 2 and 3, of which seabed imagery was undertaken at all 76 and grabs were acquired at 40. Figure 4.3 shows the location of the stations and at which grabs were taken. The quality of the video and stills was generally good, with the exception of stations 54 and 59 where an error with the camera system meant the focus did not work so the stills were blurry. Video scientists could not identify the cause for this error but were able to prevent it happening on subsequent transects by resetting the camera. Grab samples retained were generally quite small, potentially due to the underlying rock present.

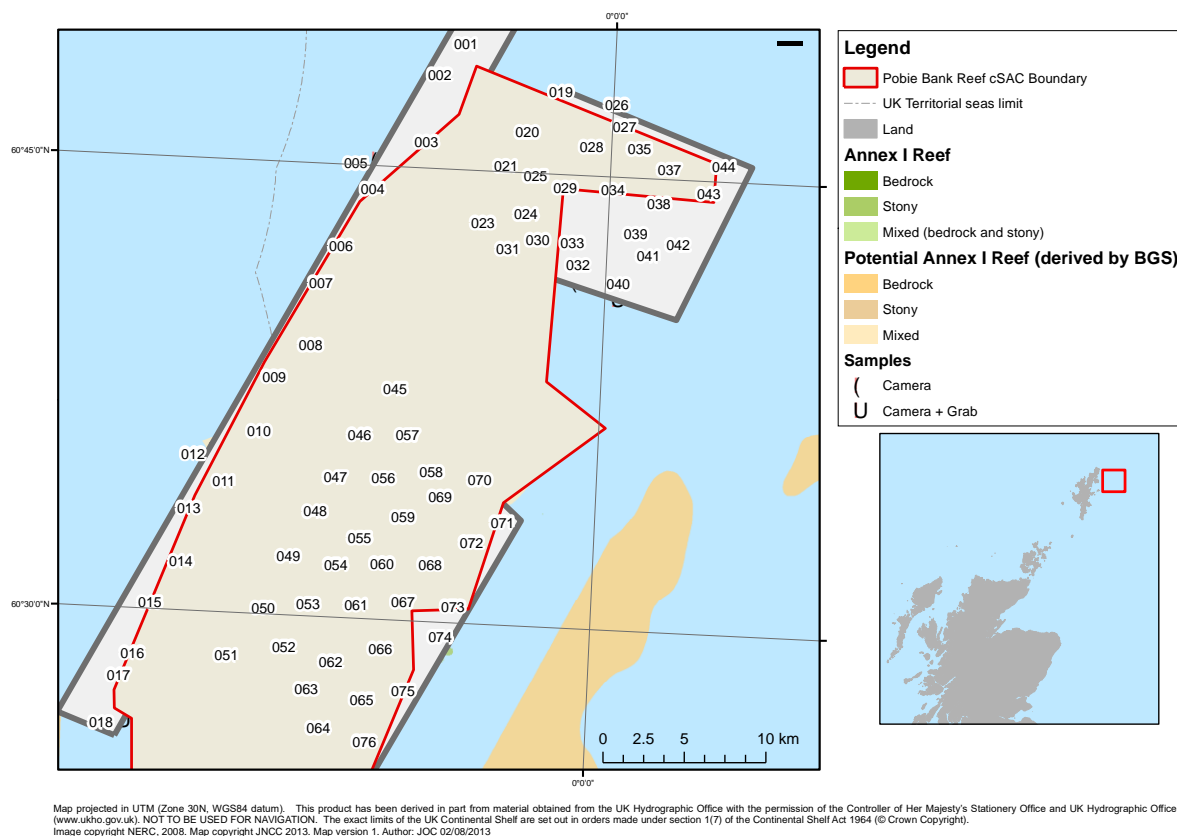


Figure 4.3: Benthic sampling station locations.

#### 4.2.1. Preliminary habitat descriptions

The benthic sampling indicates that the site consists of patches of muddy sand sediments and coarser sediments with coarse sand, shell fragments and gravel. Sediments could be EUNIS Sand and muddy sands, coarse sediment or mixed sediment, depending on the mud content present and how coarse the sand component is. It is not possible to estimate this accurately in the field. Outcrops of both stony reef and bedrock were recorded across the site, and generally matched well with the predicted Annex I reef layers. Table 4.1 summarises where potential Annex I rocky reef was encountered, but it should be noted that a full assessment will be undertaken for the final survey report and results may differ slightly from preliminary estimates from the field. The bedrock reef and stony reef was generally interspersed with sediment along the transects and did not comprise 100% of the substrate.

Table 4.1: Preliminary summary of Annex I reef presence.

Annex I reef type	Stations potentially present	Total number of stations
Bedrock	3, 7, 9, 10, 11, 14, 22, 23, 24, 31, 35, 45, 46, 50, 51, 52, 54, 55, 56, 57, 58, 59, 60, 62, 63, 64, 69, 70	28
Stony	2, 4, 5, 12, 15, 17, 21, 22, 25, 29, 30, 32, 33, 38, 40, 44, 48, 56, 57, 58, 61, 74, 76	23

Faunal communities identified from real-time viewing of the video were similar to those recorded in previous surveys in the Pobie bank area. Preliminary results indicate that the habitat types displayed in Table 4.2 were present. It is not possible to estimate which sedimentary level 5 biotopes were present before PSA and infaunal data are available. Biotopes will be officially assigned following faunal data analysis.

















Example seabed and grab (where available) photographs for each station are displayed in Table 4.3 to give an overview of the range of substrates and types of fauna identified in the field. It should be noted that field descriptions are just preliminary and may not match the final descriptions assigned in the final survey report following more in-depth analysis of data. Descriptions of faunal communities were not recorded in real-time for some stations.

*Please Note: These tables and associated images are not compliant with the WCAG 2.1 accessibility guidelines.*


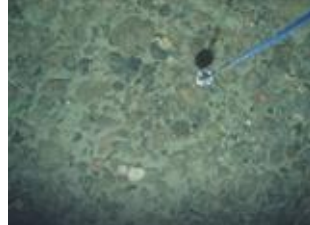



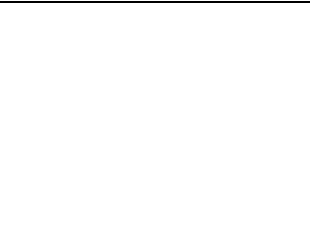


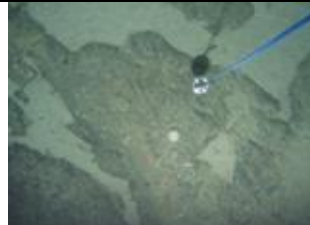
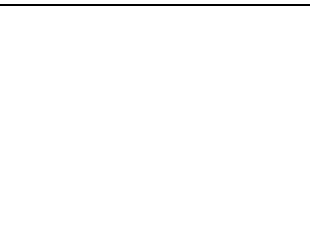




**Table 4.2:** Possible Biotopes present estimated from field data.

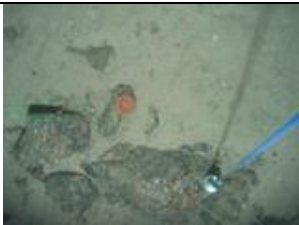








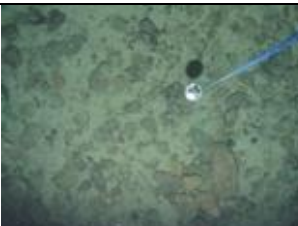




<p><a href="#">CR.HCR.DpSp.PhaAxi</a> (EUNIS A4.121)  <i>Phakellia ventilabrum</i> and Axinellid sponges on deep, wave- exposed circalittoral rock  Found at deeper stations ~80 – 140m on stony reef</p> 	<p><a href="#">CR.MCR.EcCr.CarSp</a> <i>Caryophyllia smithii</i>, sponges and crustose communities on wave-exposed circalittoral rock  Found at deeper stations ~80 – 140m on bedrock</p> 
<p><a href="#">CR.MCR.EcCr.FaAICr</a> (EUNIS 4.214)  Faunal and algal crusts on exposed to moderately wave-exposed circalittoral rock  Found at shallower stations ~60m on rock</p> 	<p>Offshore circalittoral coarse sediment / mixed sediment / sandy mud</p> 














**Table 4.3:** Summary of benthic sampling preliminary results estimated in the field.

<b>Station 001</b>  <b>Depth:</b> 133 – 136m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand <b>Fauna:</b> Hermit crabs, seastars, hydroids <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	 PBR_001_DC_011	 PBR_001_DC_007
			
<b>Station 002</b>  <b>Depth:</b> 108 – 110m	<b>Preliminary field description</b> <b>Substrate:</b> Coarse sediment with occasional patches of boulders <b>Fauna:</b> Sponges, anemones, cushion stars <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes	 PBR_002_DC_010	 PBR_002_DC_011
			
<b>Station 003</b>  <b>Depth:</b> 93 – 106m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand with gravel with some boulders and a patch of stony reef in the centre <b>Fauna:</b> Seastars, serpulids, sponges <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes	 PBR_003_DC_010	 PBR_003_DC_019
			
<b>Station 004</b>  <b>Depth:</b> 89 – 90m	<b>Preliminary field description</b> <b>Substrate:</b> Mixed sediment with boulders <b>Fauna:</b> Urchins, sponges <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_004_DC_005	 PBR_004_DC_012





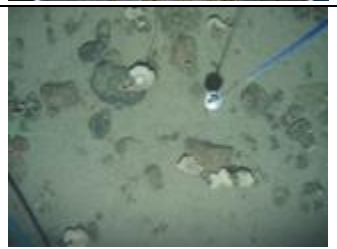
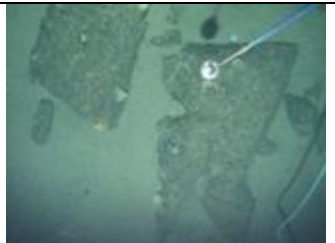



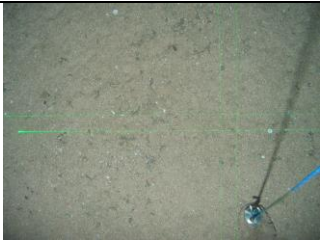
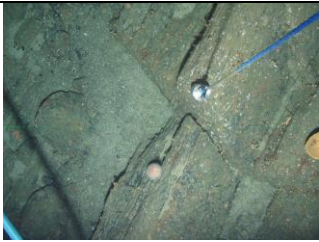




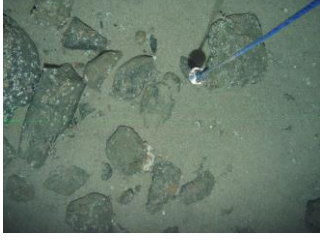





<b>Station</b> 005  <b>Depth:</b> 92 – 115m	<b>Preliminary field description</b> <b>Substrate:</b> Rocky <b>Fauna:</b> Sea urchins, sponges <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_005_DC_005	 PBR_005_DC_006
<b>Station</b> 006  <b>Depth:</b> 92 – 95m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand, a patch with some small rocks <b>Fauna:</b> Worms, hermit crab <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes	 PBR_006_DC_008  	 PBR_006_DC_012  
<b>Station</b> 007  <b>Depth:</b> ~95 – 96m <b>HiPAP</b> missing	<b>Preliminary field description</b> <b>Substrate:</b> Coarse sediments and a small patch of bedrock <b>Fauna:</b> Cushion stars, seastars, sponges, anemones, urchins, gastropod <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes	 PBR_007_DC_004  	 PBR_007_DC_005  
<b>Station</b> 008  <b>Depth:</b> ~90m <b>HiPAP</b> missing	<b>Preliminary field description</b> <b>Substrate:</b> Sand, muddy sand, bedrock <b>Fauna:</b> Sponges, skate <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes	 PBR_008_DC_008  	 PBR_008_DC_019  

<b>Station 009</b>  <b>Depth:</b> 87 – 94m	<b>Preliminary field description</b> <b>Substrate:</b> Coarse sediment with some boulders, patches of rock <b>Fauna:</b> Sponges, serpulids, urchins, dogfish <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes	 PBR_009_DC_020	 BR_009_DC_022
			
<b>Station 010</b>  <b>Depth:</b> 84 – 86m	<b>Preliminary field description</b> <b>Substrate:</b> Bedrock <b>Fauna:</b> Cup corals, sponges, dogfish, other fish <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_010_DC_004	 PBR_010_DC_006
<b>Station 011</b>  <b>Depth:</b> 84 – 89m	<b>Preliminary field description</b> <b>Substrate:</b> Bedrock with occasional small patches of coarse sediment <b>Fauna:</b> Numerous hermit crabs, fish <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_011_DC_003	 PBR_011_DC_006
<b>Station 012</b>  <b>Depth:</b> 90 – 107m	<b>Preliminary field description</b> <b>Substrate:</b> cobbles/pebbles changing to muddy sand at the end <b>Fauna:</b> Hermit crabs, sponges <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes	 PBR_012_DC_001	 PBR_012_DC_003
			
<b>Station 013</b>  <b>Depth:</b> 92 – 94m	<b>Preliminary field description</b> <b>Substrate:</b> Sand and muddy sand <b>Fauna:</b> Anemones <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	 PBR_013_DC_003	 PBR_013_DC_006



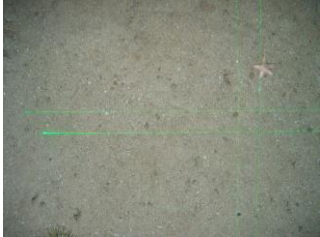











			
<b>Station 014</b>  <b>Depth:</b> 90 – 94m	<b>Preliminary field description</b> <b>Substrate:</b> Bedrock with muddy sand veneer <b>Fauna:</b> Sponges <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes		
		PBR_014_DC_001	PBR_014_DC_004
			
<b>Station 015</b>  <b>Depth:</b> 94 – 96m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand with occasional cobble patches <b>Fauna:</b> Worms and hermit crab <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes		
		PBR_015_DC_005	PBR_015_DC_008
			
<b>Station 016</b>  <b>Depth:</b> 87 – 88m	<b>Preliminary field description</b> <b>Substrate:</b> Bedrock and sand <b>Fauna:</b> Sponges, starfish, urchins, hermit crab <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		
		PBR_016_DC_001	PBR_016_DC_013
<b>Station 017</b>  <b>Depth:</b> 90 – 91m	<b>Preliminary field description</b> <b>Substrate:</b> Rock and boulders with coarse sediment <b>Fauna:</b> Sponges, starfish, urchins <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		
		PBR_017_DC_007	PBR_017_DC_005

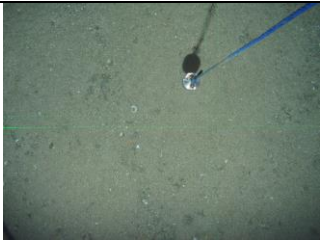

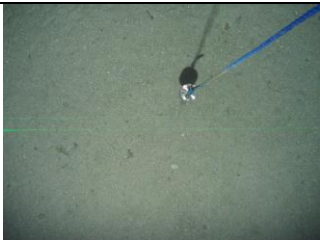


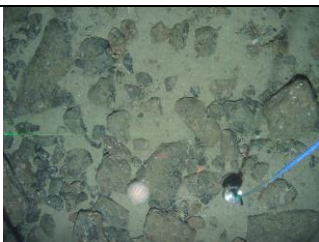
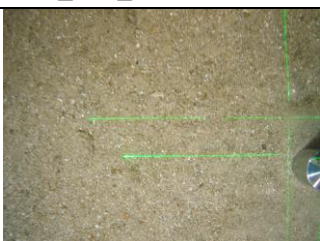







<b>Station 018</b>  <b>Depth:</b> 114 – 115m	<b>Preliminary field description</b> <b>Substrate:</b> Coarse sediment <b>Fauna:</b> Worms and fish species <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	 PBR_018_DC_001	 PBR_018_DC_011
<b>Station 019</b>  <b>Depth:</b> 122 – 126m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy with occasional boulders <b>Fauna:</b> Starfish, anemone <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	 PBR_019_002	 PBR_019_004
<b>Station 020</b>  <b>Depth:</b> ~103 – 104m No HiPAP	<b>Preliminary field description</b> <b>Substrate:</b> Sandy with occasional boulders <b>Fauna:</b> Starfish, sponges, ling <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes	 PBR_020_002	 PBR_020_010
<b>Station 021</b>  <b>Depth:</b> 89 – 94m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand and rock, large boulders and cobbles <b>Fauna:</b> Numerous sponges, cup corals, sea stars, urchins <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		



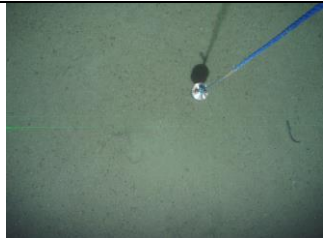






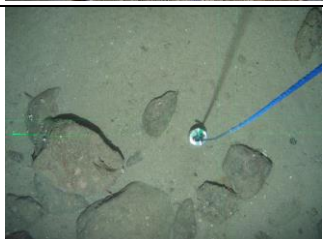




		PBR_021_001	PBR_021_004
<b>Station 022</b>  <b>Depth:</b> No HiPAP	<b>Preliminary field description</b> <b>Substrate:</b> Mixed sediments with boulders and some bedrock <b>Fauna:</b> Sponges, urchins, starfish <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		
<b>Station 023</b>  <b>Depth:</b> 88 – 91m	<b>Preliminary field description</b> <b>Substrate:</b> Gravely muddy sand and bedrock <b>Fauna:</b> Urchins, sponges, cup corals, brittle stars, sea stars, dead man's fingers <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		
<b>Station 024</b>  <b>Depth:</b> 93 – 97m	<b>Preliminary field description</b> <b>Substrate:</b> Boulders and bedrock <b>Fauna:</b> <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		
<b>Station 025</b>  <b>Depth:</b> 100 – 102m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand, sporadic boulders, boulder reef at end <b>Fauna:</b> <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes		
		 PBR_025_005	 PBR_025_010
<b>Station 026</b>  <b>Depth:</b> 136 – 139m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand <b>Fauna:</b> <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes		
		PBR_026_001	PBR_026_007









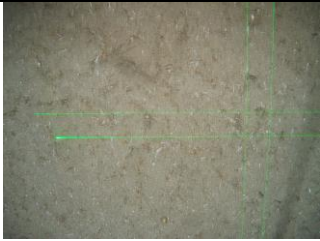



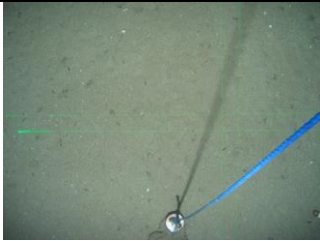
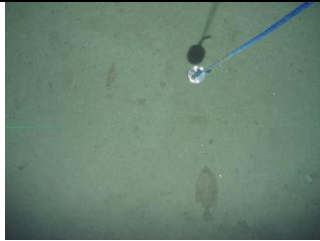


			
<b>Station 027</b>  <b>Depth:</b> 137 – 139m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand with occasional boulder patches <b>Fauna:</b> <b>Annex 1 habitat:</b> No <b>Grab:</b> No		
		PBR_027_007	PBR_027_011
			
<b>Station 028</b>  <b>Depth:</b> 114 – 116m	<b>Preliminary field description</b> <b>Substrate:</b> Sand/coarse sediment with occasional cobbles <b>Fauna:</b> <b>Annex 1 habitat:</b> No <b>Grab:</b> No		
		PBR_028_001	PBR_028_004
			
<b>Station 029</b>  <b>Depth:</b> ~106 – 107m HiPAP missing	<b>Preliminary field description</b> <b>Substrate:</b> Coarse sand with boulder outcrops <b>Fauna:</b> <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		
		PBR_029_001	PBR_029_008
<b>Station 030</b>  <b>Depth:</b> 95 – 100m	<b>Preliminary field description</b> <b>Substrate:</b> Coarse sand with boulder reef <b>Fauna:</b> <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		







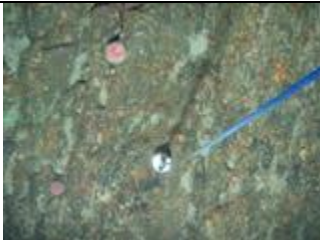

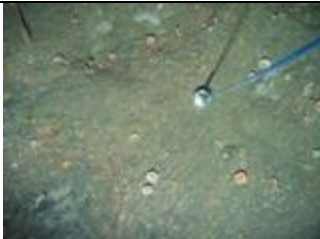


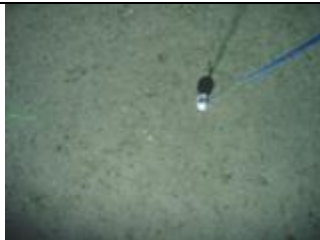
		PBR_030_007	PBR_030_012
<b>Station 031</b>  <b>Depth:</b> 90 - 95m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy coarse sand to boulders and bedrock <b>Fauna:</b> <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		
		PBR_031_003	PBR_031_007
<b>Station 032</b>  <b>Depth:</b> 102 – 108m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy coarse sand to stony reef <b>Fauna:</b> <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		
		PBR_032_002	PBR_032_009
<b>Station 033</b>  <b>Depth:</b> 105 – 107m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand at start, rocky boulder reef towards end <b>Fauna:</b> <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		
		PBR_033_010	PBR_033_015
<b>Station 034</b>  <b>Depth:</b> 114 – 116m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand <b>Fauna:</b> <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes		
			
<b>Station 035</b>  <b>Depth:</b> 123 – 125m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand, occasional small outcroppings of rock <b>Fauna:</b> <b>Annex 1 habitat:</b> No <b>Grab:</b> No		
		PBR_035_007	PBR_035_008








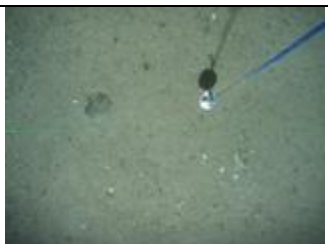






			
<b>Station 036</b>  <b>Depth:</b> 122 – 123m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy sediment with boulders <b>Fauna:</b> Anemones, sponges <b>Annex 1 habitat:</b> No <b>Grab:</b> No		
		PBR_036_001	PBR_036_008
<b>Station 037</b>  <b>Depth:</b> 118 – 122m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy sediment with isolated rocks <b>Fauna:</b> Juvenile fish, squat lobster, anemone, sponges <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes		
		PBR_037_008	PBR_037_009
			
<b>Station 038</b>  <b>Depth:</b> 118 – 123m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand with some boulders <b>Fauna:</b> Hydroids, squat lobster, cushion star, urchins, sponges, anemones, hermit crabs <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes		
		PBR_038_002	PBR_038_005
			
<b>Station 039</b>  <b>Depth:</b> 118 – 121m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy muddy sediment with some isolated rocks <b>Fauna:</b> Flatfish, cushion star, crab, hermit crabs <b>Annex 1 habitat:</b> No <b>Grab:</b> No		
		PBR_039_001	PBR_039_006

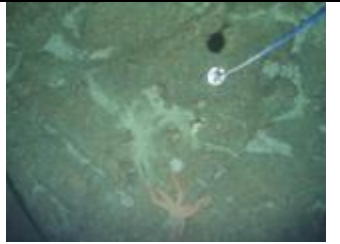


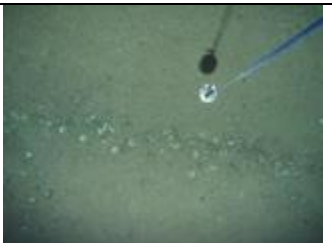


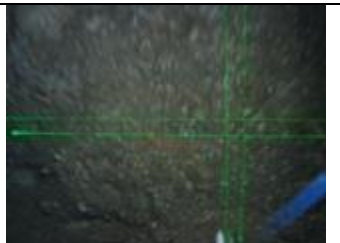

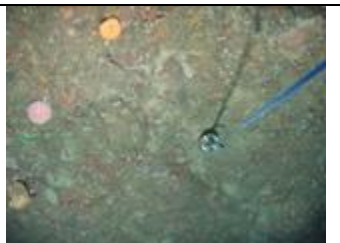





			
<b>Station 040</b>  <b>Depth:</b> 118 – 121m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand with some cobbles and boulders <b>Fauna:</b> Hydroids, urchins, cushion stars, sponges <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes		
		PBR_040_010	PBR_040_014
			
<b>Station 041</b>  <b>Depth:</b> 123 – 127m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy muddy sediment with isolated boulders <b>Fauna:</b> <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes		
		PBR_041_002	PBR_041_015
			
<b>Station 042</b>  <b>Depth:</b> 131 – 134m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sandy sediment <b>Fauna:</b> Flatfish <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes		
		PBR_042_001	PBR_042_002
			








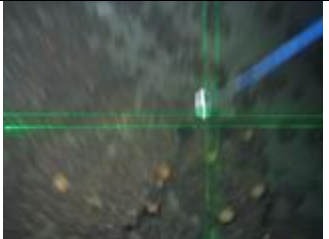




<b>Station 043</b>  <b>Depth:</b> 128 – 130m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy muddy sediment <b>Fauna:</b> Anemones and large gastropod <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	 PBR_043_001	 PBR_043_009
			
<b>Station 044</b>  <b>Depth:</b> 119 – 123m	<b>Preliminary field description</b> <b>Substrate:</b> <b>Fauna:</b> Sponges, monkfish <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		
<b>Station 045</b>  <b>Depth:</b> 75 - 80m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy sediment and bedrock <b>Fauna:</b> Brittlestars, cushion stars, cup corals, urchins, sponges, <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_056_007	 PBR_056_016
<b>Station 046</b>  <b>Depth:</b> 85 - 91m	<b>Preliminary field description</b> <b>Substrate:</b> Mixture of coarse sediments and bedrock <b>Fauna:</b> Brittlestars <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_046_016	 PBR_046_005
<b>Station 047</b>  <b>Depth:</b> 96 - 99m	<b>Preliminary field description</b> <b>Substrate:</b> Sand and coarse sediment <b>Fauna:</b> <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	 PBR_047_007	 PBR_047_010















			
<b>Station 048</b>  <b>Depth:</b> 94 - 96m	<b>Preliminary field description</b> <b>Substrate:</b> Mixed sediment, cobbles, boulders and bedrock <b>Fauna:</b> Sponges, urchins, cushion stars, squat lobster <b>Annex 1 habitat:</b> <b>Grab:</b> Yes	 PBR_048_013	 PBR_048_002
<b>Station 049</b>  <b>Depth:</b> 86 - 89m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy sediment <b>Fauna:</b> Cushion stars <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	 PBR_049_008	 PBR_049_009
			
<b>Station 050</b>  <b>Depth:</b> 60 - 70m	<b>Preliminary field description</b> <b>Substrate:</b> Bedrock <b>Fauna:</b> Cushion stars, brittlestars, sponges, seastars, Dead Mens Fingers, urchin <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_050_002	 PBR_050_008
<b>Station 051</b>  <b>Depth:</b> 76 - 84m	<b>Preliminary field description</b> <b>Substrate:</b> Mixture of sandy sediment and bedrock <b>Fauna:</b> Squat lobster, cup corals, sponges, urchins, brittlestars <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_051_007	 PBR_051_005













<b>Station</b> 052  <b>Depth:</b> 83 - 85m	<b>Preliminary field description</b> <b>Substrate:</b> Bedrock <b>Fauna:</b> Cupcorals, sponges, sunstar, urchins, brittlestars, cushion stars <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_052_009	 PBR_052_002
<b>Station</b> 053  <b>Depth:</b> 87 - 89m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy sediment on ridges with shell fragments infill <b>Fauna:</b> <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	 PBR_053_005	 PBR_053_008
			
<b>Station</b> 054  <b>Depth:</b> 81 - 90m	<b>Preliminary field description</b> <b>Substrate:</b> Bedrock with section of sandy sediment <b>Fauna:</b> Urchins, crab, sponges, scallop shell <b>Annex 1 habitat:</b> <b>Grab:</b> No	 PBR_054_014 – photos blurred	 PBR_054_010
<b>Station</b> 055  <b>Depth:</b> 82 - 91m	<b>Preliminary field description</b> <b>Substrate:</b> Mainly bedrock with small sections of sand <b>Fauna:</b> Urchins, sponges, dead man's fingers, brittlestars <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_055_002	 PBR_055_010
<b>Station</b> 056  <b>Depth:</b> 81 - 86m	<b>Preliminary field description</b> <b>Substrate:</b> Mixture of bedrock, boulders and cobbles and sandy sediment <b>Fauna:</b> Cup corals, Seastars, urchins, sponges, cushion star <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_056_003	 PBR_056_009















<b>Station</b> 057  <b>Depth:</b> 87 - 90m	<b>Preliminary field description</b> <b>Substrate:</b> Lines of shelly material interspersed with sand and areas of stony reef and bedrock <b>Fauna:</b> Urchins, sponges, cushion star, hydroids, seastars, sunstar <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes	 PBR_057_002	 PBR_057_012
			
<b>Station</b> 058  <b>Depth:</b> 90 - 97m	<b>Preliminary field description</b> <b>Substrate:</b> Mixture of sediment bedrock, boulders and cobbles <b>Fauna:</b> Sponges, urchins <b>Annex 1 habitat:</b> <b>Grab:</b> No	 PBR_058_009	 PBR_058_013
<b>Station</b> 059  <b>Depth:</b> 87 - 92m	<b>Preliminary field description</b> <b>Substrate:</b> Bedrock <b>Fauna:</b> Sponges, urchins, seastars, squat lobsters <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_059_005	 PBR_059_006
<b>Station</b> 060  <b>Depth:</b> 98 -102m	<b>Preliminary field description</b> <b>Substrate:</b> Mixture of sandy sediment bedrock and boulders <b>Fauna:</b> Common starfish, sponges, flatfish <b>Annex 1 habitat:</b> <b>Grab:</b> Yes	 PBR_060_007	 PBR_060_011
			






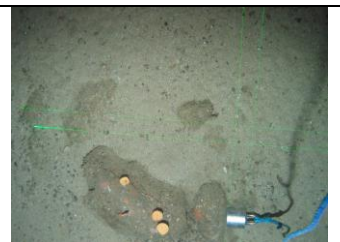
<b>Station</b> 061  <b>Depth:</b> 105 - 109m	<b>Preliminary field description</b> <b>Substrate:</b> Sand and boulders <b>Fauna:</b> Common starfish, anemone, cushion star, sponges, spider crab, gadoid fish - cod/ling? <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_061_011	 PBR_061_017
<b>Station</b> 062  <b>Depth:</b> 99 -103m	<b>Preliminary field description</b> <b>Substrate:</b> Predominantly bedrock with some boulders and coarse sandy sediment <b>Fauna:</b> Sponges, cushion stars, seastars, urchins <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_062_007	 PBR_062_014
<b>Station</b> 063  <b>Depth:</b> 96 – 98m	<b>Preliminary field description</b> <b>Substrate:</b> Coarse sandy sediment with bedrock and boulders <b>Fauna:</b> Seastars, sponges, urchins <b>Annex 1 habitat:</b> No <b>Grab:</b> No	 PBR_063_007	 PBR_063_010
<b>Station</b> 064  <b>Depth:</b> 86 - 95m	<b>Preliminary field description</b> <b>Substrate:</b> Bedrock <b>Fauna:</b> Cushion stars, urchins, sponges <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_064_008	 PBR_064_013
<b>Station</b> 065  <b>Depth:</b> 107 – 110m	<b>Preliminary field description</b> <b>Substrate:</b> Coarse sandy sediment <b>Fauna:</b> Seastars, small fish, hermit grabs <b>Annex 1 habitat:</b> No <b>Grab:</b> No	 PBR_065_009	 PBR065_002
<b>Station</b> 066  <b>Depth:</b> 109 - 112m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sand and boulders <b>Fauna:</b> Urchins, sponges, brittlestar, sunstars, small fish <b>Annex 1 habitat:</b> Yes <b>Grab:</b> Yes	 PBR_066_005	 PBR_066_010



			
<b>Station 067</b>  <b>Depth:</b> 107 – 109m	<b>Preliminary field description</b> <b>Substrate:</b> Muddy sediment <b>Fauna:</b> Small fish, hermit crabs <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes		
		PBR_067_008	PBR_067_004
<b>Station 068</b>  <b>Depth:</b> 110 - 111m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy sediment <b>Fauna:</b> Small fish, bivalve shell <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes		
			
<b>Station 069</b>  <b>Depth:</b> 91 – 96m	<b>Preliminary field description</b> <b>Substrate:</b> Bedrock <b>Fauna:</b> Brittlestars, sponges, crab, seastars, urchin, fish <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		
		PBR069_002	PBR069_014
<b>Station 070</b>  <b>Depth:</b> 104 - 108m	<b>Preliminary field description</b> <b>Substrate:</b> Coarse sediment with large rock outcroppings <b>Fauna:</b> Seastars, large fish <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No		

		PBR_070_001	PBR_070_005
<b>Station 071</b>  <b>Depth:</b> 114 - 116m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy and coarse sediment <b>Fauna:</b> Seastar, flatfish, hermit crabs <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	  PBR_071_006	  PBR_071_011
<b>Station 072</b>  <b>Depth:</b> 107 – 108m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy and coarse sediment <b>Fauna:</b> Sunstars, hermit crabs <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	  PBR_072_004	  PBR_072_009
<b>Station 073</b>  <b>Depth:</b> 109 – 110m	<b>Preliminary field description</b> <b>Substrate:</b> Sandy sediment <b>Fauna:</b> hermit crabs <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	 PBR_073_002	 PBR_073_004
			



<b>Station</b> 074  <b>Depth:</b> 107 – 108m	<b>Substrate:</b> Rocky reef with sandy matrix <b>Fauna:</b> Sea stars, urchins, sponges, purple encrusting species <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_074_008	 PBR_074_010
<b>Station</b> 075  <b>Depth:</b> 103 – 104m	<b>Substrate:</b> Sandy muddy sediment <b>Fauna:</b> Sea stars <b>Annex 1 habitat:</b> No <b>Grab:</b> Yes	 PBR_075_003	 PBR_075_010
<b>Station</b> 076  <b>Depth:</b> ~105 – 108m <b>No</b> <b>HiPAP</b>	<b>Substrate:</b> Mixture of Boulders and cobbles, pebbles and sandy sediment <b>Fauna:</b> Cup sponges, seastars, urchins <b>Annex 1 habitat:</b> Yes <b>Grab:</b> No	 PBR_076_003	 PBR_076_011

### 4.3. Human of activity

Trawl scars were identified on the side scan sonar data at various places across the site. Some pipelines were also identified. A number of other vessels were sighted in the area, including fishing vessels. Plastic litter was recorded in the video at station 38.

### 4.4. H&S events

A safety induction was held at the start of the survey and a fire drill undertaken. There were no incidents during the survey.

## Appendix 1: Vessel, equipment used, software and operational parameters

Details of the vessel can be found here:

<http://www.scotland.gov.uk/Uploads/Documents/OR06Scotia.pdf>

### Camera Equipment

Camera	Viewing angle (nominal) deg	Viewing angle Horizontal (deg)	Viewing angle Vertical (deg)	Aspect Ratio	Field width (mm) at range 1.25m	Field height (mm) at range 1.25m
<b>Kongsberg OE-14-366 (TV)</b>	61 (diagonal)	50	41	4:3	975	750
<b>Kongsberg OE-14-208 (Digital Stills)</b>	62 (diagonal)	50	38	4:3	1125	870
<b>SubC Control HD 1Cam Alpha</b>	60 (horizontal)	60	34	16:9	1100	625

Digital Stills Camera configuration	
Focus	1.2 5m (fixed)
Aperture	f5.6
Mode	Aperture Priority
ISO	200
Flash	1/8 +1
Resolution	RAW
HD camera configuration	
File format	AVC-HD
Image quality	HD-FH
Filename = recording start date and time	YYMMDDHHMMSS (eg 20130830002125)
Recording capacity	96 GB (available time approx 12h 20m)

Camera frame was fitted with a 4-unit Laser "stripe" assembly (reference scale set to 60mm).

Images were converted from .RAW to .JPEG using Cannon ZoomBrowser 4.1.

### Acoustic Equipment

Reson 7125 Multibeam sonar. Dual frequency 200KHz and 400KHz  
 Applanix POS MV Wavemaster Motion Reference Unit (MRU)  
 Fugro Seastar 8200 HP (VBS and HP subscription enabled)  
 Valeport miniSVP  
 Simrad EK60 scientific sounder system  
 Edegetech 4200 sidescan system with Discover software  
 Applied Acoustic Engineering 1019 transponder

## **Ancillary**

Roxann connected to Simrad EK60 sounder 38KHz split beam transducer mounted on drop keel - sounder Ping interval was 1 second. Roxann data was averaged over a 10 second interval

## **Deployment**

The Reson 7125 transducers were mounted in a Reson Hydrodynamic Fairing on the drop keel of MRV Scotia. The drop keel was lowered to 2m below the keel of the vessel giving a nominal deployment depth of 7.5m. The interface bottle was mounted within the drop keel.

## **Appendix 2: Survey metadata**

This information is provided as a separate .xlsx file:

JNCC-Report-636-OffshoreSurveyData-2013-08-1013S-PobieBank.xlsx