CLIDIVE BSAC 410

North Shetland

4 – 21 August 2011

Expedition Report

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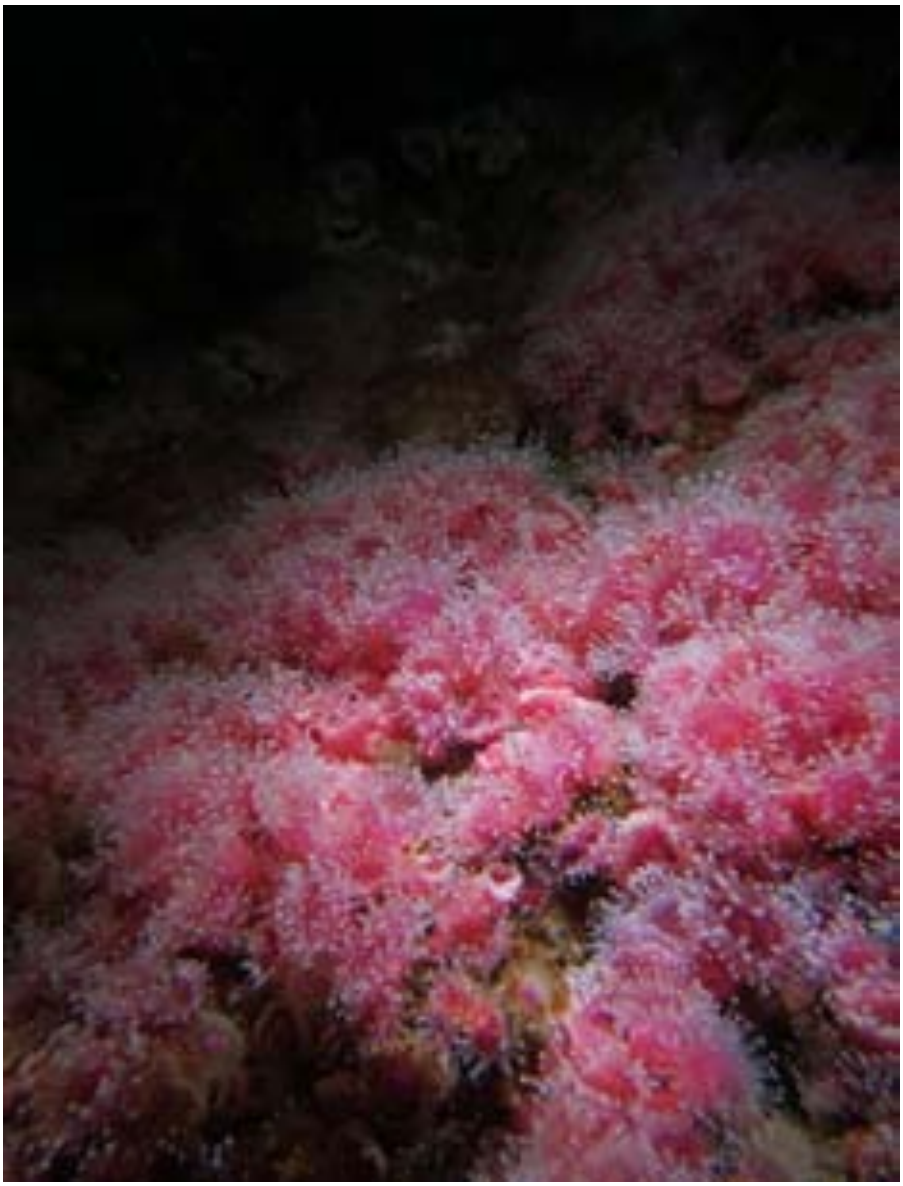


Section One: Background

Summary of Expedition

In August 2011 16 divers, two vehicles and a RHIB travelled over 800 miles from London to Unst, the most northerly of the Shetland Islands, for a two week exploration of the underwater environment in a remote and rarely dived area of the UK. For some, this was a return visit to the area and a chance to build on previous experience and explore new sites – for others, it was their first taste of expeditionary diving. For everyone, it was hard work, but the rewards were up to 20 metres of visibility and an underwater garden covered in life. We left with the feeling that there is still so much more to explore in this wonderful part of the world, and with the enthusiasm and skills to undertake further expeditions. This report is a summary of our expedition – the planning, the achievements, and also the difficulties we encountered and how we overcame these in order to achieve our aims.

Background

Clidive is a BSAC branch based in central London. We have around 110 members. The club owns two 6.5m RHIBs, two vehicles, and 16 full sets of scuba kit. We run an extensive training programme, with both entry level courses and a range of higher level and skill development courses throughout the year. In 2009, we decided to organise an expedition to the Shetland Islands as part of our 40th birthday celebrations. We won the Peter Small Award following this expedition, and in 2010 the BSAC Heinke Award. More information about the club can be found at www.clidive.org.

At our annual dive planning meeting in October 2010, it was agreed that we would again like to organise an expedition to the Shetland Islands. We wanted to return to Shetland to build on the work done in our 2009 expedition. We wanted to explore new sites and promote expeditionary RHIB diving within the club and within BSAC. To aid this and to add a focus to the expedition, it was decided to apply for funding from the BSAC Expeditionary Grant Scheme (BEGS). We were successful in provisionally being awarded a grant of £1,000, should the expedition go ahead as planned.

Expedition Purpose

The overall purpose of the expedition was to further explore the area of North Shetland, and in particular the largely un-dived West Coast of Unst. The expedition aimed to:

- Discover new dive sites in the area and extend Clidive's Dive Guide to Unst
- Cascade skills from First Class Diver level through to Sport Divers
- Complete a more extensive Seasearch survey of the area
- Carry out a further survey of the wreck of the E49
- Promote expeditionary diving and North Shetland to the wider diving community

North Shetland – The Location

North Shetland is remote. It's closer to Norway than it is to mainland Scotland, and is on the same latitude as Southern Greenland. Divers need to be self-sufficient – there is no commercially available air, and no dive shop. The nearest hyperbaric chamber is at Stromness in the Orkneys, over 150 miles away. The area posed many challenges:

- The weather – Unst holds the UK record for the strongest wind speed in the UK at 177mph. We didn't quite reach this level, but we did have our fair share of the gales, strong swells and sea fogs common to the area. On land temperatures ranged from 10° - 16° Celsius. The underwater temperature was 11-12° Celsius.
- Poor mobile phone reception hindered communication between team members.
- Lack of diving amenities meant expedition is at risk should key equipment fail – which it did!
- Strong and complex currents and short slack times – unknown currents in many areas.
- The area is poorly charted; depths are unknown in many areas, particularly the West coast.

The area also boasts dramatic coastal scenery and a plethora of wildlife, including the third largest gannetry in the UK. The underwater life and topography is spectacular, with visibility up to 20m, making this a world class dive destination. Despite 'challenging' weather, we were only blown out for one day – there is nearly always somewhere that you can dive. We can also now boast that we have visited the most Northerly – well, everything – in the UK!

Section Two: Preparation

Research and Planning

Following an initial planning meeting, key roles were identified. In order to aid diver progression, it was agreed that advanced diver candidate Naomi Davies would work with expedition leader and dive managers Rory Budds and Ben Jaffey to organise the expedition, and to lead on the application to BEGS. Key potential dive sites were identified, by researching previous expeditions and dive site information and identifying areas which had not yet been explored, and that due to current or topography, merited exploration.

Seasearch Training - Swanage

Training needs were agreed and a training programme arranged to meet those needs, including Seasearch theory and practical, Advanced Diver theory, Gas Blending, and Chartwork and Position Fixing. Individuals were also expected to complete UK RHIB diving immediately prior to the trip. A planning meeting was held in April 2011 for all participants to discuss the dive plan and to agree on roles and responsibilities for the week. A passage planning meeting was also held prior to the trip to draw up passage plans for key sites.

April planning Meeting, London

Selection of Participants

One of the aims of the expedition was to open up expeditionary diving to people who had not had the opportunity to take part in this type of diving before, in order to cascade skills through the club members. However, safety was also important and therefore only experienced UK divers, with depth progression to 35m already undertaken, were invited to apply for a place. A mix of diver grades was sought in order to have the experience and skills necessary for the trip to succeed in its aims. Divers also needed to be committed to the aims of the expedition and be willing to undertake additional training as necessary. Below is a full list of participants:

Name	Diver Grade	Additional Qualifications	BSAC Number
Week One			
John Davies	First Class Diver	OWI / CO / DC / GB / TR	A103392
Rory Budds	Advanced Diver	OWI / CO / GB / DC / SS / TR	A393924
Mary Brown	Advanced Diver	OWI / CO / GB / SS / DC / ADP	A659396
Warwick Mason	Advanced Diver	OWI / CO / SS / DC / TR	A684598
Naomi Davies	Dive Leader	CO / SS / BH / N(A)	A756026
Paul Reid	Dive Leader	OWI / CO / BH / SS / N(A)	A783575
Natascha Gewaltig	Dive Leader	BH / N	A799636
Bethan Young	Sports Diver	SS / N	A799625
Week Two			
Ben Jaffey	Advanced Diver	AI / CO / SS / DC / BHI / GB / ADP	A707257
Declan Daly	Advanced Diver	AI / CO / GB / DC / BHI / SS / TR	A393946
Annette Millar	Advanced Diver	AI / CO / DC / GB / ADP	A706492
Elaine Hendry	Dive Leader	OWI / DC / N(A)	A393927
Nick Harrison	Dive Leader	DC / N(A)	A660884
Dave Pickford	Dive Leader	BH / SS / TR	A776834
Chris Coles	Sports Diver	BH / N	A735018
Cori Crider	Sports Diver	N	A809417

Key: BH = Boat Handler; DC = Diver Cox'n; BHI = Boat Handler Instructor; OWI = Open Water Instructor; AI = Advanced Instructor; CO = Compressor Operator; GB = Gas Blender; SS = Seasearch, N(A) = Nitrox (Advanced), Tr = Trimix, ADP = Accelerated Deco. Procedures:
NB: Qualifications are correct as of August 2011, and doesn't include on-expedition training.

Inter-Club Collaboration

Several participants have dual membership with other BSAC clubs. This was vital in organising the expedition. Plymouth Sound BSAC kindly offered to hire J-cylinders of O2 for us as securing O2 was proving to be difficult. Allen Murray from Totnes BSAC also assisted us with planning a methodology for the survey of the E-49. Maritime Volunteer Service London City, a BSAC Special Branch with several joint members, provided us with access to HMS President on the Thames and their RHIBs for boat handling training, and to their hard boat, Londonium I, for Chartwork and Position Fixing training. Saffron Walden BSAC let us use their compressor room and mixing panel for gas blending training. The updated Dive Guide to Unst, which can be seen as Appendix J, has been made available on our website. It is envisaged that this will be a useful planning tool for other clubs and encourage them to the area. This report will also be available on the BSAC web pages.

Equipment Logistics

Getting our equipment to Shetland was no easy task. Two participants lived outside of London; our RHIB was in Plymouth, and the compressor we hired was in Worcestershire. We booked secure storage space at Penton Hook Marina near Chertsey off the M25 for our RHIB just before and after the trip, and arranged a kit loading session, which doubled up as a pre-expedition last minute planning meeting. The below table details the equipment logistics:

Saturday 30 July	John picks up J-cylinders from Plymouth Sound BSAC during training trip
Sunday 31 July	John tows yellow boat from Plymouth to Penton Hook Marina with red van
Tuesday 2 August	John drives red, Warwick drives white truck to Rory's house Club equipment unloaded into Rory's shed Whole team load personal equipment into vehicles White van stays at Rory's; Red van driven back by Declan
Wednesday 3 August	Paul picks up red van from Declan Rory picks up compressor from Worcestershire
Thursday 4 August	Both vehicles and boat drive to Shetland; John, Rory, Natascha and Paul
Saturday 6 August	Arrival in Shetland, Week One
Saturday 20 August	Departure from Shetland, Week Two
Sunday 21 August	Nick and Elaine drop boat at Penton Hook; drive white truck to Rory's Ben and Declan drive red van back to Declan's
Tuesday 23 August	Rory returns compressor to Worcestershire
Wednesday 24 August	White and red van's driven to Rory's; personal kit unloaded – whole team Club kit reloaded into red van
Thursday 25 August	Vehicles driven to club to load for August bank holiday trip
Friday 26 August	White truck picks up boat from Penton Hook and return to Plymouth - Ben J-cylinders returned to Plymouth Sound BSAC - Ben

Sources of Information

The following sources of information were used to plan the expedition:

- A Sublittoral Survey of Shetland, *Moss and Ackers, MCS* (1987)
- Admiralty Tidal Stream Atlas NP209, Orkney and Shetland Islands (1986)
- C-Map Electronic Chart Software
- Clyde Cruising Club Sailing Directions and Anchorages for Shetland Islands
- Dive Scotland Volume III, *Gordon Ridley* (1992)
- OS Explorer Map 470; Shetland – Unst, Yell and Fetlar
- Reeds Nautical Almanac (2011)
- Shetland Shipwrecks, *Shetland Sub Aqua Club* (1989)
- Shipwrecks of the North of Scotland, *RN Baird* (2003)
- The Expedition Manual, *BSAC* (2010)
- UK Hydrographic Office Chart 3293

Section Three: Expedition Logistics

Travel

Unst is a long way from London – 810 miles. However you get there, it will take a long time. In order to share the long drive and to have a backup vehicle in case of breakdown, we decided to take both our club vehicles, with two drivers in each. One of the vehicles held the compressor and towed the boat, and the other vehicle held the oxygen cylinders, diving cylinders and personal diving equipment. It is possible to take full cylinders onto the ferry if this is arranged with Northlink Ferries in advance and vehicles are fully marked as containing hazardous goods: www.northlinkferries.co.uk.

The rest of the participants hired a car from Sumburgh airport for the drive up to Unst, which also allowed us an extra vehicle during the week, helping logistically with the division of daily duties. The following table summarises our journeys, however full logistics for the main drivers can be found in Appendix I.

Week One	
John and Rory	Tow boat in white truck, Aberdeen to London Overnight ferry from Aberdeen to Lerwick (South Shetland) Inter-Island ferries, Mainland – Yell – Unst
Natascha and Paul	Drive red van, Aberdeen to London Overnight ferry from Aberdeen to Lerwick (South Shetland) Inter-Island ferries, Mainland – Yell – Unst
Naomi, Mary, Bethan, Warwick	Plane to Aberdeen, Plane to Sumburgh (South Shetland) Hire car from Sumburgh Inter-Island ferries, Mainland – Yell – Unst
Whole team	Hire car and white truck to Lerwick for handover Mixture of hire car and local bus to Sumburgh airport Fly back to London via Aberdeen
Week Two	
Whole team	Plane to Aberdeen, Plane to Sumburgh (South Shetland) Hire car and local bus, Sumburgh – Lerwick Hire car, white truck and inter-island ferries to Unst
Elaine and Nick	Tow boat in white truck to Lerwick via inter-island ferries Overnight ferry, Lerwick to Aberdeen Tow boat in white truck, Aberdeen to London
Declan and Ben	Drive red van to Lerwick via inter-island ferries Overnight ferry, Lerwick to Aberdeen Drive red van, Aberdeen to London
Cori, Dave and Chris	Hire car and inter-island ferries, Unst – Sumburgh airport Fly back to London via Aberdeen Dave then drives back to Portsmouth
Annette	Lift in red van to Lerwick via inter-island ferries Overnight ferry, Lerwick to Aberdeen Train, Aberdeen to Plymouth

Mary – nearly there!

The drivers arrive…

Sumburgh Airport, South Shetland

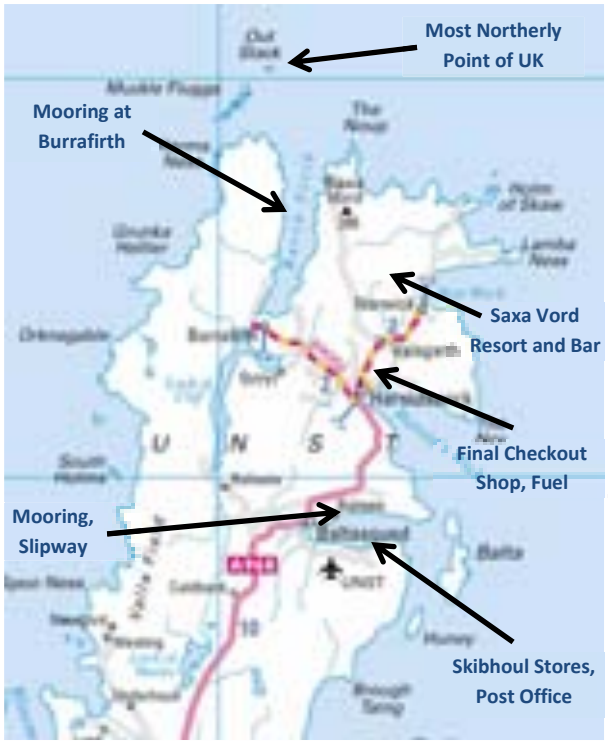
Accommodation

We stayed at the Saxa Vord resort in Valsgarth, Unst – www.saxavord.com. The location is ideal, being a 20 minute drive from both the mooring at both Burra Firth and Baltasound. There is a bar and restaurant on site and also wi-fi available in the bar, which we used to update our online blog.

The resort has a mixture of hostel style accommodation and self-catering cottages. We hired two self-catering cottages, allowed us to set up one house as the dive planning house and the other as the catering house. The cottages have been renovated to a high standard, and have a large dining space which enabled us to eat together in the evenings and to conduct dive briefings for the following day. The houses also have laundry facilities, a lounge and large garages, which we used to store dive kit for the alternative week. Phone reception is poor in the houses and therefore we needed to communicate in the old fashioned way, with forward planning and keeping to timings!

Local Services

Unst has all of the services that you need for a week's diving holiday, with the notable exception of a dive shop and air! Fuel for the vehicles and boats was purchased at The Final Checkout near Haroldswick, where there is also a well-stocked shop. This year we also used Skibhoul Stores, a five minute drive from the mooring in Baltasound. This shop is also well stocked and serves soup, pies and tea and coffee which really helped to warm up week one divers during bitter Northern winds. A full list of useful contacts can be found at Appendix E.



Saxa Vord Resort

Catering

To cut down on cost, both weeks of the expedition self-catered, with a rota for cooking and preparing lunch. A bulk shop was done for the basics in Lerwick, where there are two large supermarkets, and additional shopping was then done each day. Both shops have weekly delivery times for fresh food and are open generally between 9am and 6pm, or 5.30pm some days, and hence the dive planners needed to factor this in so that if we were to be returning late, food would be purchased in the morning or the previous day. Allergies and dietary preferences were also taken into account. Soup was also made for the boat, which proved to be much needed on the colder days. Each week also ate out at the restaurant in Saxa Vord on the final night.

Week One Menu:	
Saturday – Warwick	Tuna Pasta Bake
Sunday – Naomi	Sausage and Mash
Monday – Mary	Macaroni Cheese
Tuesday – Bethan	Kedgeree + Apple Pie
Weds – Natascha	Goulash + Veggi Chilli
Thursday – Rory	Mackerel, Cheese+ Biscuits
Friday	Meal out at Saxa Vord

Week one enjoy macaroni cheese, courtesy of Mary

Air

As there is no commercially available air in Shetland, we needed to compress our own air. We therefore hired a petrol driven portable compressor, plus oil and a spare filter, with both DIN and A-clamp outlets. We also hired 3 J-cylinders of oxygen so that we could use nitrox during the trip. Every member of the expedition was qualified to use nitrox, with 12 out of the 16 having a minimum of Advanced Nitrox qualification. Gas blending courses were run both prior to and during the trip, qualifying in total 11 divers, and Compressor Operator courses were run on both weeks of the trip, qualifying 7 divers. Each day two divers filled the cylinders at lunch and in the evening, on a rota basis. We also completed a compressor log.

Initial briefing on the hired compressor

Due to our busy training and diving calendar, we were unable to find a suitable weekend to run an Accelerated Decompression course prior to the trip, however 7 members of the expedition were already qualified and completed accelerated decompression dives throughout the trip, predominantly on the wreck of the E-49, which at a depth of 33m, allowed much needed extra bottom time for surveying purposes. Nitrox was used throughout the trip as an added safety feature; this was especially helpful given that not all sites are suitable for decompression diving due to complex currents.

The compressor that we hired caused us significant problems. We were unable to fill all 16 cylinders in one sitting at the end of the day, due to needing to wait for the compressor to cool before refilling the fuel. This meant that we needed to compress half the cylinders at lunchtime, causing us to have to return to mooring at lunch. Due to the size of the island, we were able to return to different moorings and drive the compressor round, and hence this did not cause significant difficulties.

During week two, it became apparent that the compressor was causing symptoms such as headaches and nausea during the first day of diving. The filter was changed, and diving proceeded with caution. However divers continued to experience symptoms and it was suspected that carbon monoxide was present in the air. The use of the compressor was immediately discontinued, putting the expedition into jeopardy and causing a break from diving to remedy the situation.

Still smiling with the new, smaller compressor!

Luckily, MV Valkyrie was in Lerwick that week, and skipper Hazel agreed to fill cylinders for us, and hence the long journey to Lerwick (about 7 hours return) was commenced for two days. We then managed to find Ian, a fish farmer in Unst with a small electrical compressor, who kindly agreed to hire it to us for the final days of diving. Since returning, we had the compressor tested. It was found to be faulty and producing air with high levels of carbon monoxide. We also sent a sample of air for analysis. This confirmed high levels of carbon monoxide. A BSAC incident report has been prepared and the Trading Standards Department of the local authority area of the compressor hire business has been informed.

Equipment

Below is a full list of equipment taken to Shetland. It was important to have back-up equipment in case of failure as there are no dive shops available. We decided to take our twin-engine RHIB in case of engine failure. Spares were available as each diver took their own dive kit. We arranged to share cylinders and tool kits between the two weeks, however four additional cylinders were also brought as back-up, which proved to be very useful when the compressor broke. The boat engines and trailers were serviced immediately prior to the trip.

- 6.5m Tornado RHIB (twin 90hp Yamaha engines, on trailer)
- Fitted VHF radio, GPS and Echosounder
- 2 spare handheld VHF radios and GPS
- Compressor
- 20 cylinders (mixture of 15l and 12l, O2 clean, and din/a-clamp)
- 16 sets of personal diving equipment including pony cylinders and weights
- 2 emergency 7 litre oxygen cylinders and equipment for four divers to be treated at once
- EPIRB, A-flag, oars, throw-rope, two shot weights, lifting bags and ropes
- Slates, measuring equipment
- Club transit van and club 4x4 pick up
- Boat boxes containing flares, first aid kit and tools
- Fuel containers
- Charts, OS maps and literature, marine ID books
- Personal cameras
- Flasks

Clidive Yellow in Burrafirth

Communication

Prior to the expedition, regular e-mail updates were sent to team members (see Appendix I). Once the expedition had started, there was regular communication between the teams via phone (when we could get reception!) and e-mail. We also held a handover meeting in Lerwick at the mid-point for all team members. Dive site Reporting Logs had been completed for every dive.

We used an online Blog to communicate to the rest of the club, family and friends, and the wider diving community. This can be found at http://clidive.blogspot.com/ and also Appendix D, along with our trip reports at Appendix H, which are also available on our website in our open access area.

Expedition Management

As well as our dive mentor, John Davies, each week had a dive manager and an assistant dive manager. In addition to this, less experienced members of the team shadowed those more experienced to take on dive management for different days on a rota basis, in order to cascade knowledge and maximise the learning experience, and for some as part of Advanced Diver training.

In addition each day the following tasks were rotated:

Dive planning

- Cox'n and Navigator x 2
- Preparing lunches
- Shopping and cooks x 2
- Seasearch surveying
- Dive planning x 2
- Filling cylinders x 2
- Dive site reporting log x 2
- Boat marshall, to include fuelling and preparing / tidying boats x 2

With so many tasks, days were busy, normally leaving the house at 8am with two dives each day. We also conducted depth surveys during lunch breaks to find suitable future dive sites and to fully explore the area. Diving normally finished at around 5.30pm, allowing time for dive planning and reporting, cooking and filling cylinders, normally eating by around 8.30pm. Training was carried out in the evenings and on the two days when we were not able to dive.

To ensure the smooth running of the expedition, areas of responsibility for the week were delegated as follows:

Role	Week 1	Week 2	Description of Role
Mentor, First Class Diver	John		Oversees expedition, supports dive managers
Expedition Leader	Ben		Ensures expedition aims are being met Manages BEGS application and reporting
Dive Manager	Rory	Ben	Co-ordinates dive plan for the week
Assistant Dive Manager	Naomi	Dave	Shadows DM to progress experience Takes on planning tasks as delegated
Drivers x 2 – red van	Paul + Natascha	Ben + Declan	Drives red van to / from Shetland
Drivers x 2 – white truck	Rory + John	Nick + Elaine	Drives white truck and tows boat to / from Shetland
Money Marshall	Paul	Chris	Collates receipts and completes money sheet
Equipment Marshall	Warwick		Ensures equipment is brought and working
Dive Site Information Co-ordinator	Naomi	Elaine	Collates information about sites dived, including location, features, slack times, depth
Seasearch Co-ordinator	Bethan	Dave	Ensures Seasearch data is being collected and reported, and collates information
Wreck Surveying	Annette		Co-ordinates surveying work of E-49
Food Co-ordinator	Mary	Cori	Plans shopping and cooking for the week Ensures boat is stocked with water, chocolate + soup
Boats Co-ordinator	Rory	Nick	Ensures boats are fuelled, oiled and in working order
Air Co-ordinator	John	Declan	Co-ordinates training around compressor use
Blog Co-ordinator	Natascha	Chris	Ensures blog is updated every day
Trip Report for Club	Bethan	Dave	Writes trip report for club website
Training Co-ordinator	John	Ben	Ensures training needs are met
Hire Car	Warwick	Dave	Responsible for hire car

Safety

Safety was a priority in such a remote location. Passage plans were drawn up before each day's diving and key waypoints were entered into the GPS at the start of the trip. Key waypoints are listed in the table below. This proved vital when thick fog descended without warning during week two. A risk assessment for the trip can be found at Appendix A. Individual risk assessments were drawn up before each dive was undertaken and the Coastguard was kept informed of our activities on a daily basis. Decompression was only allowed on dive sites with either a static shot such as the E-49 or in well sheltered areas. During week one, hostile weather conditions also meant that a maximum dive time was given to prevent divers from becoming too cold whilst waiting on the surface.

In case of emergencies, we carried two 7 litre cylinders of oxygen with capacity to treat four divers at the same time. All divers were briefed to be familiar and dive within BSAC safe diving practices, and a safety briefing was given before each dive. All divers carried a DSMB and flag, back up pony cylinder, torch, and a line cutter/knife.

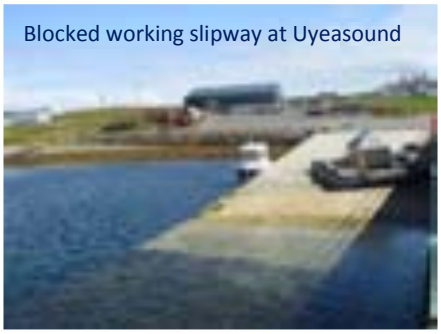
Latitude North	Longitude West	Location and Comment
60°43.413	0°59.475	NW entrance to Bluemull Sound
60°46.823	0°59.426	W of Brindacks / Unst
60°51.606	0°53.498	NW of Muckle Flugga
60°50.687	0°51.434	Entrance to Burra Firth (shelter from E, S, and W)
60°51.478	0°52.659	Channel between Muckle Flugga and Out Stack
60°51.863	0°52.278	N of Out Stack
60°50.679	0°44.604	NE of Unst (Holm of Skaw)
60°48.517	0°43.873	E of Norwick
60°45.886	0°45.198	E of Balta Island
60°45.681	0°47.794	Baltasound N Channel
60°44.008	0°47.693	SE of entrance to Baltasound
60°44.483	0°48.316	Entrance to Baltasound
60°45.587	0°50.329	Baltasound (anchorage/slip)
60°39.408	0°49.451	SE of Haaf Gruney (for S entrance to Bluemulll Sound)
60°38.571	0°52.028	E of entrance to Bluemull Sound
60°40.437	0°52.310	E entrance to Uyeasound (alternative anchorage/slip)
60°41.316	0°54.974	Slipway in Uyeasound
60°39.904	0°57.548	Bluemull Sound S entrance

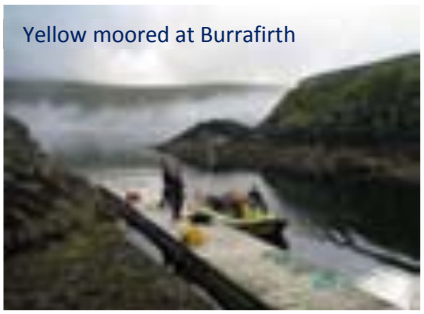
Launch, Recovery, and Moorings


Launching close to low water, Baltasound

The best slipway in Unst is at Baltasound, which can be used to launch at most states of tide, apart from low water. Fuel and shops are close by (5 minute drive). A visitor's mooring can also be arranged in advance and we paid just £20 for the two weeks. There was water on site to hose down the trailer and to wash dive gear, and toilets and showers are available. There is a suggested £1 donation box for use of showers.

With persistent northerly winds, we were forced to the south of the island, at Uyeasound. The slipway can be accessed at any state of tide, however this is a working harbour that gets very busy, and it is not normally possible to moor here. As you can see from the picture on the left, the slip way wasn't useable when we were there. We were kindly allowed to use a space on the pontoon for the night. There is another slipway, however you can only launch and recover at high water. The slipway is also incredibly slippery.


Blocked working slipway at Uyeasound


Yellow moored at Burrafirth

During week two, the wind veered to the south, allowing access to the north and north-west of the island. These can be reached from either Uyeasound or Baltasound, however we asked Edmund Nicholson from Muckle Flugga charters if we could moor at his private pontoon at Burra Firth, for easier access to the north. He kindly allowed us to moor here. There are toilets at the visitors centre and ample parking.

	Baltasound	Burra Firth	Uyeasound
Position	60°45.587N; 0°50.329W	60°48.906N; 0°52.380W	60°41.324N; 0°54.988W
Chart	3282 / 3293	3282	3282
Depth (low water)	5.0 metres	3.1 metres	Parts of pontoon dry out
Tidal Differences	-0055 Lerwick	-0110 Lerwick	-0105 Lerwick
Main Contact	Ian McCay 01957 711420	Edmund Nicholson, 01806 522447	Ask locally
Notes	Accessible slip, water Well sheltered, toilet Mooring available	No slip, exposed to the north, toilet	Working harbour, 2 x slips, not always available Exposed from the South

Tides

Tidal information was gained from the Reeds Nautical Almanac. Tidal differences can be seen in the table above. Tides are strongest around the north of Unst, and racing through Bluemull Sound in the east. We went to sites where tidal flow was expected an hour before slack to monitor the site, and where slack times were due to be short, set maximum dive times and strict briefings to put up a DSMB and surface should current sweep divers away from the site. We found the sites on the west coast to be fairly slack at most times, and that the sites to the north had strong and complex currents. Tidal information for Lerwick, August (BST):

Sunday 7	**Monday 8 neap**	**Tuesday 9**	**Wednesday 10**	**Thursday 11**	**Friday 12**
0517 1.9	0013 0.9	0154 0.8	0307 0.7	0404 0.6	0449 0.5
1131 0.8	0635 1.8	0805 1.7	0922 1.8	1021 1.9	1108 1.9
1750 1.7	1301 0.9	1421 0.9	1524 0.9	1614 0.8	1656 0.7
	1907 1.7	2027 1.8	2133 1.9	2226 2.0	2312 2.1
Sunday 14	**Monday 15 spring**	**Tuesday 16**	**Wednesday 17**	**Thursday 18**	**Friday 19**
0603 0.4	0028 2.2	0101 2.2	0133 2.1	0204 2.1	0235 2.0
1225 2.0	0637 0.4	0709 0.4	0740 0.5	0810 0.6	0841 0.7
1809 0.6	1259 2.0	1331 2.0	1401 2.0	1431 1.9	1503 1.9
	1842 0.6	1914 0.6	1945 0.6	2017 0.7	2051 0.8

Location of Dive Sites

Key areas to explore and possible sites were identified prior to the trip, by viewing what looked to be previously undived areas and where there was likely to be interesting topography and life. During the expedition, the areas that we were able to explore were entirely weather dependent. You can generally dive somewhere no matter what the weather throws at you, as you can find shelter somewhere around the island, but faced with a force 8 north easterly gale, we were blown out on the second day of the expedition by huge swells. For the rest of the time, dive sites were identified by scanning areas of the coastline using charts and the echosounder. We were successful in finding many areas with pinnacles and walls down to 30 metres using this method, often in areas surrounded by a 12 meter sloping seabed.

Surveying

Prior to the trip, correspondence from Chris Wood at the Marine Conservation Society confirmed that there were rarely Seasearch observations carried out in Shetland. Seasearch were particularly interested in surveys being carried out on new dive sites. In order to facilitate this, a Seasearch course was organised in Swanage. Six members of the team attended to complete their qualifying dives and one member completed her full training. This brought the total to six qualified observers on week one, and three on week two. A library of marine identification texts and A4 slates were also brought, with several members of each week's teams bringing underwater cameras to aid with marine identification. During the expedition, Seasearch Observation Forms were completed for every new dive site; with a total of 15 forms being completed. A sample can be found at Appendix G.


Declan decompressing after a survey of the E-49

Building on the work done in 2009, we wanted to conduct a more thorough survey of the World War 1 submarine HMS E-49. Annette Millar attended the Nautical Archaeology Society's Intro and Part 1 course and discussed the expedition's plans with the course leaders, Peter Holt, a Nautical Archaeology surveyor and Project Supervisor of Promare and Allen Murray, an experienced First Class diver with archaeology and survey experience from Totnes BSAC. Peter suggested a useful approach would be to build up a photo-mosaic of the site using a specialist survey programme called Site Recorder which Peter himself had developed. This very sophisticated survey programme is used on professional Nautical Archaeology projects across the world as the primary means of recording nautical archaeology surveys. The fully integrated survey programme allows underwater survey points to be fixed to known GPS points and allows for photos of the site to be overlaid on the original plans of the vessel. Peter kindly agreed to sponsor the expedition by allowing us to use the professional version of the programme for free and giving us the benefit of his advice and experience.

During the second week of the expedition, we managed to take hundreds of photos of the wreck. Surveying at a depth of 35m provides a number of challenges including narcosis and the relatively short dive times available to survey a large submarine. To maximise our bottom times, we used

nitrox on the dives and a rich O2 mix for our deco stops. In spite of this, we found the survey physically tiring as there was a lot of swimming around, particularly for those members of the team who were moving the survey poles. The Royal Navy ensign flying over the wreck (which wasn't there on our previous trip) was a poignant reminder that this wreck is a war grave as well as being a historic place and we ensured that we showed the utmost respect throughout all dives and used the greatest care not to disturb this special site.

All photos needed to be taken at a consistent depth and after our first run of photos we realised they needed to be taken in a consistent orientation to make it easier to match them up. We also had to use a scale rule to help establish the scale of the wreck and iron out any differences in the depth of the photographer on different runs. After the first dive, we added a tape measure laid out in a straight line on the wreck as a means of helping to line up the individual photos.

The visibility was not as good as on the previous expedition, which meant we had to be a lot closer to the wreck and take many more photos of it to get a full coverage. Annette learned the basics of the Site Recorder programme on the NAS courses and built on this during the expedition. She also taught other members of the expedition the basics of how to use the software.

Diving

Below is a summary of the dive sites on both weeks. Dive log sheets can be found at Appendix C. A sample of the Dive Site Reporting Logs, which we used to record our findings, is at Appendix F.

Day One – 7 August 2011 Due to strong north easterly winds, we were confined to the area surrounding Balta today, returning to Baltasound for lunch and to fill cylinders. In the morning, we dived the E-49, a site familiar to several divers, as a check dive. In the afternoon, we explored the area around Huney and split into two groups, diving two new scenic dive sites.	
Site	E-49 – East Unst
Position from GPS	60°44.213N 000°47.930W
Launch	Baltasound
Distance to site	2.0 nautical miles
Weather	North-Easterly Force 6
Slack	Can be dived at any time, can be small amount of current on wreck, particularly on a spring
Depth	33 metres to seabed. Wreckage rises maximum 1.5 metres above seabed
Visibility	20 metres
Surface Notes	The wreck is difficult to see on the echosounder, however if a shot is dropped on the mark the wreck will be found.
Description	This site is largely sheltered, except in a strong north-easterly wind. The wreck of the E-49 is a protected war grave. Before diving we informed the police at Unst as a courtesy. Laid out on white sand, the site had excellent visibility and also has a large number of fish including ling, squat lobsters and prawns in situ.
Site	South East Huney – East Unst
Position from GPS	60°43.954N 000°48.562W
Launch	Baltasound
Distance to site	2.4 nautical miles
Weather	North-Easterly Force 6-7
Slack	Dive at any time
Depth	Max depth 25 metres
Visibility	15 metres

Surface Notes	Drop in close to cove, and advise divers to swim South. Beware of uncovering rocks on left and right side of cove. Well sheltered site.
Description	Wall down to 18m, then seabed slopes down to 25m with small gullies and crevices. The wall is covered in kelp down to 18m, however there is abundant marine life among the kelp, including devonshire cup coral, brittle stars, squat lobsters, prawns and sponges.
Site	Whale Geo, Huney – East Unst
Position from GPS	60°43.916N 000°48.640W
Launch	Baltasound
Distance to site	2.6 nautical miles
Weather	North-Easterly Force 7
Slack	Appears to be diveable at any time.
Depth	5-30 metres
Visibility	10-15 metres
Surface Notes	Although it was calm underwater, on the surface the wind increased to Force 7 – this site isn't suitable for winds higher than this.
Description	Large boulders and gullies from 5m to 18m, then slopes down to 30m with large boulders. Large number of prawns, sea hares, nudibranches, anemones and brittlestars covering all surfaces. A fantastic dive site, especially given the conditions!

Day Two – 8 August 2011

Today we were faced with biting North-Easterly Force 8 winds and howling rain. It became apparent that the weather was due to remain extremely windy for at least 24 hours and there were huge swell, and therefore we decided not to dive today for safety reasons. Instead, we walked at Hermaness nature reserve, and ran a compressor operator course.

Day Three – 9 August 2011

Today the wind had 'dropped' to a North-Westerly Force 6. We had hoped that the change in direction may allow us access further out along the east coast, however the strong swells still coming in prevented us from leaving the protection of the area around Baltasound. We therefore further explored the area around Huney and Balta to dive two new dive sites, returning to Baltasound for lunch.

Site	Lanca Skerry – South Huney, East Unst
Position from GPS	60°43.858N 000°48.729W
Launch	Baltasound
Distance to site	1.5 nautical miles
Weather	North-Westerly Force 6
Slack	Appears to be diveable at any time
Depth	10-27 metres
Visibility	10-15 metres
Surface Notes	Drop divers in east of Lanca Skerry point. This site is well protected in NW winds. There are seals present on land.
Description	Rocky reef and boulders, then a sandy seabed sloping to 27m. Large amounts of macro life and brittlestars. Many lobsters, crabs, sponges and anemones.
Site	Salta Skerry – SW Balta Island, East Unst
Position from GPS	60°44.426N 000°47.826W
Launch	Baltasound
Distance to site	2.0 nautical miles
Weather	North-Westerly Force 6
Slack	Dive at any time
Depth	Max depth 27 metres
Visibility	8-10 metres
Surface Notes	Drop in at 15m to avoid the kelp and for the best life, SW of the Balta lighthouse opposite the cleft in the cliff. Site is well sheltered.

Description	A wall from 13 to 18m, and gullies from 10m to 18m and large boulders. Slopes down to a sandy seabed at 27. Huge amounts of life. In the sandy gully the visibility disappeared due to a large number of fry!

Day Four – 10 August 2011	
The weather had dropped to a NW Force 3-4 today, allowing us to explore further. We decided to head to South Unst, and were finally able to reach the West coast as the wind changed direction to the NE later on in the day. We were able to find two new and excellent sites and explore the West coast, marking positions along the uncharted areas and noting suitable dive sites. It was certainly worth the wait! We based ourselves in Uyeasound on the south coast, and were given permission to moor there overnight. Not content with just two world class dives, Warwick and Rory did a third dive on the south coast for a drift dive.	
Site	SW Haaf Gruney – South Unst
Position from GPS	60°39.546N 000°50.080W
Launch	Baltasound
Distance to site	7.0 nautical miles
Weather	North-Westerly Force 3-4
Slack	Appears to be diveable at any time, especially after HW Lerwick
Depth	10-30 metres +
Visibility	10-15 metres
Surface Notes	Drive due north from marks until find the 20m drop off, drop divers in about 16m. Divers should swim SW for depth. We saw seals and porpoises on the surface.
Description	Rocky reef down to 20m, then drops off quickly sloping to about 30m. Many crevices with squat lobsters, prawns and eels. Sandy bottom at 30m had several large flat fish. There was also a large amount of brittle and feather stars. An excellent site.
Site	Valaberg, Flubersgerdie – West Unst
Position from GPS	60°47.317N 000°57.183W
Launch	Uyeasound
Distance to site	10.0 nautical miles
Weather	North-Easterly Force 3-4
Slack	Appears to be diveable at any time.
Depth	Max depth 33 metres +
Visibility	15 metres +
Surface Notes	Fantastic scenery with stunning coastline, seals, puffins, gannets and guillemots. Marks are on a gully from 15m to 30m – shot top of gully at 15m.
Description	Fantastic underwater topography makes this a world class dive site. Gullies and walls from 15m-30m, and many large boulders. Rock faces were covered in jewel anemones, dahlia anemones, dead men's fingers and sunstars, and there were many varieties of nudibranch present. We also spotted an angler fish.
Site	Winnaness – South Unst
Position from GPS	60°39.750N 000°54.730W
Launch	Uyeasound
Distance to site	2.0 nautical miles
Weather	North-Easterly Force 3-4
Slack	Drift dive (1.5 knots) 2.5 hours before HW Lerwick. Slack after HW Lerwick
Depth	23-29 metres
Visibility	10 metres
Surface Notes	There are fish farms in the area – avoid these and drop in anywhere at about 23m. DSMBs need to be used throughout dive if drifting.
Description	Shelving sandy seabed down to 29m. Large amounts of dogfish, velvet swimming crabs, and scallops. Maerl bed also present.

Day Five – 11 August 2011	
Today the weather remained stable, and so we made the most of it to again explore the West coast of Unst. Unfortunately, our echosounder broke just before our first dive, registering that we were constantly at 5m depth – which we definitely weren't! Luckily, we had explored the area well the previous day, and were able to drop divers in at a wall we had identified. This turned out to be a world class dive site. One of the divers came up from a normal dive with symptoms of DCI. O2 was administered and advice sought via the Coastguard – a decision was made to evacuate him to recompression facilities and he was sent via helicopter to Aberdeen for recompression treatment, where he made a full recovery. After this, it was getting later in the afternoon, and we needed to head back to Baltasound. We also had no echosounder, and hence decided to dive the E-49 again and shot it for the following week's surveying. We discovered that it is possible to shot the wreck successfully within 5 meters of the wreck without the echosounder!	
Site	Hevda Skerry – West Unst
Position from GPS	60°46.419N 000°57.310W
Launch	Uyeasound
Distance to site	10.0 nautical miles
Weather	North-Easterly Force 3-4
Slack	Appears to be diveable at any time
Depth	5-30 metres
Visibility	15-20 metres
Surface Notes	Apart from in a westerly wind, this is a well sheltered site. Above water scenery is magnificent. Drop in close to wall and tell divers to keep the wall on the right for the best dive. The gullies at the end of the dive were at 60°46.434N, 000°56.165W.
Description	A sheer wall from 5-20m. Kelp is down to 15m however there is still an abundance of life including large patches of jewel anemones. There is then a sloping boulder field down to a sandy bottom at 30m. Although interesting, the better dive is to keep on the wall at 20m and swim with it on your right. You then reach large gullies and enormous boulders from 5-27m, caked with life such as jewel anemones and dead men's fingers, and with nudibranch and lobsters abounding. A world class site.
Site	E-49 – East Unst
Position from GPS	60°44.213N 000°47.930W
Launch	Baltasound
Distance to site	2.0 nautical miles
Weather	North-Easterly Force 4
Slack	Can be dived at any time, can be small amount of current on wreck, particularly on a spring
Depth	33 metres to seabed. Wreckage rises maximum 1.5 metres above seabed
Visibility	20 metres visibility
Surface Notes	See day one
Description	See day one

Day Six – 12 August 2011	
Today the wind had dropped to a Force 3 and had finally swung away from the north to the east. We decided to see if we could make it to the North of Unst, and managed to dive Muckle Flugga, in our opinion the best dive in Unst – and possibly the world! In the afternoon we continued our explorations with a fantastic new nature dive on the East coast, before washing off our kit, and heading to the pub for a much deserved drink, with the knowledge that despite challenging weather we had managed to dive on all four sides of Unst.	
Site	NW Muckleflugga – North Unst
Position from GPS	60°51.240N 000°53.329W
Launch	Baltasound
Distance to site	9.6 nautical miles
Weather	Easterly Force 3
Slack	Slack is 30 minutes before HW Lerwick. Normally slacks are short, however slack lasted over an hour today- this seems to be unusual based on previous experience and slacks recorded during week two of the expedition. But we weren't complaining.
Depth	Maximum depth 30 metres

Visibility	15 metres
Surface Notes	With strong and complex currents surrounding Muckle Flugga, and multiple rocks, this site calls for cautious boat handling. This is not a dive for decompression as divers could be swept into the rocks. Divers must be told that if they drift off the wall, they must put up a DSMB and end the dive. Above water, the area is stunning – soaring sheer cliffs and puffins, gannets and skewers surround you.
Description	A large gulley from the surface down to about 30m. Every surface is carpeted with life. A real contender for the top UK dive. There are strong up and down currents and swells on this site at most times and complex currents travelling in different directions. This is a site for experienced divers only.
Site	South Nev – East Unst
Position from GPS	60°45.920N 000°48.470W
Launch	Baltasound
Distance to site	1.9 nautical miles
Weather	Easterly Force 3
Slack	Can be dived at any time
Depth	6 - 30 metres
Visibility	10 metres
Surface Notes	Well sheltered cove, except in a strong NE/E wind.
Description	Inshore, a series of walls and canyons from 6m – 20m, covered in kelp forest and with plenty of life including ling, prawns, scorpion fish and nudibranch. Then a rocky reef and large boulders, sloping down to 30m and a sandy / pebbled seabed. This makes a lovely nature dive as a second dive.

Day Seven – 13 August 2011
Today was the handover day – both teams met in Lerwick for a briefing and handover meeting, before week one headed to a live music bar in Lerwick and week two headed up to Unst.

Day Eight – 14 August 2011	
With still no echo sounder, the first dive of the day was to Muckleflugga. In the afternoon we headed to North Holms, and dived a new site there which looked promising from the chart, which proves that you really can just dive anywhere in Unst and have a great dive!	
Site	NW Muckleflugga – North Unst
Position from GPS	60°51.240N 000°53.329W
Launch	Baltasound
Distance to site	2.5 nautical miles
Weather	Westerly Force 3
Slack	Slack is 30 minutes before HW Lerwick and lasted about 30 minutes
Depth	Maximum depth 30 metres
Visibility	10 metres
Surface Notes	See day six
Description	See day six – except a shorter slack time!
Site	North Holms – West Unst
Position from GPS	60°46.994N 000°57.423W
Launch	Burra Firth
Distance to site	7.5 nautical miles
Weather	Westerly Force 3
Slack	Dive at any time
Depth	30 metres +
Visibility	10 – 15 metres – better at depth
Surface Notes	Rocky island in a large bay
Description	Pinnacles, walls, crevices and gullies. Kelp parks cover the many boulders. Large lobsters, multiple prawns, dogfish, jewel anemones and shoals of saithe. Much juvenile life.

Day Nine – 15 August 2011	
With still no working echosounder, two divers explored the south side of Muckleflugga, while other divers explored the most Northern dive site in the UK. After an afternoon dive in Burra Firth, divers surfaced complaining of headaches and nausea. The symptoms suggested problems with the air. As the filter on the compressor had been changed the day before, divers were treated with O2 and the compressor taken out of use. The air was dumped from all cylinders but one, to be tested after the trip. The echosounder had arrived and was fitted during the evening, and cold water swimmer Annette became the first woman to swim around Muckleflugga! Brrr.	
Site	Tipta Skerry – North Unst
Position from GPS	60°51.096N 000°53.290W
Launch	Burra Firth
Distance to site	2.5 nautical miles
Weather	South-Westerly Force 2
Slack	30 minutes before HW Lerwick, however likely to be slack at other times as well
Depth	8 – 24 metres
Visibility	10 metres
Surface Notes	The 'sheltered' side of Muckleflugga is shallow – beware of rocks.
Description	The south side of Muckleflugga is very shallow, and it was a long swim to find the 24 metres of depth, with kelp forest for the majority of this. There were a lot of Pollack.
Site	NW Outstack – North Unst
Position from GPS	60°51.658N 000°52.361W
Launch	Burra Firth
Distance to site	2.9 nautical miles
Weather	South-Westerly Force 2
Slack	Slack was at HW Lerwick, 30 minutes later than predicted. Slack is short – about 30 minutes only
Depth	35 metres
Visibility	15 + metres
Surface Notes	The most northerly point of the UK, this small island is seething with skuas, gannets and puffins. Care must be taken for underwater rocks in the area.
Description	A sheer wall down to 28 metres leads you into a gully, with the opposite wall rising to 13m. Both sides are covered with jewel and dahlia anemones, crustacea, nudibranch, dogfish, flatfish and blenny. There are strong and complex currents and this is for experienced divers only. A top UK dive.
Site	Da Uda Cave – North Unst
Position from GPS	60°49.825N 000°51.185W
Launch	Burra Firth
Distance to site	0.5 nautical miles
Weather	South-Westerly Force 2
Slack	Can be dived at any time
Depth	10 metres in the cave, 20 metres outside
Visibility	10 metres
Surface Notes	One of the entrances to the cave is visible on the surface – drop divers in here.
Description	H-shaped cavern system with several long passageways to explore. No currents. Very sheltered from all but northerly winds. There are four exits to the caves, three of them at 20m and one just showing above water to the east. After swimming through the cave, the dive was continued on the 20 metre wall. Squat lobsters, butterfish and sunstars were seen.

Day Ten – 16 August 2011
With the compressor out of action, diving today was cancelled. The day was spent sourcing an alternative compressor, and driving to Lerwick to get air fills from MV Valkyrie which was based there for the week. The team also went on a walk, and training was completed.

Day Eleven – 17 August 2011 With the wind coming from the south, a working echosounder, and air in the tanks, the aim of the day was to locate deep walls on the North coast. Two new excellent sites were found, despite the fog rolling in. The day ended with two volunteers making the long round trip to Lerwick for air again, whilst other members of the team managed to find a small electric compressor to hire from a fish farmer on Unst.	
Site	Humla Stack, Hermaness – North Unst
Position from GPS	60°50.521N 000°54.043W
Launch	Burra Firth
Distance to site	3.5 nautical miles
Weather	South-Westerly Force 2
Slack	An inshore current was present but this didn't prevent diving. Can be dived anytime
Depth	32 metres
Visibility	15 metres
Surface Notes	Drop in near arch in cliff.
Description	Sheer walls and gullies, with boulders at the seabed. Covered in deadmen's fingers, plumose, dahlia and jewel anemones and shoals of saithe.
Site	NW Outstack – North Unst
Position from GPS	60°51.658N 000°52.361W
Launch	Burra Firth
Distance to site	2.9 nautical miles
Weather	South-Westerly Force 2
Slack	Again, slack was at HW Lerwick, 30 minutes later than predicted
Depth	29 metres
Visibility	15 + metres
Surface Notes	See Day 9.
Description	See Day 9.
Site	Dragon's Mouth, NW Headland of Burra Firth – North Unst
Position from GPS	60°50.704N 000°52.442W
Launch	Burra Firth
Distance to site	1.6 nautical miles
Weather	South-Westerly Force 2
Slack	Various currents moving in different directions
Depth	26 metres maximum depth
Visibility	15 metres
Surface Notes	Drop in at the foot of the NW headland of Burra Firth.
Description	A sheer wall to 26 metres, with multiple pinnacles, caves and inlets. There was an abundance of life – including saithe, squat lobsters, prawns, goby, and sunstars.

Day Twelve – 18 August 2011 The weather took a turn for the worse today, preventing further exploration of the west coast. After an early morning dive on Muckleflugga to catch the last of the good weather, we drove round to the east to begin surveying the E-49. The day ended with a very lengthy filling session from the slow but much appreciated hired compressor.	
Site	NW Muckleflugga – North Unst
Position from GPS	60°51.240N 000°53.329W
Launch	Burra Firth
Distance to site	2.5 nautical miles
Weather	South-Westerly Force 3
Slack	Slack was at LW Lerwick
Depth	Maximum depth 30 metres
Visibility	10 - 15 metres
Surface Notes	See day six.
Description	See day six.

Site	E-49 – East Unst
Position from GPS	60°44.213N 000°47.930W
Launch	Baltasound
Distance to site	2.0 nautical miles
Weather	South-Westerly Force 5
Slack	Can be dived at any time, can be small amount of current on wreck, particularly on a spring
Depth	33 metres to seabed. Wreckage rises maximum 1.5 metres above seabed
Visibility	10 metres
Surface Notes	See Day One.
Description	See Day One.

Day Thirteen – 19 August 2011	
The final diving day of the trip was certainly a busy one, as we packed in five separate dives to give everyone a flavour of what the rest of Unst has to offer. The main aim of the day was to complete the surveying work on the E-49, and this was dived early in the morning, in the afternoon, and just before the sunset to allow for a long enough surface interval. Nitrox and rich decompression mixes were used to maximise time at depth. A new site was also found on Balta island, and both a wreck and a scallop dive on the south coast were squeezed in.	
Site	E-49 – East Unst
Position from GPS	60°44.213N 000°47.930W
Launch	Baltasound
Distance to site	2.0 nautical miles
Weather	Westerly Force 3
Slack	Can be dived at any time, can be small amount of current on wreck, particularly on a spring
Depth	33 metres to seabed. Wreckage rises maximum 1.5 metres above seabed.
Visibility	10 – 15 metres visibility
Surface Notes	See day one.
Description	See day one.
Site	East Balta Head – East Unst
Position from GPS	60°44.813N 000°47.063W
Launch	Baltasound
Distance to site	2.0 nautical miles
Weather	Westerly Force 3
Slack	Can be dived at any time, although there was a slight current
Depth	32 metres
Visibility	10 metres
Surface Notes	Drop off at eastern edge of Balta island. Head east for depth.
Description	A steeply sloping wall down to 30 metre gullies. Large boulders present at depth, with crevices and overhangs. Kelp down to 20 metres. A good amount of life was present.
Site	The Jane – South Unst
Position from GPS	60°38.461N 000°56.606W
Launch	Baltasound
Distance to site	8.0 nautical miles
Weather	Westerly Force 3
Slack	4-5 hours before HW Lerwick and 2 hours after HW Lerwick
Depth	22 metres maximum depth, the wreck rises 5 metres above the seabed
Visibility	8 metres
Surface Notes	The wreck was already buoyed when we arrived, however this can't be assumed.
Description	This wreck lies on a maerl bed. The wreck is not intact, however there are some large structures and swim-throughs present. The wreck is populated by some very friendly ballan wrasse, dogfish and scallops, and an enormous edible crab.

Site	Winnaness – South Unst
Position from GPS	60°39.750N 000°54.730W
Launch	Baltasound
Distance to site	8 nautical miles
Weather	Westerly Force 3
Slack	Drift dive (1.5 knots) 2.5 hours before HW Lerwick. Slack after HW Lerwick.
Depth	20 metres
Visibility	10 metres
Surface Notes	There are fish farms in the area – avoid these and drop in anywhere at about 20m. DSMBs need to be used throughout dive if drifting.
Description	See day four. Sea hares and flat fish also seen.

Breakdown of Costs

Organising a two week expedition to Shetland is not a cheap undertaking, and there were exceptional costs such as hiring compressors and O2. It was agreed therefore to charge an expedition levy of £100 per person on top of our normal £25 per day dive fee to the club, and to apply for a BSAC Expeditions Grant. We also used part of the money awarded to Clidive for the Peter Small Award to pay for Compressor Operator Training and Gas Blending Courses. Below is a full breakdown of costs over the two weeks. Additional costs for team members were flights (approximately £250 per person) and for the week one team, an extra nights accommodation in Lerwick to allow for a handover meeting (£30 per person). Receipts can be found at Appendix B.

Diving Costs		
Fuel for RIB		£1034.61
Compressor Hire and Air	Compressor hire, MV Valkyrie and Compressor, Unst	£587
Mooring, Unst	Baltasound	£20
Mooring, London	Penton Hook Marina	£35.10
O2	Hire of J-cylinders from BOC, via Plymouth BSAC	£200
Total Diving Costs: £1876.71		
Transport Costs		
Ferry, Aberdeen - Lerwick	2 x vehicles, 4 x drivers return cost, Northlink Ferries	£1398.80
Internal Shetland Ferries	Mainlaind – Yell – Unst	£107.20
Hire cars	Star Rent-A-Car, Sumburgh – 2 cars, one week each	£564.18
Fuel and hire cars	London to Unst, 2 x vehicles x 1212 miles return	£1307.99
Total Transport Costs: £3378.17		
Other Costs		
Accommodation	2 x self-catering cottages, Saxa Vord	£1840
Food		£1058.84
Equipment	Masking tape etc.	£34.56
Total Other Costs: £2952.16		
		Total Cost: £8188.28

Difficulties Encountered

We experienced significant difficulties which could have put the expedition into jeopardy. We were however still able to meet our expedition aims, due to the hard work and determination of the participants, and all came away with valuable experience and lessons learned.

- The weather was 'challenging' on the first week as you can see from the snapshot below, but not untypical! A bitter wind blew in from the north, and the constant changing of the wind from east to west blew us out completely one day and ensured that swells constantly headed down the east and west side of Unst for the majority of week one, blowing out many areas. It also meant that it was very cold in between dives, and hence we needed long surface intervals to warm up.

GFS 05.08.2011 12 UTC	Sa 06. 04h	Sa 06. 07h	Sa 06. 10h	Sa 06. 13h	Sa 06. 16h	Sa 06. 19h	Sa 06. 22h	Su 07. 04h	Su 07. 07h	Su 07. 10h	Su 07. 13h	Su 07. 16h	Su 07. 19h	Su 07. 22h	Mo 08. 04h	Mo 08. 07h	Mo 08. 10h	Mo 08. 13h	Mo 08. 16h	Mo 08. 19h	Mo 08. 22h	Tu 09. 04h	Tu 09. 07h
Wind speed (Bft)	5	5	5	5	4	4	3	2	4	4	6	6	6	7	8	8	8	7	7	6	6	6	6
Wind gusts (Bft)	6	6	6	5	5	4	3	2	4	5	7	7	7	8	9	9	9	8	7	7	6	6	6
Wind direction																							
*Temperature (°C)	13	13	13	13	13	13	13	12	12	13	13	13	13	13	13	13	12	12	12	12	12	11	11

- The echosounder broke on day five of week one. We immediately ordered a new one to be express delivered to Unst. This didn't cause significant problems as we had done extensive exploration for possible dive sites already, however it did prevent us from discovering as many new sites as we had hoped. A cheap spare would be ideal for future expeditions.
- The compressor fault caused significant problems, as detailed above. In future we would seriously consider taking a backup compressor. Luckily this didn't cause serious injury and only lost us one day of diving. In the future we would again take oxygen for nitrox as this added a safety margin and meant we had lots of oxygen available, and a carbon monoxide tester which have recently come onto the market.

Section Four: Expedition Achievements

Triumph through adversity


Bad weather didn't dampen our spirits!

The expedition was not without its difficulties, as you can see in the above section. However, the teams pulled together and despite exceptional equipment failures and poor weather, we still managed to achieve our expedition aims. On the two days we were unable to dive, we ran training courses, and went for walks around the beautiful coastal path at Hermaness nature reserve.

Training and cascading knowledge


Compressor Operator training, week one

During the expedition, sports divers and dive leaders were able to benefit from joint dive planning experience with more experienced divers in a remote, unknown and exciting location. There was a broad spectrum of knowledge and skills, and the buddy system meant that these were cascaded, for example boat handling and maintenance, dive planning in unknown locations, compressor use and blending, marine identification, and the logistics required to run a successful expedition. We also completed a large amount of training both prior to and during the expedition, with 33 new qualifications completed:

Training and Participants	
Compressor Operator	Dave Pickford, Nick Harrison, Chris Coles, Elaine Hendry, Bethan Young, Natascha Gewaltig, Cori Crider
Gas Blending	Ben Jaffey, John Davies, Annette Millar, Declan Daly, Chris Coles, Cori Crider, Dave Pickford, Nick Harrison, Elaine Hendry, Rory Budds, Mary Brown
Advanced Diver Theory + dive planning during expedition	Dave Pickford, Nick Harrison, Naomi Davies, Elaine Hendry, Paul Reid
Chartwork and Position Fixing	Natascha Gewaltig, Naomi Davies, Bethan Young
NAS Part 1: Certificate in Foreshore and Underwater Archaeology	Annette Millar
Seasearch Observer Course	Bethan Young, Naomi Davies (qualifying dives), Paul Reid (qualifying dives), Mary Brown (qualifying dives), Dave Pickford (qualifying dives), Warwick Mason (qualifying dives), Rory Budds (qualifying dives)
RYA Day Skipper	Mary Brown, Warwick Mason
RYA VHF Radio	Chris Coles, Natascha Gewaltig
Preparation for Diver Cox'n	Dave Pickford, Chris Coles, Natascha Gewaltig, Bethan Young, Paul Reid

Dave practises his boat handling skills

Naomi and Paul plan towards their Advanced Diver

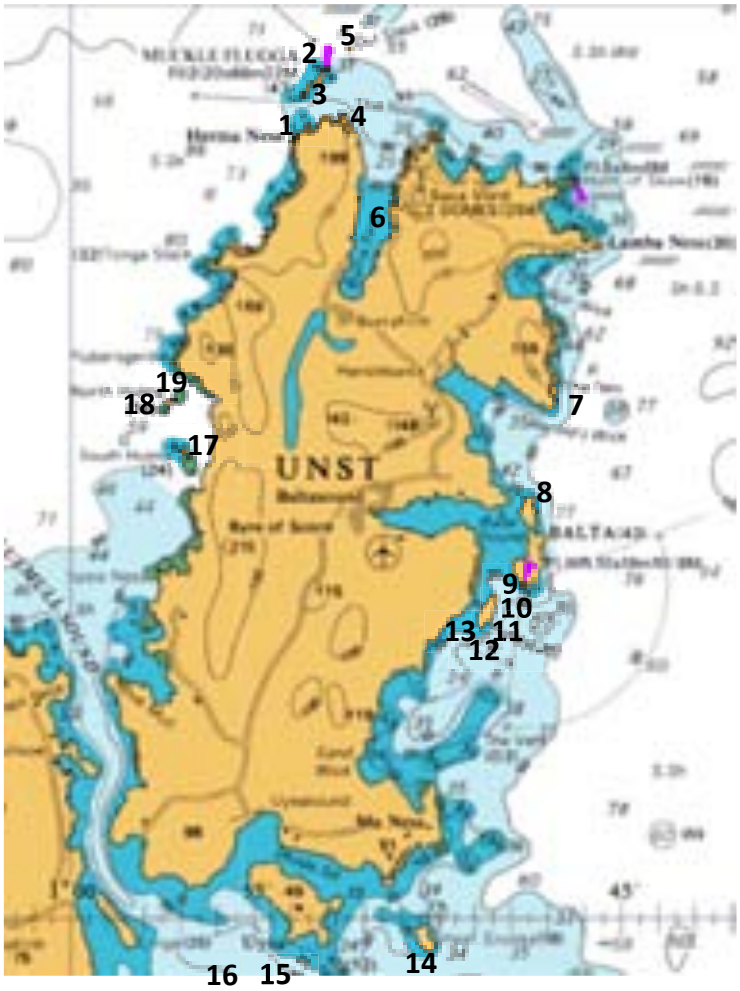
Promotion of Area

We hope that our expedition will further promote the area of Shetland to the diving community, through the BEGS expedition report which will be available on the BSAC website. Our blog also attracts many visitors and was updated daily during the expedition. We have also updated and extended our Dive Guide to Unst, which will be available on our website at www.clidive.org.

New Dive Sites Discovered

We discovered 14 new dive sites on the expedition and re-visited 5 sites, confirming slack times and completing further surveying work:

Dive Site	Max Depth	Location	
North Unst			
1. Humla Stack	32m	60°50.521N	0°54.043W
2. Muckleflugga	30m	60°51.240N	0°53.329W
3. Tipta Skerry	24m	60°51.096N	0°53.290W
4. Dragon's Mouth	26m	60°50.704N	0°52.442W
5. Outstack	35m	60°51.658N	0°52.361W
6. Da Uda Cave	20m	60°49.825N	0°51.185W
East Unst			
7. South Nev	30m	60°45.920N	0°48.470W
8. East Balta Head	32m	60°44.813N	0°47.063W
9. Salta Skerry	27m	60°44.426N	0°47.826W
10.E-49	33m	60°44.213N	0°47.930W
11.SE Huney	25m	60°43.954N	0°48.562W
12.Whale Geo	30m	60°43.916N	0°48.640W
13.Lanca Skerry	27m	60°43.858N	0°48.729W
South Unst			
14.SW Haaf Gruney	30m	60°39.546N	0°50.080W
15.Winnaness	29m	60°39.750N	0°54.730W
16.The Jane	22m	60°38.461N	0°56.606W
West Unst			
17.Hevda Skerry	30m	60°46.419N	0°57.310W
18. North Holms	30m	60°46.994N	0°57.423W
19.Valaberg	33m	60°47.317N	0°57.183W



Scientific Achievements

During the expedition, 15 different sites were recorded for Seasearch, the majority of which were on sites which had not been recorded before. Particular findings of note (aside from the usual array of anemones, molluscs, bryozoans, echinoderms, squirts, hydroids, fish, crustaceans, sponge found at every site!) were:

- Kelp forests were often present down to around 15 – 20m
- Large carpets of jewel anemones on many sites, even those protected from currents
- Large number and variety of nudibranch and sea hares
- Large numbers of juvenile humpback prawns and adult humpback prawns on every site

Surveying the E-49

For the E-49 survey, Peter Holt has continued to give us advice and help us with the post-expedition work. He has looked at the photographs and has said that they are useable and will tidy up well in Photoshop. We are currently trying to find the original full plans of the E-class submarine which will enable us to more accurately compose the photo mosaic of the site. It will take some time to assemble the photo-mosaic but Peter has offered to continue giving us advice and help with this.

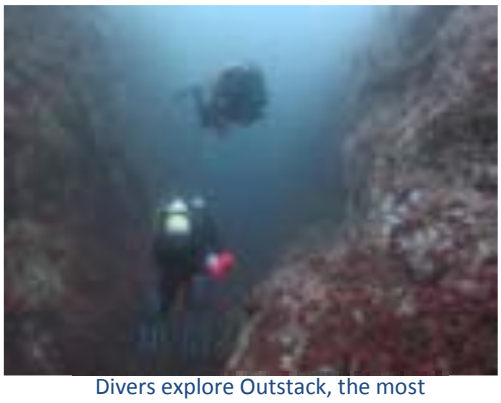
The photo-mosaic will provide an interesting and realistic overview of how the site looks now. This will be of interest to other divers, heritage organisations, the Navy and possibly some descendants of those who were lost on the wreck. If we are able to locate the original plans, this will also help to show how the wreck has changed from how it originally looked and how it looks now. We have contacted several museums who have expressed an interest in receiving a copy of the final survey report. These are the Royal Navy Submarine Museum in Gosport, the Shetland Museum and Archives in Lerwick and the Unst Heritage Centre.

Section Five: Summary

Taking part in the expedition has encouraged participants to organise and take part in further expeditions to rarely dived locations around the UK. Club members who weren't able to attend are already talking about becoming 'dived up' so that they can take part in the future. As with any expedition, not everything went entirely to plan, but we all left with a feeling that there is still so much more to explore in this magical location.

The Trip in Numbers

- 14 new dive sites discovered
- 164 individual dives
- 33 new qualifications
- More than 50 hours spent filling cylinders
- 15 Seasearch surveys completed
- Force 8 winds and multiple changes in wind directions
- 16 happy and tired divers!



Divers explore Outstack, the most northerly point of the UK

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- Ian, Fish Farmer in Uyeasound who hired us his compressor at short notice
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- Saxa Vord bar staff for ordering us a cask of Unst ale and for bearing with our dive briefings
- The people of Unst, for being helpful and welcoming throughout our stay
- The British Sub Aqua Club