



Darwin Initiative Overseas Territories Challenge Fund Final Report

This report should be completed and submitted within a month of agreed end date of project

Darwin Ref Number	EIDCF013
Darwin Project Title	South Atlantic wilderness; assessment of Tristan da Cunha's seabed biodiversity
Country (ies)	UK, Tristan da Cunha, Falkland Islands
Award holding Organisation	British Antarctic Survey
Partner Organisations	Dept Conservation, Tristan da Cunha Government Shallow Marine Surveys Group, Falkland Islands
Grant Value	£XXX
Start/end date	1 st April 2012-30 th July 2013
Author(s), date	David Barnes, Oliver Hogg, Trevor Glass, Paul Brickle

1. Challenge Fund Background

There are just two temperate, mid-oceanic island archipelagos in the Southern Hemisphere; little is known of seabed biodiversity below 40m at either. One of these is the UK overseas territory of Tristan da Cunha (TdC) in the mid South Atlantic. This area is shown in Figure 1.

With no airport and low human impact, the perceived importance of the biodiversity of the Tristan Archipelago is underlined by its World Heritage Site status. A previous Darwin-funded project (DI post-project EIDP023) investigated its shallow depths, but the state of most of its marine environment and native species (below diving depths) is virtually unknown. The Challenge fund grant was sought to support a science cruise, JR287, and collaboration between the British Antarctic Survey, Conservation Department of the Tristan da Cunha Government and the Shallow Marine Surveys Group based in the Falkland Islands. The Science cruise would map the seabed below the more-studied shallows and take photographic and trawl samples to identify how biodiversity was distributed in the region.

The Challenge fund of £25k employed a biogeographer, Oliver Hogg, to search and collate the records of past samples and species found in the region in order to plan a strong sampling design for the research cruise. This he did well and the sample design achieved is shown in Figure 2.

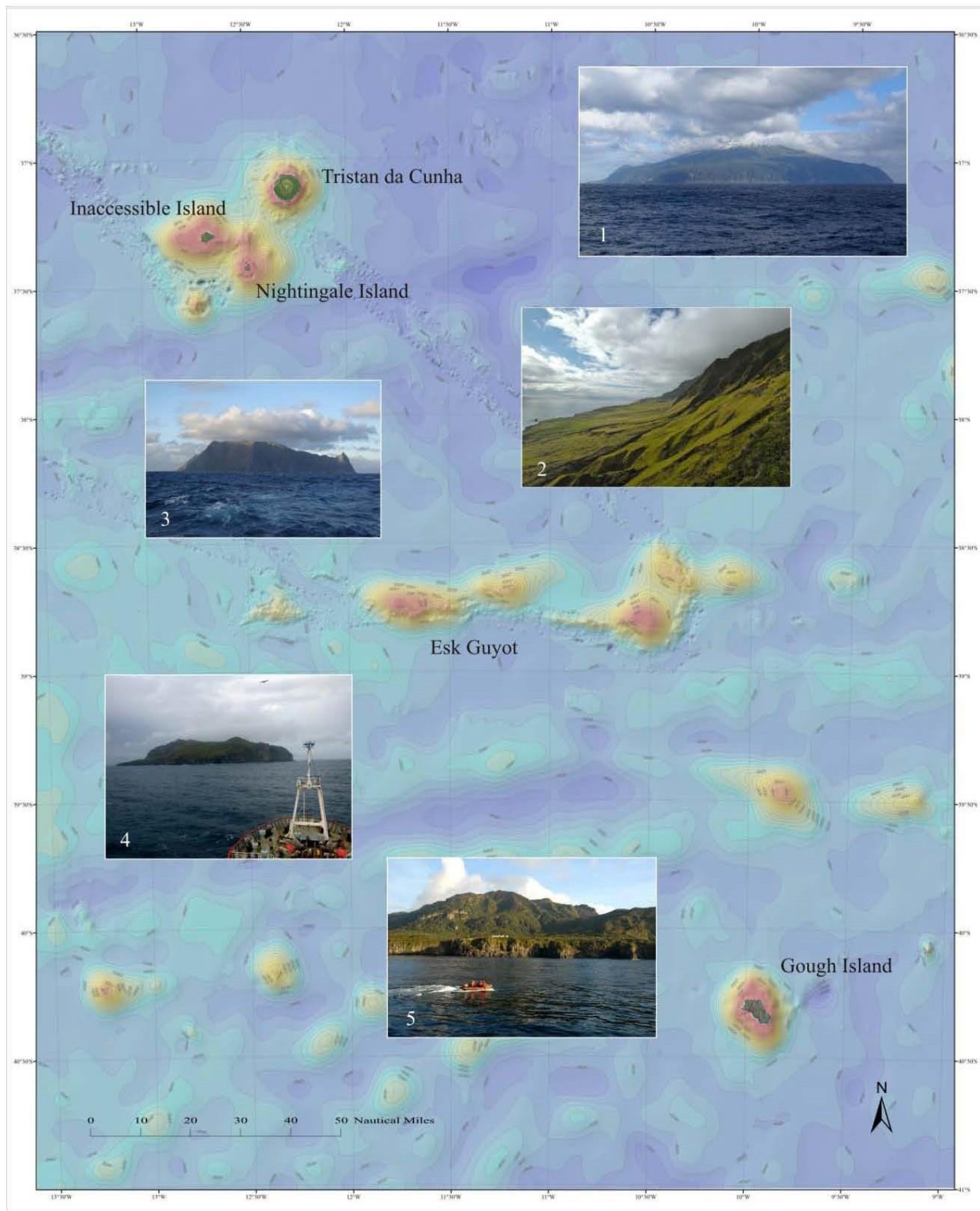


Figure 1 TdC archipelago. Inset photos: Tristan da Cunha: view from offshore (1) and from the 'base' (2); Inaccessible Island (3); Nightingale Island (4); Gough Island (5).

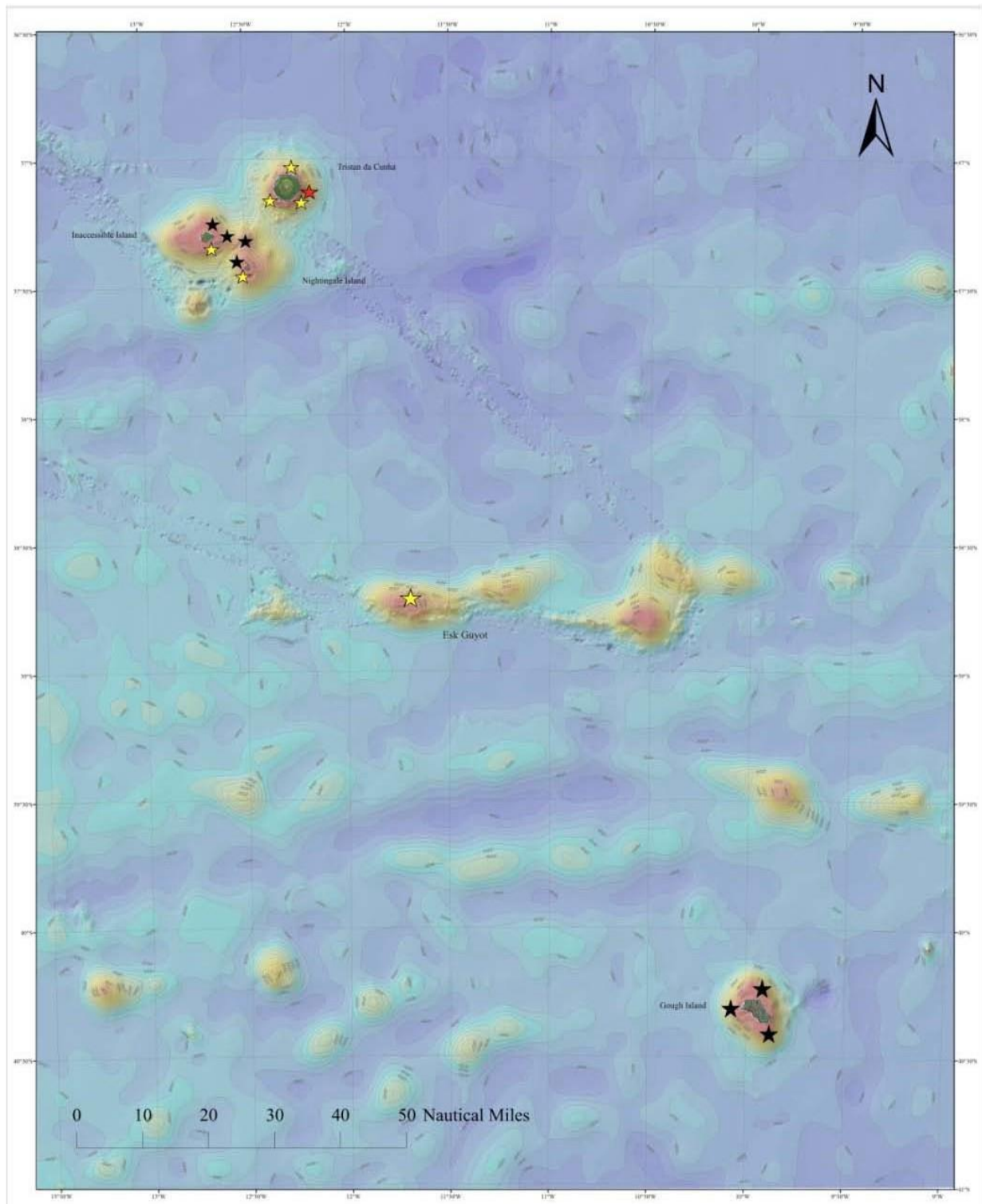


Figure 2 Achieved sample regime at TdC (black = Agassiz trawl, Rectangular mid-water trawl and deep camera; yellow = just camera, red = Agassiz trawl and deep camera).

2. Challenge Fund Activities

Oliver Hogg sought out and catalogued existing records of marine biodiversity around the Tristan Archipelago. From these he plotted an idealized sampling design for research cruise JR287. On completion of its Antarctic work in the austral summer of 2012/2013, the oceanographic research ship RRS *James Clark Ross* diverted from its usual path to reach Gough Island on 18th May. At each of Gough, Tristan da Cunha, Gough, Nightingale and Inaccessible Islands we attempted to

characterise the seabed from ~100-400m depth and the biota present. A small team of scientists were assembled which included representation of each of the three partner organizations collaborating on this grant, plus others.

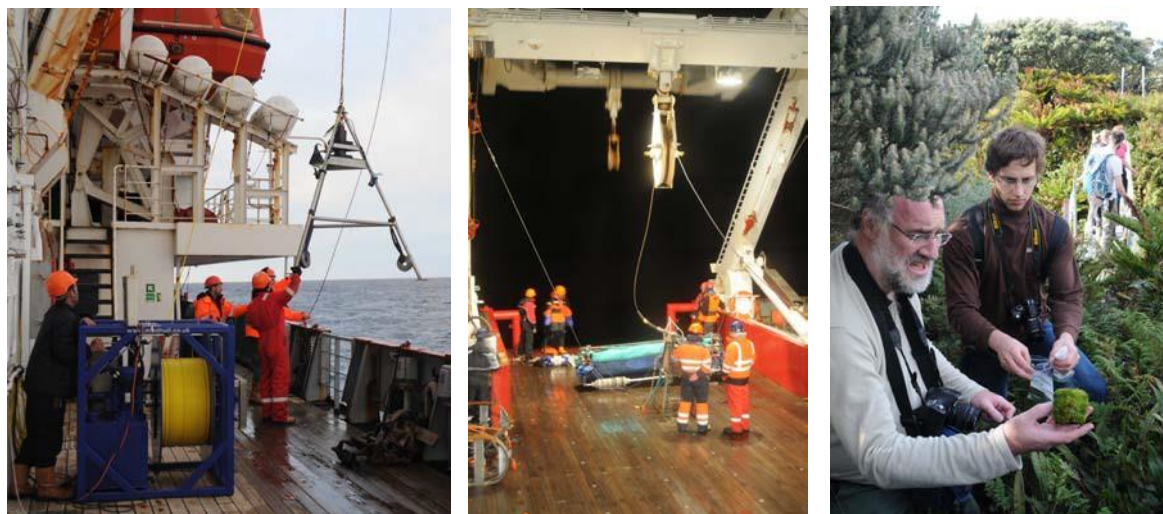


Fig 3 Deploying the camera lander (left), pelagic RMT net (centre) and collecting mosses (right)

We undertook 7 x 24hrs of sampling around the archipelago beginning at Gough Island and ending at Tristan itself. We used the following suite of apparatus: multibeam sonar swath was used to produce the first detailed bathymetric map of the surrounding seafloor (for Gough Island). A snapshot of water column physico-chemistry was gained using CTD, the benthos was imaged (video and stills) using a camera lander (Fig 3 left), multiple Agassiz trawls were carried out to sample megabenthos and finally pelagos and benthopelagic coupling were examined using a towed RMT8 net system (Fig 3 centre). The camera lander images (eg Fig 4 left) were stored for specialist analysis in UK. Specimens collected were photographed (eg Fig 4 centre), fixed and then preserved in 96% ethanol for later genetic analyses and additional specimens of similar morphotypes were frozen for later fatty acid and/or isotopic work. We also lowered the camera lander onto the top of the recently discovered seamount Esk Guyot, half way between Gough Island and the main Tristan da Cunha archipelago.



Fig 4 Tristan seabed 100m (left), a Caryophyllia coral (centre) and Inaccessible Is. shore (right)

Landings were made on three islands to collect terrestrial flora (Fig 3 & 4 right) and microfauna as well as intertidal biota, again to shed light on linkages with regions further south, and to provide baseline biodiversity data for some less charismatic groups (mosses, microarthropods) that nevertheless form a major component of these islands' biodiversity and importance. The people who undertook this work were;

DKA Barnes	BAS	Cruise leader
P Convey	BAS	Terrestrial ecologist
J Dömel	RUB	Molecular ecologist
J Edmonston	BAS	Computing support
P Enderlein	BAS	Moorings biologist
W Goodall-Copestake	BAS	Geneticist
E Hancox	SMSG	Intertidal biologist
O Hogg	BAS	Biogeographer
J Klepacki	BAS	Electronic engineer
C Moreau	BAS	Marine biologist
S Scott	PT	Marine biologist
G Stowasser	BAS	Trophic biologist

The organisations are British Antarctic Survey (BAS), Ruhr University Bochum (RUB), Shallow Marine Surveys Group, Falkland Islands (SMSG) and Pew Charitable Trusts (PT).

The main problems encountered were occasional extreme weather conditions limiting what gear could be deployed at certain locations and very rough and steep bottom topography on the seabed making collection of physical samples difficult (ripping nets etc).

The main achievements of the Challenge fund grant were the most comprehensive seabed mapping and sampling around the TdC Archipelago to date. This has provided years worth of work for biodiversity experts around the world to identify the nature and uniqueness of their fauna. A new species of salp has been found, described and shortly to be submitted in a paper. A cruise report covering all aspects of the voyage has been completed and is included as Annex 1.

3. Outcome & Impact of Challenge Fund

Getting the grant made a massive difference because it initiated a short cruise that other organizations were then prepared to invest in to make larger. Without the Challenge Grant we could not have gone but in the end we attracted six times as much money from other sources because of having the Challenge Grant. The question now is whether the main project to the TdC Archipelago is now needed so we will process samples before going ahead with the main proposal to see how effective we were at gaining good enough samples.

We had three setbacks. The first was a five day delay in timings and diversion to do some commissioned fishery work around South Georgia, South Atlantic. We were able to compensate for this by undertaking some equipment testing and personnel training whilst at South Georgia. The other setback was the late delivery of equipment to BAS for the planned deep camera update. As a result we had to leave UK without all the equipment to convert the electronic camera-lander to fibre optics. This meant that taking photographs of the seabed was much slower and weather prone than we would have hoped and required a larger team to operate it than we had planned. We therefore adjusted the rota of who did what and were still able to gain enough good images. We have just employed a biodiversity image analyst to start looking at these photographs to convert them into data – he starts 2nd Dec. Lastly we had two late changes in personnel but despite this everything work fine and all personnel got on well and were able to achieve something in their areas of science.

4. Lessons

A major part of why the voyage was so successful and there was so little weather ‘down-time’ was due to the pairing of our project with another which needed complimentary weather

conditions. That is, when it was too rough for us it was good for them and vice versa, so consideration of which projects to pair can greatly assist success.

5. Project Expenditure

Most of the project expenditure was matched funding (which is not included below). Planned matched funding was 53.3k but an additional 60k was won from The Pew Charitable Trusts after the award of the Challenge Grant and BAS contributed a bit more than planned so matched funding totalled ~115k. Below are the details of Challenge fund spending only.

Item	Budget for whole project*	Actual Expenditure	Variance** as a %	Comments
Travel Costs				Flights UK-Falkland then ASI-UK
Subsistence costs				
Overhead costs				
Operating Costs				
Capital Costs				
Other				
Salaries (specify by individual)				Employed for 1 mo extra Paid out of BAS funds Emily Hanox participation on cruise
TOTAL	25k	25k		

* please indicate which document you refer to if other than your project application or annual grant offer letter

** please explain any variance of +/- >10%

6. Other comments not covered elsewhere

None

Checklist for submission

	Check
Is the report less than 5MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project reference number in the Subject line.	Y
Is your report more than 5MB? If so, please advise Darwin-Projects@ltsi.co.uk that the report will be send by post on CD, putting the project reference number in the Subject line.	N
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	Y
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	N
Have you involved your partners in preparation of the report and named the main contributors	Y
Have you completed the Project Expenditure table fully?	Y

Do not include claim forms or other communications with this report.
