

EXECUTIVE COUNCIL

CONFIDENTIAL

Title of Report: Establishing a South Atlantic Environmental Research Institute (SAERI) in the Falkland Islands

Paper No: 264/11

Date: 14th December 2011

Report of: Head of Policy and Projects Director

1.0 Purpose

The purpose of this paper is to present to Honourable Members the South Atlantic Environmental Research Institute (SAERI) Feasibility Study and to propose a phased approach to the development of SAERI. SAERI aims to increase the level of scientific research undertaken in the Falkland Islands and the development of the location as an international research platform. The paper specifically seeks approval to progress with Phase 1 of SAERI over a three year period.

2.0 Recommendations

- (a) That Honourable Members approve in principle the phased approach to the development of the SAERI
- (b) That Honourable Members approve the implementation of Phase 1 of SAERI over a three year period, as detailed in this paper.
- (c) That Honourable Members approve the creation of 1.5 FTE posts within SAERI for a three year period.

3.0 Summary of Financial Implications

	2011/12	2012/13	2013/14	2014/15	2015/16	TOTAL
Operating Budget	(58,750)	47,500	42,500	(4,750)	(50,000)	(23,500)

4.0 Background

- 4.1 Executive Council have previously supported in principle (Paper 44/10, February 2010) the funding and establishment of a South Atlantic Environmental Research Institute (SAERI) that would provide an umbrella organisation for existing local research activities and aim to increase the volume of scientific research conducted in the Falklands Islands. The Institute would be uniquely positioned to become a key research centre for a broad range of environmental research in subjects including geology,

climate change, oceanography, inshore marine environment, fisheries and agriculture, biodiversity and renewable energy.

4.2 SAERI would be uniquely positioned to focus its research on the natural environment of the South Atlantic, with benefits for the Falkland Islands in terms of:

- localising work currently taking place overseas or undertaken by overseas contractors/researchers – retaining the economic value of the activity within the Islands;
- increasing the volume of scientific work undertaken in the Islands by gaining research funding directly or in collaboration with other institutions;
- reducing the costs of research activity by reducing the reliance on expensive overseas organisations;
- enhancing the value of local scientific activity through enabling academic activity to take place on the Islands, and improving efficiency through the co-ordination of existing facilities and assets;
- establishing a strong international identity for the Falklands Islands;
- increasing the Falklands' ability to leverage international environmental research funding and commercial consultancy contracts.

4.3 Following approval in principle to progress the initiative, the British Antarctic Survey (BAS) were commissioned to produce a Feasibility Study for the establishment of the Institute. The final report was received in May 2011 (Appendix A). The key conclusions of this work were:

- There are opportunities to pursue more environmental research in the Falkland Islands and the wider South Atlantic (and benefits to a combined strategy for co-ordinating research with South Georgia);
- Greater promotion of existing local research activity and potential is required in order to engage with collaborators and potential research funders around the world;
- There is a need for an umbrella organisation for the existing range of research groups operating in the Falklands. SAERI's role would be to expand on this base of activity (not compete with it) to lead to an overall increase in the volume of research being undertaken, and to increase international awareness of and involvement in environmental research in the Falkland Islands, South Georgia and wider South Atlantic;
- A phased approach to the establishment of the Institute is the most appropriate way forward, so as to minimise risks and financial commitments, and to enable on-going monitoring of the success of the Institute before progressing with further development of the facility.

4.4 The proposed Phasing is of SAERI is discussed below.

Phase 1: Establish the SAERI over an initial 3-year period (for which funding is sought within this paper)

4.5 Phase 1 will involve the establishment of the SAERI as a new organisation, with the appointment of a Director to provide strategic leadership of the initiative and to build linkages with research groups and agencies – both those currently operating in the Falkland Islands and promoting the Institute internationally. Key activities during Phase 1 will include:

- Appointment of a Director of SAERI to establish the new organisation and lead its implementation. To be based in the Falkland Islands. In order to attract the support of, and foster links with, international, high profile scientific institutions, the Director of SAERI will need to be well-regarded and credible within the international scientific community. The salary offered must be sufficient to attract an individual with the necessary combination of commercial, scientific and local knowledge to provide SAERI the best chance of success from the outset. A local Director of SAERI would be desirable as they would be best placed to communicate the Falklands wider messages and engage with locally-based partner organisations which are central to the Institute's success. However it is also essential that the individual have good external connections and be capable of raising the profile and reputation of SAERI on an international stage.
- SAERI Director to establish a Governing Board for the institute to include both local and international representation.
- Director to engage with existing local research groups to establish working relationships and to understand and catalogue the array of current research being undertaken on the Islands.
- Form partnerships with universities and research institutes.
- Establish and maintain an on-line database of Falkland Islands and South Georgia research – as a tool to raise awareness of the Institute and a platform to start to engage with the international research community.
- Establish a website for the SAERI to raise awareness and to promote the Institute and the research facilities available in the Islands, both at home and overseas.
- Co-ordinate access to the range of existing Government and non-Government research and laboratory facilities available in the Islands (including those at the Department of Natural Resources, KEMH and elsewhere).
- Establish the infrastructure needs of SAERI for Phase 2 to ensure that the Institute has a physical presence and the equipment necessary to attract research to the Islands, over and above that which already exists.

- Produce a Business Plan for SAERI, to include identification of key research priorities, future funding streams and potential commercial opportunities.
- 4.6 Initially the Director would be an employee of FIG, however the intention is that the post will be financed from research income generated by the Institute during Phase 2.
- 4.7 Accommodation for SAERI has been reserved at Stanley Cottage, sitting alongside the BAS offices. This will provide an initial base for the Institute, though it is envisaged that the facilities SAERI will offer will extend to the research laboratories and facilities that currently exist on the Islands (e.g. labs within Agriculture and Fisheries departments, and KEMH).

Phase 2: Access Research Funding and Consultancy Business (to be considered after successful completion of Phase 1)

- 4.8 Phase 2 will be dependent on the successful implementation of Phase 1 as proposed above and will require the Director to produce a Business Plan for the further development of SAERI. However, it is anticipated that Phase 2 will include:
- Attracting scientists and researchers to the Institute;
 - Consideration of the potential for FIG Agricultural and Environmental research to be conducted at the Institute (with the aim of achieving cost savings for FIG in the medium term);
 - Establishing working relationships with universities to supervise MSc and PhD students;
 - Applying for international research funding (and undertaking the subsequent research);
 - Competing commercially for environmental consultancy on the world market – generating income for SAERI and its partner organisations within the Falklands;
 - Providing fisheries consultancy for the Falkland Islands and South Georgia Governments.
- 4.9 Funding is not sought for Phase 2 at this stage. Full proposals will be developed by the SAERI Director as part of the preparation of the Business Plan. The Institute shall be revenue generating, and may allow some Government funded research to be externalised (such as fisheries and environmental research currently undertaken in house).
- 4.10 The consultancy arm of the Institute will be an important element in generating a revenue stream for SAERI. It is envisaged that consultancy work could be undertaken in a number of areas, perhaps with an initial focus

on undertaking Environmental Impact Assessments for the oil industry. Work to establish the consultancy arm should be progressed during Phase 1.

4.11 A number of local and international organisations have expressed initial support for the initiative

- Falklands Conservation
- Shallow Marine Survey Group (SMSG)
- Government House
- Government of South Georgia and the South Sandwich Islands (GSGSSI) – which has also pledged £10,000 in funding for Phase 1
- Aberdeen University (which already supports MSc and PhD students in the Islands)
- The Alfred Wegener Institute of Polar and Marine Research (see letter of support at Appendix B)
- The University of Otago, New Zealand
- British Antarctic Survey.

5.0 Rationale for Government Investment

5.1 The SAERI proposal addresses a number issues that will not be overcome without Government intervention, namely:

- The absence of any formalised public face to the raft of existing research being undertaken on the Islands means that the outside world has limited information regarding such activity in the Falkland Islands. Establishing the SAERI would overcome this, providing greater information and knowledge on environmental research activities (and opportunities) in the Falklands and increasing international awareness of the Islands.
- Environmental research involves scientific expertise and investment in equipment. There is little incentive for an individual company to bear the cost of this investment. To achieve the desirable goals of improved environmental management, the Government must enhance access to any such beneficial research.
- The environmental research that the Institute will generate will not be produced by the private sector, as no one company could seek to capture the full benefits of the research. The enhanced social and environmental benefits can only be achieved through Government intervention.

6.0 Driving Forward the Economic Development Strategy (and Islands Plan Objectives)

- 6.1 The Economic Development Strategy (EDS) for the Islands highlights the importance of developing new economic activities to diversify the economy and generate new income streams to reduce reliance on the core sectors of agriculture, fishing and tourism. The SAERI proposal offers an opportunity to develop a sustainable knowledge-based activity – and one which has a clear synergy with the Islands’ strengths in the environment and conservation.
- 6.2 Phase 1 of SAERI would represent a significant step forward in the development of new industries on the Islands, and the first major step towards the creation of new economic activities to support future economic growth. The proposal builds on the existing strengths of the Islands in research activities, providing a building block for further development and raising the image and reputation of the Islands internationally.
- 6.3 In doing so, SAERI would contribute directly to the Islands Plan objectives of:
 - Economic diversification and enhanced GDP rates
 - Continuing positive public awareness in the UK and overseas.

7.0 Direct Benefits to the economy

- 7.1 The phased approach to the initiative means that the benefits will be incremental. The direct economic benefits of Phase 1 are modest in comparison to the longer-term impacts that are achievable - though it is noteworthy that the estimated economic benefits of Phase 1 alone will exceed the implementation costs.
- 7.2 In the medium-term the Institute has the potential to be a significant contributor to economic growth, generating income and expenditure associated with researchers based in the Islands and from visiting teams of researchers that would be based on the Islands for fixed periods to conduct research for the Institute, or for others under the banner of SAERI.
- 7.3 Quantifying these benefits is difficult due to the uncertain level of research income that may be generated. This is an issue that will be explored in detail in preparing a business plan for Phase 2 of SAERI. This said, preliminary estimates produced by the Policy Unit suggest the following impacts may be achievable:
 - **Direct impacts** will arise as a result of output generated and persons employed in the day-to-day operation of the SAERI in the Falkland Islands:
 - Phase 1 will result in the employment of 1 full-time Director and a part-time administrator.

- Phase 2 could result in an additional 5-10 full-time researchers employed at SAERI (and potentially even more as the Institute establishes an international reputation and secures additional research funding from overseas).
- **Indirect Impacts** will arise in output and employment generated in businesses that supply the materials and services used by SAERI, and from the expenditures of visiting research teams:
 - **Phase 1**
 - Impacts will include the local expenditure of the 1.5 full-time employees. Based on anticipated salaries and typical expenditure patterns in the economy, it is estimated that Phase 1 will generate almost £100,000 in local expenditure over the three year period.
 - In addition, it is estimated that during Phase 1 SAERI will attract almost 200 visiting researchers and scientists, either on short-stay fact-finding missions or for longer-stay research projects. Such visits will also generate benefits to the local economy through expenditure incurred whilst on the Islands. Such benefits are estimated to amount to £168,000 during Phase 1.
 - Additional local benefits can be derived if web-site design and hosting is undertaken locally, amounting to approximately £10,000 in Phase 1.
 - **Phase 2**
 - Phase 2 of SAERI has the potential to generate significantly greater economic benefits to the Islands with a greatly increased staffing and visitor presence generating additional expenditure in the economy. Conservatively assuming an additional 5-10 researchers will be based at the facility suggests additional local expenditure of almost £200,000, supporting 3 local jobs.
 - Increased volumes of visiting research teams can be expected to generate an additional £480,000 in local expenditure each year.
 - Increased operating costs of the facility will generate increased demand for local services and supplies. Additional supplier expenditure of £25,000 in the local economy can be expected.
- **Induced** output and employment will be created from further rounds of spending in the local economy derived from workers' and visitors' spend. This has been conservatively estimated in the region of two additional local jobs.

7.4 In summary:

- Total economic benefits of Phase 1 are estimated to be £350,000 (compared to the total estimated cost of £296,500 i.e. the economic benefits of Phase 1 alone exceed the costs of implementation).
- The total economic benefits of Phase 2 are expected to be significantly greater, estimated in the region of £1.5m though this is considered a conservative estimate and will be subject to the production of a full Phase 2 Business Plan.

7.5 In addition to the operating impacts of the SAERI described above, further impacts can be expected to arise in the longer-term as a result of the outcomes of research conducted by the institute being applied e.g. through the implementation of strategic advice regarding fisheries management or environmental management. Such impacts, may well be significant in the future, though cannot be meaningfully quantified at this stage in the development of the SAERI proposal.

7.6 It is also noteworthy that the SAERI has the potential to generate demand for essential services which will help overcome some of the well-known barriers to development in the Islands. For example, securing a steady flow of additional air passengers in the form of visiting researchers will generate demand for increased air travel and increase the commercial viability of air services to and from the Islands.

8.0 Wider Benefits

8.1 In addition to the direct economic benefits, significant wider benefits would arise from the establishment of an environmental research institute.

8.2 *Science*

8.2.1 A single umbrella organisation for Falkland Islands science with a global profile will foster a clear, strategic approach to scientific research. This collaborative approach, alongside well-regarded international partner organisations, will both increase ability to leverage external funding and strengthen bids for these funds, as well as providing opportunities to secure economies of scale in research logistics, resource-sharing and equipment purchase.

8.2.2 The collaborative approach to scientific research facilitated by SAERI will enhance the extent and quality of research undertaken. Publications relating to the Falklands, South Georgia, and regional science would increase as a consequence. As a result of increased research activity, the Islands will acquire more extensive knowledge of environmental baseline conditions and be able to monitor the environment more effectively.

8.2.3 The Environmental Research Institute also provides an opportunity to market the Falkland Islands as a 'gateway for Antarctic Science', building upon the Islands' long association with the British Antarctic Survey. This

marketing opportunity is strengthened through the Government of South Georgia and South Sandwich Islands (GSGSSI) support for the SAERI initiative. South Georgia has excellent research facilities at King Edward Point which are currently under-utilised. The potential to undertake scientific research in South Georgia will enhance the attraction of SAERI to international scientific research bodies. Additionally, marketing the Islands as a gateway for Antarctic science will raise awareness of, and interest in, the Islands generally and will complement efforts to market the Islands as a tourist 'gateway to Antarctica'.

- 8.2.4 Facilitating links with world class research centres and leading scientists will increase the network of peers for Falklands-based scientists, reducing professional isolation, and making the Islands a more attractive place for scientists to live and work. This will improve the potential for the Knowledge Economy to develop further.
- 8.2.5 SAERI could become a lead partner in a collaborative approach to environmental management and research across the Overseas Territories. As well as deriving economies of scale and strengthening bids for funding across the Territories, this collaboration could enable more comparative science in respect of, for example, fisheries conservation and management and climate change.

8.3 *Public diplomacy*

- 8.3.1 The Research Institute would provide an opportunity to celebrate and gain recognition for the science that occurs in the Islands and to showcase the Islands' environmental stewardship. SAERI would achieve this through facilitating Falkland Islands scientists' engagement in networking and presenting opportunities at overseas conferences and in increased collaborative research with external scientists and institutions.
- 8.3.2 An increase in the number of visiting researchers, and consequently in the extent and quality of research undertaken and scientific publications relating to the region, would, as well as increasing knowledge and environmental monitoring ability, increase awareness about the Islands generally and promote a wider understanding of the Islands as dynamic, self-governing and self sufficient.
- 8.3.3 Additionally, SAERI would provide a non-political vehicle for communicating messages about the Islands to a different demographic, which FIG would be unable to access directly.

9.0 Financial Implications

- 9.1 Phase 1 of SAERI requires funding of £296,500, largely to cover the cost of a Director to run the Institute and drive forward its development over a three year period. Other costs will be incurred in the development of the website, the extensive overseas travel that will be required in order to establish relationships with universities and other research institutes overseas; and in provision of administrative support.

Project Costs

SAERI Operating Budget Phase 1	2011/12	2012/13	2013/14	2014/15	TOTAL
SAERI Director	31,250	62,500	62,500	31,250	187,500
Recruitment & Relocation	12,000				12,000
Travel Costs	10,000	20,000	20,000	10,000	60,000
Website Development /Hosting		5,000			5,000
PT Administration	4,000	8,000	8,000	4,000	24,000
Marketing/Promotional Materials	4,000	2,000	2,000		8,000
TOTAL	61,250	97,500	92,500	45,250	296,500

9.2 ExCo previously approved the allocation of £50,000 per annum for the development of the SAERI, and this funding has been incorporated into the funding package detailed below. The Government of South Georgia and the South Sandwich Islands have indicated that they will support the initiative with £10,000 in Year 1. An additional £10,000 may be available from Government House to promote the initial marketing and development of the initiative¹.

9.3 The funding package will result in net savings of £23,500 to FIG, and will require a re-profiling of funds currently allocated to SAERI as summarised the table below. The proposal does not require additional FIG funds to be allocated.

Financial Implications	2011/12	2012/13	2013/14	2014/15	2015/16	TOTAL
Total Costs	61,250	97,500	92,500	45,250	-	296,500
Funding						
- SAERI Budget	100,000	50,000	50,000	50,000	50,000	300,000
- Government of South Georgia	10,000					10,000
- Government House	10,000					10,000
Total Funds	120,000	50,000	50,000	50,000	50,000	320,000
Net Financial Implications	(58,750)	47,500	42,500	(4,750)	(50,000)	(23,500)

10.0 Legal Implications

None related to the initial establishment of SAERI. As the Institute grows and establishes itself there may be a requirement for legal advice and assistance regarding contracts for consultants, experts, land, buildings, copyright patents, and establishing a company structure for the Institute. Such services could be provided by the private sector.

11.0 Human Resources Implications

This proposal involves the creation of the new post of Director of the South Atlantic Environmental Research Institute (Grade A) and a new part-time administration post (Grade H).

¹ Funds must be spent by March 2012

Appendix B – Letter of Support from Alfred Wegener Institute in Germany

Dr. C. Held, Alfred-Wegener-Institut, Postfach 12 01 61, 27515 Bremerhaven

Dr. Paul Brickle
Fisheries Biologist/Marine Ecologist
Directorate of Natural Resources
Fisheries Department, Stanley
Falkland Islands



**Alfred-Wegener-Institut für Polar-
und Meeresforschung**
in der Helmholtz-Gemeinschaft

Institute for Polar and Marine Research

Telefon: +49/471-4831-1315
Telefax: +49/471-4831-1918
e-mail: Christoph.Held@AWI.de

Ihr Zeichen/Ihre Nachricht vom

Unser Zeichen

Datum

16.3.2010

Expression of interest

Dear Paul,

with great interest we take note of the plans to establish a research institute dedicated to marine science around the Falkland Islands. As one of the world's largest institute of its kind, the Alfred Wegener Institute is focused on polar and marine research and with its research infrastructure (research vessels "Polarstern" and the Neumayer station) makes a significant contribution to the advancement of our understanding of the Arctic and Antarctic.

However, with most of our large scale research infrastructure being concentrated in the Southern Ocean we are interested in forming closer bonds with local partners that can provide infrastructure and knowledge to facilitate cold-water research in inshore areas of the Subantarctic. In the following, we will outline possible areas of interest on our behalf and expertise various working groups inside AWI could bring into this project.



Alfred-Wegener-Institut für
Polar- und Meeresforschung
Mitglied der Hermann von
Helmholtz-Gemeinschaft
Deutscher Forschungszentren
e.V. (HGF)

Vorsitzende des Kuratoriums:
Mindir, Bärbel Brumme-Bothe
Direktorium:
Prof. Dr. Karin Lochte
(Direktorin)
Dr. Heike Wolke
(Verwaltungsdirektorin)
Prof. Dr. Karen Wiltshire
(Stellvertretende Direktorin)
Prof. Dr. Heinrich Müller
(Stellvertretender Direktor)

Sitz und Anschrift des
Instituts: Am Alten Hafen
26
27568 Bremerhaven
Telefon 0471/4831-0
Telefax 0471/4831-1149
<http://www.awi.de>

Bankverbindung:
Commerzbank AG,
Bremerhaven
Konto: 34 91 925
(BLZ 292 400 24)

Prof. Brey, Dr. Christoph Held and their groups are interested in studying the generation of biodiversity in the Southern Ocean and analyse the population genetic and phylogenetic consequences of speciation events. Their previous research activities around the Falkland Islands with the "Nathaniel B. Palmer" during the ICEFISH 2004 cruise and a two week research stay in 2006 funded by the Shackleton foundation have been successful and indicate future avenues for research. The molecular data from these studies and ongoing work in the genus *Nacella* confirm that the Falkland Islands harbour a genetically diverse fauna which may be far less strongly connected to communities on the South American shelf than previously hypothesized. Please find attached a publication demonstrating complete reproductive isolation and the existence of two species (one currently undescribed) of benthic isopods occurring around the Falklands and in Southern Patagonia.

A second field of interest are long-lived macroorganisms with carbonate shells/skeletons such as bryozoans, molluscs or finfish (otoliths). We interpret such carbonate structures as bioarchives and intend to reconstruct past environmental conditions from their morphological and biogeochemical properties.

Prof. Claudio Richter, Dr. Jürgen Laudien and their groups are studying benthopelagic coupling and already undertake various research projects in cold-water areas. Their group employs a state of the art remotely operated vehicle (ROV), which could be put to use if a suitable platform can be provided.

In view of the successful cooperation in the past and encouraged by the possibilities of lab space, inshore fishing and diving operations under ESD regulations (European Scientific Diving) we would like to express our keen interest to cooperate with the South Atlantic Research Institute and hope that this will enable us to intensify our research around the Falklands.

Sincerely yours



Prof. Thomas Brey, section head

Dr. Christoph Held, work group leader

Prof. Claudio Richter, section head

Dr. Jürgen Laudien, work group leader

Feasibility study for a South Atlantic Environmental Research Institute in the Falkland Islands



**British
Antarctic Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

This page is intentionally blank

Reference

SAERI

Date

27th May 2011

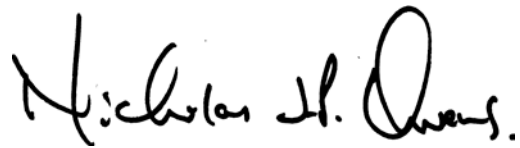
issue

V 2.2

author

A handwritten signature in black ink, appearing to read 'A. Fleming'.

approval

A handwritten signature in black ink, appearing to read 'Nicholas H. Owens'.

Andrew Fleming

Ian Briggs

Paul Rodhouse

Nick Owens

Alan Rodger

John Shears

This page is intentionally blank

Contents

1. Executive Summary	7
2. Introduction.....	11
3. Scope of study	12
4. Method	14
5. Current Environmental Research in the Falkland Islands and South Georgia	15
5.1. Fisheries	15
5.2. Agriculture	17
5.3. Conservation and Biodiversity.....	17
5.4. Inshore Marine Environment	18
5.5. Geology & Geomorphology.....	18
5.6. Renewable Energy	18
5.7. Upper Atmosphere	19
5.8. Gateway to Antarctica and South Georgia.....	20
5.9. Existing Infrastructure & Facilities	20
5.10. External Research Activities and Links	24
6. Lessons from Analogous Institutes	25
6.1. University Centre in Svalbard.....	25
6.2. Bermuda Institute of Ocean Sciences	26
6.3. North Atlantic Fisheries College Marine Centre	28
6.4. Summary of lessons learnt	29
7. Considerations for Increased Falkland Islands Research Activity.....	30
7.1. Drivers for increased research activity.....	30
7.2. Constraints on increasing research activity.....	31
7.3. Potential development of facilities.....	32
7.4. The Potential Role of an Environmental Research Institute	35
7.5. Summary	36
8. Proposed Route to Establishing an Institute	37
8.1. First steps	37
8.1.1. Establish the formal structure of the South Atlantic Research Institute.....	38
8.1.2. Appoint a Research Institute Director	38
8.1.3. Establish a Governing Board.....	38

8.1.4.	Establish formal linkages with local research groups	38
8.1.5.	Implement a logistics coordination capability.....	39
8.1.6.	Maintain an online database of Falkland Islands and South Georgia research	39
8.1.7.	Produce a new website and marketing material for the new institute	39
8.2.	Options for growth.....	39
8.2.1.	Establish a new collaborators funding mechanism	40
8.2.2.	Investment of revenue from oil industry development.....	40
8.2.3.	Development of the institute as a ‘satellite’ facility	42
8.2.4.	Development of commercial and consultancy spin-offs	42
9.	Governance Structure and Legal Form	44
9.1.	Introduction.....	44
9.2.	Governance Structure.....	44
9.3.	Legal Form.....	46
9.4.	Summary	48
10.	Operational Structure and Administration.....	49
11.	Finance Plan	50
11.1.	Expenditure Budget	50
11.2.	Economic benefit	51
11.3.	Self-Funding Options.....	52
11.4.	Summary	54
12.	Implications of Oil Industry Development.....	55
12.1.	Issue	55
12.2.	Impact and risk.....	55
12.3.	Opportunities.....	56
12.4.	Environmental Impact Assessments	56
12.5.	SOTEAG experience.....	58
13.	Conclusions & Recommendations.....	59
14.	Appendix A: Terms of Reference provided by FIG	63
15.	Appendix B: Briefing Note Provided Ahead of Stakeholder Interviews.....	66
16.	Appendix C: External Research Groups with Falkland Island Research Interests	67
17.	Appendix D: List of Stakeholders Interviewed	68

1. Executive Summary

Consideration of a South Atlantic Environmental Research Institute is aimed at increasing scientific research based in the Falkland Islands and developing the location as an international research platform. An expansion in research activity must build on the considerable environmental expertise that already exists on the Falkland Islands and aim to organically grow this activity through combined efforts to attract new international research funds and collaborations. This goal is part of the Falkland Islands Government's (FIG) aim to develop a knowledge economy as part of the Falkland Islands Economic Development Strategy. Including South Georgia in the scope of this activity also reflects the aspiration of the Government of South Georgia and the South Sandwich Islands to diversify its research programme.

A local research institute can provide additional effort to augment and help expand the existing range of research activities. By establishing an umbrella structure for the existing independent elements of Falkland Islands environmental research, all groups involved will be able to present a single coordinated face to the international research community. Jointly building this common structure will allow development of a common strategy for Falkland Islands and South Georgia environmental research, taking account of existing frameworks such as the Falkland Islands Biodiversity Strategy (FIBioS) and new long term monitoring requirements. This development will help correct the perception of a currently fragmented and uncoordinated approach, encourage development of existing collaborations and foster new international linkages. Providing a single point of contact for environmental research will also lower perceived practical difficulties in organising research by visiting scientists.

This study investigated the feasibility of such an institute, considered the options for increased research, barriers to development, changes required, lessons learnt from similar initiatives and the best options for investment. It is apparent that elements of the financial planning will require more detailed investigation than was possible in the scope of this study. Specifically further work to fully quantify the level of external research funding the institute is likely to attract is recommended before proceeding.

There is already much environmental research activity on the Falkland Islands and South Georgia, including some good links with international collaborators. There are also opportunities to pursue more research in the region especially related to fisheries, conservation, biodiversity and geomorphology. Whilst there is no single 'unique selling point', there is clearly an interest in a range of subjects and the opportunities presented by the relatively pristine environment and location in the Southern Ocean. It is also clear that many research interests are common with those of South Georgia and the scope of the proposed institute would be considerably enhanced if it was to encompass this region and its opportunities for joint environmental research. In addition the Falkland Islands is the key access point for South Georgia and it is clear that the institute will attract more international attention if it is seen to facilitate access to this larger region of the South Atlantic.

However there are very significant factors which will restrict the development of research activity on the Falkland Islands and South Georgia which represent barriers to the long term aspirations of a research institute. Firstly, it appears that there is a lack of wide awareness about the research potential and current local research activity. Clearly greater promotion of the region and its potential is necessary in order to engage with new collaborators and funding bodies. Secondly, transport and telecommunications links are widely acknowledged to be a serious limitation and will restrict what is possible. In particular attracting senior research staff on a permanent or long term basis is likely to be

very difficult given the relatively poor connections. In addition, the perception of a complicated geopolitical situation and competition from neighbouring South American countries also pose problems for potential visiting researchers.

Of utmost importance is the need for engagement from the local Falkland Island and South Georgia research community. They must understand and value the advantages of supporting the development of an umbrella organisation and the benefits of a more joined up approach. In its early stages the new institute would act purely as a focus to represent and develop existing Falkland Islands and South Georgia environmental research to the wider world. It is not possible to predict the best development path for such an institute and all options should remain open, but initially it is not recommended to assimilate existing research groups into the new institute. However it is essential that the institute is not viewed as just another research organisation operating and competing in parallel to existing groups. It is essential that its role is clearly defined as building on and expanding existing environmental research activity. To succeed it must be enthusiastically supported and guided in this role by the established organisations it is aiming to help.

Leading the development of the new institute will require a driven and capable individual with wide ranging scientific, managerial and political skills. They will need to be local in order to engage effectively with local research groups, but also be required to travel widely to promote the institute. We recommend that additional funding be found to allow this to be a full time post as it will not be achievable as a part time commitment. The institute Director should also be supported by an experienced Governing Board, chaired by someone of high standing and reputation who will be able to promote the institute to the international community and bring experience of the challenges in running a research institute.

If a decision is taken to establish a new research institute we recommend a gradual approach to development and propose the following steps be implemented over the next 5 years. This first step aims to develop an umbrella organisation for the local environmental research community, which will not affect their autonomous status at this stage. In fact, during this first step we do not recommend that any existing FIG environmental research funds should be reallocated to the new institute since it would only serve to disturb established activities and expertise.

1. Establish the South Atlantic Environmental Research Institute, as a new company limited by guarantee and registered as a charity.
2. Appoint a full-time and supported Director for the new research institute.
3. Establish a Governing Board composed of both local and international representatives.
4. Appoint to the Chair of the Governing Board an individual with significant international stature and scientific reputation.
5. Establish formal linkages between the institute and local environmental research groups to ensure their engagement and influence with the institute.
6. In parallel a Falkland Islands and South Georgia environmental research network should be established to provide a broad forum to encourage collaboration and shared use of resources.
7. Implement and appoint an administration and logistics support role to work alongside the Director.

8. Establish access to an online and up to date database of existing Falkland Islands and South Georgia science projects and research publications.
9. Produce a new website and marketing material for the institute, including dissemination of the online research database.

These steps will provide the basis for achieving an increased and more coordinated research programme in the South Atlantic and a basis for future growth. Expansion and development of the institute will depend on a number of factors but should be directed by the Governing Board and Director with input from all local stakeholders. Whilst it is not possible to dictate the optimal development path at this early stage it is worth considering a number of longer term options. These may include the following:

- Continued organic growth of the Institute as an umbrella organisation.
- A more significant expansion of infrastructure and funded research stimulated by investment of revenue from a developing oil industry.
- Include partnering with a larger organisation who may wish to operate the South Atlantic Environmental Research Institute as a satellite facility.

Given that a key objective of the institute is to attract new international research groups to the region, we suggest that if new environmental research funds were available to FIG then a research fund could be established to kick-start new research programmes involving international groups who have not previously worked in the region. Further options for such a fund may be that matched part-funding needs to be provided by the grant recipients, that matched funding is provided by another funding body in the UK or Europe and that a local research group is involved in the proposed research programme. The benefits are clear in attracting new collaborators and providing an incentive to investigate research options in the region. This 'new collaborators' award could be administered by the institute, would directly benefit local research groups and encourage them to engage in the priorities of the institute.

Developing an environmental research centre in remote locations has worked elsewhere e.g. the University Centre in Svalbard. Important lessons can be learnt from these analogous institutes including the wider benefits to the local economy, the vital need for formal linkages with other research organisations and universities, an increase in the local skill base and the long term approach required to develop a significant reputation and size. Most significantly is the need for ongoing government financial and political support which is evident in each analogous institute we investigated. Even with this government backing in place the effort and long time scales involved are very significant.

The development of an offshore oil industry is likely to have an impact on environmental research required by the Falkland Islands in the medium term. Changes to the islands related to climate change are also unknown and need to be considered. A coordinated approach to study and long term monitoring of the environment is necessary to fully understand the resulting impact to the environment and economy resulting from these changes. A new South Atlantic Environmental Research Institute would play an important role in defining and implementing the necessary monitoring activities and in providing advice to Falkland Islands Government and the local community on these issues.

This study has shown the feasibility of a South Atlantic Environmental Research Institute and highlighted some of the opportunities and barriers for development. The benefits of an expanded programme of environmental research are apparent and worth pursuing. However the barriers to development are significant and should not be underestimated. If a decision is taken to proceed with establishing a new research institute we propose a gradual approach to implementation. But this plan does not guarantee success and will depend on many factors, primarily success in funding new research collaborations and engaging the local research groups.

2. Introduction

The Falkland Islands Government (FIG) is currently considering establishing a ‘South Atlantic Environmental Research Institute’. The aim is to coordinate and increase the volume and impact of environmental science in the region by establishing the Falkland Islands and South Georgia as an international research platform. The net effect will be development of a local knowledge economy in line with the aims of the Falkland Islands Economic Development Strategy¹. Increasing the role of environmental research will also provide evidence to UK Government of ongoing development of the Falkland Islands and South Georgia by increasing the local skill base and profile of marine and environmental research.

There is already considerable environmental research activity associated with the Falkland Islands and South Georgia which forms a good foundation for the proposed institute. Presenting a singular and coordinated research focus will create a more attractive proposition for international collaborators and providers of research funding. Establishing a South Atlantic Environmental Research Institute (SAERI) provides an opportunity to define this focus and invest in key areas which will improve the local research facilities and network.

This report presents the research potential and scope of the institute together with required financial and practical considerations. It summarises the current environmental research opportunities and the potential for further science in the Falkland Islands and South Georgia. Current barriers to pursuing research in the region are considered and we make recommendations on options to encourage more activity. The business case presents options for how the currently allocated investment may be best utilised and what future funding options should be considered. A viable structure and governance system is also proposed.

A number of similar research institutes exist worldwide and we present lessons that can be learnt from them. Finally we have outlined some of the implications and opportunities for environmental research presented by the anticipated development of the oil industry in the region.

¹

Falkland Islands Economic Development Strategy - <http://bit.ly/jiaAm8>

3. Scope of study

The primary focus of this work is to consider the potential investment, income and expenditure options, plus the structure and governance of the SAERI. The terms of reference for the study provided by the FIG are shown at Appendix A.

This study has necessarily concentrated on the feasibility of such an institute, including the options for increased research, barriers to development, changes required, lessons learnt from similar initiatives and the best options for investment. There has been insufficient time in the scope of this study to fully analyse some aspects of the business plan. Specifically further work to fully quantify the level of external research funding the institute is likely to attract is recommended before proceeding.

In considering the feasibility of the proposed institute we have aimed to include as much relevant detail as possible to give FIG a broad and informed basis for decisions.

Two differing approaches for development were considered during initial discussions with FIG:

1. Develop new infrastructure and capability very quickly, requiring significant levels of up-front investment and agreement to move all existing research activity into this new structure. This relies on being able to create a very attractive research environment with immediate impetus and consequent uplift in external research income and relocation of senior researchers to the Falkland Islands.
2. A slow-growth approach requiring lower levels of initial investment in smaller changes to attract additional research activity. This organic approach would make use of existing facilities, give the time to develop external links and grow an international reputation which will ultimately see increased research activity and income. It also allows for the addition of new facilities and capacity as demand increases.

We agreed very quickly with FIG that the second option would be considered given its higher chance of success and the very high risk strategy of attracting large investment required for option1 given the current global financial outlook.

We have therefore considered the development of an institute with a view to implementation over the next 3 to 5 years, although it must be recognised that success in establishing an Institute will need to be judged over a much longer time frame. The FIG has allocated £50K of investment per annum for the next three years (2010/2011 – 2012/2013) as start-up funding. The same level of funding has also been earmarked, although not confirmed, for two further years (2013/2014 – 2014/2015). We have considered this as the basis for available government investment. However we will also suggest options for further investment where this would strengthen the case for the institute and increase its chances of success.

The geographic scope for the Institute is viewed to be the Falkland Islands and the surrounding waters of the Falkland Islands maritime zone, plus South Georgia and the South Georgia and South Sandwich Islands Maritime Zone. South Georgia and the South Sandwich Islands are included because of interest in better access to this region from the international research community and many shared research interests with the Falkland Islands. The geographic scope of the Institute would span the South Atlantic cool temperate and Sub-Antarctic zones as well as two fisheries that will be influenced by the effects of global climate change in the South Atlantic. There is potential for a wider research network in the South Atlantic encompassing the other UK overseas territories in the South Atlantic (Tristan da Cunha, St Helena and Ascension Island) (Figure 1), but there is a risk that expanding the geographic scope too broadly will dilute the focus of the institute. Initially we consider it better to develop a local critical mass and leave expansion of the geographic remit to a later stage.

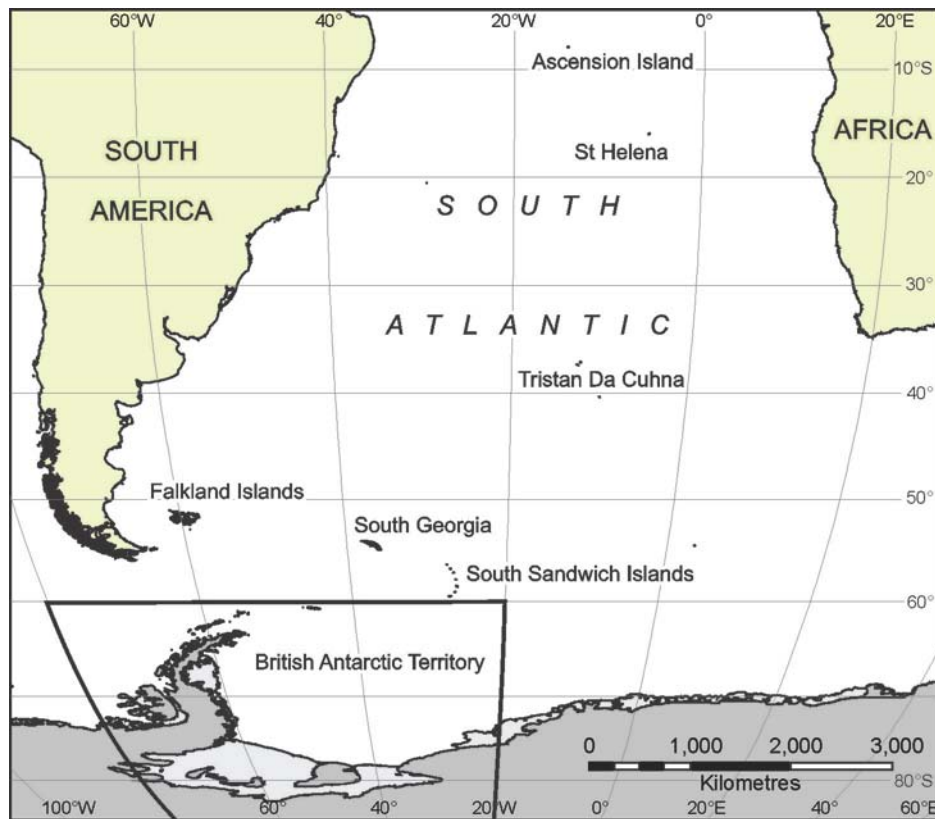


Figure 1: South Atlantic UK Overseas Territories

A key aspect of this work has been to gauge international appetite for a research institute on the Falkland Islands. In talking to potential international partners we have concentrated on those who have some prior experience working in the region and with other research groups who have potentially linked research interests. If the decision to establish the Institute is taken, a key part of its development and function of its Director will be expansion of this dialogue with a view to establishing formal collaborations and attracting funding to the institute.

4. Method

The work to investigate the potential of a South Atlantic Environmental Research Institute followed a four step process (Figure 2).



Figure 2: Four steps followed during this work

Step 1 involved discussion with many individuals and organisations on the Falkland Islands mainly during a one week visit in August 2010. Valuable information was gained on existing environmental research activity, the attitude of local stakeholders to a new research institute and links with groups in the wider international research community. A short briefing note (Appendix B) was circulated ahead of these meetings to provide background information and outline the main areas of questioning.

During Step 2 we investigated analogous research institutes to determine lessons to be learnt, in particular related to why they were established, their structure and sources of funding.

Steps 1 and 2 therefore gave us a good understanding of what areas of research the SAERI might focus on and how it might be established. From this foundation Step 3 involved ascertaining the level of potential interest from the international research community for a research institute on the Falkland Islands/South Georgia.

Based on these combined inputs and the understanding gained of opportunities and risks involved in establishing a research institute, we were able to consider the best way to proceed. This report represents the presentation of our findings and recommendations.

A list of all stakeholders consulted as part of the study is provided in Appendix D.

5. Current Environmental Research in the Falkland Islands and South Georgia

The following section provides a brief overview of the main areas of current environmental research associated with the Falkland Islands and South Georgia. This is not an exhaustive list as complete details would require more space than is available. However it does provide a high-level synopsis of the main research themes which may form the foundation for the institute research programme.

5.1. Fisheries

The Falkland Islands Government Fisheries Department has the dual mission of fisheries management, including patrol and enforcement, and applied research on the exploited stocks of the inner and outer conservation zones of the Islands (FICZ and FOCZ). Applied research is devoted almost exclusively to stock assessment, population dynamics and life cycle biology of the exploited species in support of management of the stocks. A relatively small amount of research effort is directed to more fundamental aspects of the biology of exploited species.

Since its inception the fishery has generally been dominated by two species of squid, *Illex argentinus* and *Loligo gahi* which are fast growing and short lived - spawning once and dying at the end of one year. Stock size of such species is highly variable and driven by environmental variability as well as the effects of exploitation so they need different assessment and management methods from the fin fish stocks. Currently the *Illex argentinus* stock is at a very low level. The exploited fin-fish fisheries in approximate order of landings include rock cod, hoki, hakes, blue whiting, rays, red cod, kingclip and Patagonian toothfish plus small quantities of other species.

The fin-fish stocks are assessed by bottom trawl surveys. Two surveys are usually carried out each year by a commercial trawler which is available for a total of 42 days per year. CTD (Conductivity, Temperature, Depth) drops are made at the location of each trawl.

No trawl surveys of *Illex argentinus* are currently undertaken but surveys of *Loligo gahi*, for which there are two fishing seasons per year, are undertaken two weeks in advance of each season. Monthly oceanographic (CTD) transects are also carried out over the *Loligo gahi* fishing grounds to the east of Stanley and in the region of Beauchene Island between depths of 20 – 1200m. During the fishing seasons for both squid species the stocks are assessed using a modified Leslie-Delury depletion method allowing the fishery to be managed in real time and closed when the target escapement for each species has been reached.

The Fisheries Department also operates an observer programme. Eight observers are currently employed who collect biological data on the fish and squid stocks aboard commercial fishing vessels. The data provide information on length frequency, maturity and recruitment. Biological samples are also collected – these include fish otoliths which are sent to a Polish laboratory for age reading.

The Falkland Islands fishery resources, apart from *Illex argentinus*, have been managed under a system of Individual Transferable Quotas (ITQs) since 2006. All species are managed by effort limitation rather than by Total Allowable Catch (TAC). Currently there is no third party certification (e.g. Marine Stewardship Council) of the fishery for any species in Falkland Islands waters.

Fisheries research is an interdisciplinary science encompassing among other areas biology, ecology, oceanography, climate, statistics, modelling, economics and sociology. The FI Fisheries Department carries out essential research for management of the fishery but is limited in its scope by virtue of its

small scale. The proposed institute potentially provides the opportunity for the FI Fisheries Department science programme to contribute to, and benefit from, integrative research that would lead to understanding of the impact of climate change on living marine resources in the FI Conservation Zones, on ecosystem based fishery management (EBFM) and on fishery forecasting – especially of the short-lived squid resources.

Fishery resources rarely stand still – they change in response to fishing pressure and environmental variability and change. This is nowhere more apparent than in the Falkland Islands fishery which was dominated by *Illex argentinus* in the 1980s but this highly variable species currently represents a small fraction of the total catch while other species, especially rock cod, have gained in importance. There is currently a global movement towards ecosystem based fishery management which takes into account the whole marine environment including dependent species, by-catch and climate change. The approach was pioneered by CCAMLR, the Antarctic regional fishery management organisation, it has been fundamental to management of the South Georgia Fishery, and has now been adopted by other nations. In a changing marine environment EBFM provides what is presently the best approach to long-term sustainability and also will increasingly underpin acceptance of marine products in a consumer market which is becoming ever more aware of the issues surrounding exploitation of marine living resources. Third party certification schemes inevitably consider the wider environmental issues around the exploitation of candidate fisheries. EBFM is about context not method - it does not imply managing ecosystems but it does involve managing fishing activity in the context of the changing requirements of the marine ecosystem. Assessment of the exploited stocks across their geographical range, using reliable methodologies remains central to the process and may require international collaboration in the case of straddling and shared stocks. The Falkland Islands are the regional leader of best practice in fishery management on the Patagonian Shelf and this lead will be maintained provided the science supporting management continues to keep pace with the best science elsewhere.

Aquaculture is currently a small industry in the FI but with potential for development, especially for sea trout, mussels and oysters. There could also be a lucrative market for toothfish raised in aquaculture systems but the technical problems of culturing this deepwater, low temperature species remain unsolved. There is potential for applied research on the cultivation of native (and introduced?) species as well as on the environmental and biodiversity impacts of aquaculture in inshore areas. The full potential of aquaculture in the Falkland Islands should be the subject of a separate independent review.

The South Georgia fishery is licensed and managed by the Government of South Georgia and the South Sandwich Islands (GSGSSI) who commission research by the British Antarctic Survey based at King Edward Point and stock assessment by the Marine Resources Assessment Group (MRAG). Fishery Patrol is by the SGSSI vessel *Pharos*. The fishery exploits two species, Patagonian toothfish and mackerel icefish. There have been exploratory fisheries for crabs and squid but neither have proved commercial. The Southern rock cod stock was overexploited to the point of commercial extinction by the Soviet Union in the 1970s and has never recovered.

The habitats of both the Falkland Islands and South Georgia fisheries are dominated by the Antarctic Circumpolar Current (ACC) – directly at South Georgia and indirectly via the Falkland Current, a branch of the ACC, in the case of the Falkland Islands. There are also linkages between the two ecosystems – Patagonian toothfish is exploited by both fisheries and several species of higher predator cross the Antarctic Polar Front and utilise both habitats at different times of year and at different stages in the life cycle. Problems associated with environmental variability and environmental change

are therefore common to both fisheries and a broad scale view of the South Atlantic is needed to understand ecosystem function in relation to fishery exploitation and to make reliable predictions about the future.

5.2. *Agriculture*

The Falkland Islands Government Agriculture Department is responsible for both regulatory programmes and applied research with an overall aim of improving profitability for Falkland Island farmers. Activity is split between the agriculture laboratories in Stanley and the Saladero research farm.

Applied research focuses on several topics including pasture improvement and grazing management. It considers other issues related to moves from rangeland grazing to more intensive agriculture including alternative sources of fertilizer and use of satellite imagery to monitor the impact of these programmes.

The Agriculture Department has good links with the Falkland Islands Fisheries Department investigating new fertilizer sources and with Falkland Conservations looking at sustainable practices and bird conservation. Internationally links are well established with groups in Northern Ireland and Australia.

Outside of the Agriculture Department, the Falkland Islands Trust (FIT) has undertaken a number of agriculture related research projects, including advice related to organic accreditation. It has also investigated tussac planting and its role in biodiversity, soil conservation and fodder production. FIT has also supported research into tree planting for shelter and seaweed as a source of stock feed and fertilizer. FIT also has external links with University of Magallanes investigating the potential of a peony flower export market. It may be worthwhile to open discussions with the Royal Agricultural College.

5.3. *Conservation and Biodiversity*

The Falkland Islands are home to a diverse range of flora and fauna and vast colonies of seabirds. Details of the environment including its wildlife and ecology are captured in the 2008 Falkland Islands State of the Environment Report². Conservation activities on the Falkland Islands concentrate on protecting and restoring this diverse local ecology and biodiversity.

Falklands Conservation is the most wide reaching organisation involved in conservation research. Specific activities include seabird protection, invasive species eradication, habitat restoration and assessment of potential environmental impacts from future oil and gas development. They are partly funded by FIG but also award grants to Falkland Island landowners undertaking conservation work.

Seabird protection focuses on albatross and petrels, looking specifically at causes of and measures to reduce the decline in Rockhopper penguin and Black-browed albatross populations. Seabird protection activities are closely linked with international partners and NGOs including JNCC in support of the ACAP agreement³, Birdlife International and RSPB. A number of other sea bird study sites are actively used for monitoring and research including New Island and Jason Islands.

² <http://www.falklandsconservation.com/wildlife/FIStateOfTheEnvRpt08.pdf>

³ Agreement on the Conservation of Albatrosses and Petrels - <http://www.acap.ag/>

The restoration of habitat is pursued to encourage native wildlife. Habitat has been damaged by intensive grazing and other agricultural practices such as uncontrolled burning. Replanting of native plants including giant tussac grass aims to alleviate this damage. The introduction of non-native plants and animals has also threatened the local flora and fauna requiring investigation and implementation of eradication and habitat restoration practices.

This work with invasive species in both the marine and terrestrial environment has involved a number of external partners and is a common requirement in a number of other overseas territories and sub-Antarctic islands. A significant programme to eradicate rats on South Georgia has recently commenced which will further develop this expertise and requirements for ongoing monitoring of the outcomes.

5.4. *Inshore Marine Environment*

The Shallow Marine Surveys Group (SMSG) coordinates and conducts assessments of the status of inshore environment around the Falkland Islands. Funded through a number of grant awards, a team of biologists, divers and volunteers have been photographing and cataloguing marine species since 2006. They have been successful in establishing links with other international research groups with related interests in marine conservation. The SMSG has recently (summer 2010/11) undertaken a survey of the South Georgia littoral and sublittoral to a depth of 18 m.

There have been some attempts at establishing inshore fisheries in the past. Recent discussion about establishing a new inshore fishery is of great interest to external research groups looking at changes in fish populations resulting from new fishing activity.

5.5. *Geology & Geomorphology*

In previous years significant effort was invested by the British Geological Society (funded by FIG) in mapping the onshore geology of the Falkland Islands. This is now largely complete and interest in this activity has largely stopped. There is still some ongoing study of the rock runs, but is limited to occasional student projects.

There is much greater potential for geomorphology research to investigate the palaeo-climate and glacial history of the Falkland Islands. This work may provide greater understanding of local sea level changes in the past and contribute to understanding the long term climate of the South Atlantic, including the influence of the Antarctic.

5.6. *Renewable Energy*

Recent investment in wind power by FIG has seen a significant proportion (40%) of the Falkland Islands energy needs coming from renewable sources. The great majority of farms on the islands also obtain their energy from smaller scale renewable sources. This policy has been pursued by FIG and Falkland Islands Development Corporation (FIDC) since 1996 but only since 2006 has this included larger scale installations targeted at power delivery to Stanley (Figure 3).



Figure 3: Wind turbines installed in 2006

Whilst there is relatively little research interest in this topic for the proposed institute, except the need to investigate better energy storage options, a number of people have commented on the potential of the Falkland Islands as a site to develop wind energy solutions given the investment and requirement to minimise the use of expensive fossil fuels. To realise this would require identification of a unique aspect to this work which required it to be located on the Falkland Islands rather than other more accessible locations.

5.7. *Upper Atmosphere*

A recent addition to the Falkland Islands is the installation by the British Antarctic Survey and the University of Leicester of a new radar array (Figure 4) designed to monitor the upper atmosphere. The radar is part of the international Super Dual Auroral Radar Network (SuperDARN) composed of 22 such radars which monitor the upper atmosphere to understand its link with the lower atmosphere weather and the impact of the Sun's 'solar wind' on our environment.



Figure 4: SuperDARN radar array at Goose Green

Establishing the radar on the Falkland Islands provides measurements over an important part of the globe. One of the reasons is the magnetic field in the region is relatively weak, referred to as the South Atlantic Magnetic Anomaly. The magnetic field strength is monitored on a long term basis using a magnetometer operated by the British Geological Survey.

Having overcome the limitations of power supply and telecommunications links when installing the radar array, it is now possible to consider installing other monitoring equipment and experiments at the same site. This will allow more scientists to adopt a similar model of running experiments and infrastructure remotely relying on local support.

5.8. *Gateway to Antarctica and South Georgia*

The Falkland Islands are well connected and situated in the South Atlantic (Figure 1) to act as a gateway to other places in the region. Given its shipping and airport facilities it is a well established logistics hub for organisations operating in the South Atlantic and Antarctic. The British Antarctic Survey is very experienced in this respect having used the islands in this capacity for many years.

The Falkland Islands are also home to the Government of South Georgia and the South Sandwich Islands (GSGSSI) and is the main access point for visitors to South Georgia and the South Sandwich Islands. The fisheries patrol vessel MV Pharos provides a regular link with the islands.

Increasing the use of the Falkland Islands as an access point to the Antarctic must be considered in the context of existing competition from Punta Arenas and Ushuaia in South America, and Cape Town in South Africa. However there appears to be a demand to do field work on and around South Georgia which would be better facilitated through the Falkland Islands. The proposed institute would be well placed to coordinate and maximise the use of the Falkland Islands as an access point to the wider South Atlantic and Antarctic. This role would also position it to develop collaborations with visiting scientists.

5.9. *Existing Infrastructure & Facilities*

The Falkland Islands contain a wide range of environmental research facilities and equipment which might be employed by visiting researchers through the proposed institute. Here we provide some details of this existing capability and comment on potential use and limitations.

- **Fisheries Patrol & Research Vessels**

The Falkland Islands Fisheries Department operates the fishery research vessel *Protegat* (Figure 5), a partially converted commercial fishing vessel. However it has only minimal laboratory space and cannot support grab or coring functions. The requirements for a fisheries patrol vessel are due to be reviewed in four years time, at which point it would make sense to consider the requirements of any additional fisheries research programmes at the new institute.

The South Georgia fisheries patrol vessel 'Pharos' still operates between South Georgia and the Falkland Islands and its use by the institute might be considered and discussed with SGSSI Fisheries Department. It acts as both resource for both scientific cruises and a logistics link to South Georgia, both of which expand the reach and capabilities of the Institute.



Figure 5: Falkland Islands Fisheries patrol vessel *Protegat*

- **Falkland Islands Government Environmental Planning Department**

Several aspects of the Environmental Planning Department (EPD) concern environmental research. It is responsible for all environmental impact assessments and also research permits required for field work on the Falkland Islands.

The EPD also coordinates bio-security and invasive species activity and work closely with other groups such as Falkland Conservation to implement the environmental strategy. It also manages the Environmental Studies Budget which provides approximately £50,000 of funding each year to support conservation and biodiversity projects on the Falkland Islands.

- **Falkland Conservation**

Falklands Conservation, the charitable organisation established to preserve the wildlife of the islands, is a source of knowledge and expertise on many aspects of the local ecology. They are partially funded by FIG (20%) and consist of five permanent staff and two part time staff, with other income from grant awards. In addition they work closely with local and international partners and play an important role providing independent expertise on a wide range of environmental matters.

- **Shallow Marine Survey Group & Diving Capabilities**

The Shallow Marine Survey Group (SMSG) has a great deal of experience in diving around the Falkland Islands. They also have ambitious plans to improve their facilities with the acquisition of a small dive support vessel, which will be capable of reaching South Georgia. Given the Falkland

Islands do not have access to a hyperbaric dive chamber they currently adopt a conservative approach with limited range.

- **Laboratories**

Both the Government Agriculture and Fisheries Departments have well established laboratories (Figure 6) based on the same site in Stanley. These laboratories are capable of analysis of soil, animal and fish samples for nutrient levels, trace elements etc. Where bacteriology tests are required, laboratories at the Stanley hospital are available. If laboratory facilities currently do not exist locally, e.g. for heavy metal/PCB tests, arrangements are in place to use UK or European facilities for analysis.



Figure 6: Agriculture Department laboratories

- **Saladero Research Farm**

The farm consists of 2023 hectares of land, home to both sheep flocks and the national beef herd. Its primary purpose is to investigate rotational grazing systems and animal productivity, including studies into species choice, fertiliser use and nitrogen fixing.

It has also been used by visiting researchers investigating evolution and biodiversity of organisms in the South Atlantic. There is sufficient capacity to accommodate other similar research programmes and a desire to become a site for long-term monitoring projects. Greater awareness of the research farm facilities will likely increase opportunities of achieving this.

- **South Georgia research base at King Edward Point**

King Edward Point (Figure 7) is commissioned by the Government of South Georgia and South Sandwich Islands and the UK Foreign and Commonwealth Office. It was designed, built and is operated by the British Antarctic Survey. The main purpose of the laboratory is to provide a shore base for applied fisheries research in support of management of the fishery within the South Georgia and South Sandwich Islands Maritime Zone and to support the South Georgia Marine Officer. It also provides support for the Museum at Grytviken and other projects.

The base consists of living accommodation (Everson House) and a laboratory including a large scale closed system marine aquarium (Cook Laboratory). There are boating facilities supported by professional boatmen. Fisheries research is undertaken aboard the fishery patrol vessel *Pharos* and fishing vessels chartered for fish stock assessment surveys and also by placing observers aboard the commercial fishing fleet. The base has capacity to support other scientific research at South Georgia. It is operated along the lines of British Antarctic Survey bases elsewhere in the Antarctic/sub-Antarctic and has equivalent communications including internet and voice over IP telephone.



Figure 7: King Edward Point, South Georgia

- **New Island Research Centre**

Located to the south-west of the Falkland Islands, New Island is a wildlife reserve owned and operated by the New Island Conservation Trust⁴. It is home to a diverse range of wildlife including many species of seabirds, large numbers of breeding Rockhopper, Gentoo and Magellanic penguins, burrowing petrels, passerines, seals and the striated caracara.

The island has attracted a number of visiting scientists to study the wildlife and participate in the conservation efforts. Whilst transport to the island is problematic, it does have good facilities to accommodate up to 8 scientists, including good communications, 24 hour power and a basic laboratory.

The Trust are keen to see New Island used for more research by visiting scientists which can only be achieved if the transport arrangements are improved and the capacity of the facilities increased.

Other islands have been dedicated as nature reserves, e.g. Jason Islands and Sea Lion Island, where transport links and facilities for visiting researchers exist. Many of these offer opportunities to study the seabirds, wildlife and local ecosystem.

- **MoD Conservation Group**

The Ministry of Defence base at Mount Pleasant includes a Conservation Group which is mainly concerned with management of the environment around the base. Much of their work is concerned with invasive plant species.

However they do represent a body of willing and enthusiastic volunteers who might be involved in some of the conservation and research activities on the islands. In addition to helping with tasks such as counting and photography, there is potential for contributing hardware e.g. land rovers. There is also potential for divers based at Mount Pleasant to work with SMSG.

- **Knowledge Base of Published Research from FI**

A knowledge base⁵ of published research based on the Falkland Islands is maintained by Jim McAdam and the Falkland Islands Trust. This resource provides invaluable guidance to local and

⁴ <http://www.falklandswildlife.com/PAGES/Index2.html>

⁵ <http://eservices.afbini.gov.uk/falklandislandpublications/>

visiting researchers about the range of research topics studied and progress that has been made to date. Whilst it needs to be updated to include that last few years of information, it represents an essential information for encouraging and informing international researchers and locals of the state of Falkland Islands environmental research.

5.10. *External Research Activities and Links*

A list of existing external research groups is provided in Appendix C to indicate the range of research partnerships which currently exist. This list captures some of the current and recent links (last 5 years) but is not exhaustive. A number of these partners have indicated enthusiasm to establish formal links with a South Atlantic Environmental Research Institute if it is established.

6. Lessons from Analogous Institutes

In considering the development of an environmental research institute on the Falkland Islands we have examined the experience of similar initiatives and the lessons to be learnt. Here we provide some of the details relevant to the Falkland Islands. Much of this information has contributed to the recommendations and conclusions of this study.

6.1. *University Centre in Svalbard*

Located within the Arctic Circle, the University Centre in Svalbard (UNIS) was established in 1993 as an education and research facility for Arctic studies and operates as a share-holding company owned by the Norwegian Ministry of Education and Research. It contributes to Norway's aim to develop Svalbard as an international research platform. This is a distinct part of a very far reaching and comprehensive Norwegian strategy for the high north⁶, including millions of pounds of funding allocated to high north-relevant research through the Norwegian Research Council. The ongoing development of Svalbard and benefit to the local economy and community is well documented⁷, including the role of scientific research in this strategy.

Its unique location provides access to mountain, glacial and marine environments, providing opportunities for research and graduate courses in biology, geology, geophysics and arctic technology (including environmental risk assessment). It also includes a logistics capability⁸ for all wishing to use the UNIS facilities.



Figure 8: UNIS at the Svalbard Science Centre in Longyearbyen

Despite the remote location, good commercial air links operate daily throughout the year. Thanks in part to requirements from the satellite receiving station, a fibre optic link between Svalbard and the Norwegian mainland means telecommunication links are excellent.

UNIS is the core of the Svalbard Science Centre (Figure 8) which incorporates other scientific institutions, such as the Norwegian Polar Institute and Svalbard Science Forum. Formal links are

⁶ <http://www.regjeringen.no/upload/UD/Vedlegg/strategien.pdf>

⁷ http://www.regjeringen.no/pages/2530156/PDFS/STM200820090022000EN_PDFS.pdf

⁸ http://www.unis.no/45_LOGISTICS/Booking_Logistics.htm#

maintained with the four mainland Norwegian Universities, each of which are represented on the UNIS Board of Directors.

The combination of the geographic location, infrastructure, resident expertise and government remit results in an attractive research location. This is evident in the recent addition of new research facilities including the EISCAT⁹ radar, the Longyearbyen CO2 laboratory¹⁰ (supported by oil industry partners) and Svalbard Integrated Arctic Earth Observing System¹¹ (SIOS).

Relevant lessons for SAERI

- UNIS has very strong political and financial backing from the Norwegian government.
- Its geographic location makes it ideally placed to support globally important research into climate change and the Arctic.
- There is significant external demand for this facility from Norwegian universities and international research groups.
- Despite its remote location it has excellent transport and telecommunication links.
- UNIS and the surrounding research infrastructure has taken almost 20 years to develop to its current extent and its high profile building was only opened relatively recently (2006).
- The political investment and strategy to develop a research platform on Svalbard means other initiatives and investments coalesce around the location.
- Benefit to the local economy is significant, well documented and appreciated by the local community.

6.2. Bermuda Institute of Ocean Sciences

The Bermuda Institute of Ocean Sciences (BIOS) is located in the mid-Atlantic Ocean and supports a programme of marine research and education. It aims to be a world-class science and educational institute focusing on marine ecosystems, ocean/atmospheric interactions and ocean health. Its location provides access to coral reefs and surrounding deep oceans and a diverse range of ecological communities. The institute supports research programmes including marine invertebrate zoology, coral reef ecology, chemical and physical oceanography, animal physiology and carbonate geology. It provides well-equipped laboratories, a modern research vessel, comfortable housing and support staff.

It was established over 100 years ago by a number of US universities who required a marine biological station. Initially facilities and limited ongoing funding were provided by the Bermuda Government and Rockefeller Foundation.

⁹ <http://www.eiscat.se/>

¹⁰ <http://co2-ccs.unis.no/>

¹¹ http://www.unis.no/20_RESEARCH/2080_SIAEOS/default.htm

Given its remote location away from the influence of large populations, it is still relatively easy to access being only 2 hours flight from the US east coast. This access allows students to visit for limited periods and pursue courses for which they gain academic credit.

Financial support comes from a diverse range of sources¹² including the local Bermuda Government who fund a marine monitoring program of Bermuda's marine environment and inshore waters. Significant income also comes from a philanthropic donations scheme which offers various levels of membership in return for annual donations between \$50 and greater than \$100,000. (The Bigelow Marine Laboratory in Maine also has a very successful public subscription income based on a similar model). Support also comes from local business, e.g. the HSBC Bermuda bank who sponsored¹³ the purchase of the ocean research vessel (Figure 9). The greater proportion of funds comes from the US Government through the National Science Foundation (NSF).



Figure 9: BIOS research vessel the HSBC Atlantic Explorer

BIOS leverages its location and expertise to establish roles in significant global programmes e.g. the Global Ocean Flux Study supported by NSF and NOAA in the US. They have also built formal links with other international research institutes, e.g. in the UK both Cambridge and Southampton Universities fund studentships at BIOS. A UK charitable trust is also established to raise funds for visiting UK students and to fund research carried out at BIOS. This UK element is linked very strongly with active UK universities with committed senior UK academics making it work.

¹² http://www.bios.edu/media_publications/auditors_rep_09.pdf

¹³ <http://www.royalgazette.com/rg/Article/article.jsp?articleId=7daa7ab3003000c§ionId=60>

Relevant lessons for SAERI

- Access to diverse marine environments and ecological communities away from mainland anthropogenic pollutants provides a very similar geographical setting to the Falkland Islands.
- The provision of established research facilities and expertise, together with local logistics, is attractive to visiting researchers.
- In addition to income from diverse sources, the institute is still underpinned by funding from the Bermuda and US Governments.
- Establishing formal links with international universities increases the traffic of students and their supervisors.

6.3. North Atlantic Fisheries College Marine Centre

The North Atlantic Fisheries College (NAFC) Marine Centre (Figure 10) is now part of the University of the Highlands and Islands¹⁴ in Scotland and benefits from being part of this wider research and educational network. It was established in 1992 to support the Shetland Islands marine economy.



Figure 10: NAFC Marine Centre on the Shetland Islands

The Shetland Islands Council (SIC) and the Shetland Development Trust (SDT) provide the largest sources of income. These grants provide core funding to deliver a range of services for the local fisheries industry, including training, monitoring, advice and some research and development. Only 11% of income comes from research projects. It has approximately 70 staff and an annual income of approximately £3 million.

Applied marine research is carried out by the Marine Science and Technology department to provide advice to local marine based industries. The focus is on aquaculture development, fisheries science, the marine environment and marine planning & policy.

NAFC includes the Shetland School of Nautical Studies which provides training for merchant navy officers. This appears to be the main activity and source of external income.

¹⁴

<http://www.uhi.ac.uk>

Relevant lessons for SAERI

- The majority of funding comes from local government and most external income is from activity unrelated to research, e.g. provision of training services.
- Investment in excellent facilities by the local authorities does not appear to have resulted in a thriving and growing research community.
- Developing wider research links through the University of Highlands and Islands may provide the necessary momentum to develop and widen the research programme.

6.4. *Summary of lessons learnt*

- Strategic and financial backing from government underpins almost all research institutes. In some cases this funding is provided from existing commitments to education or regional development. However in all instances represents necessary income directly from government which is recognised as being necessary to maintaining the institutes.
- It has been reported to us that despite appearances a number of remote research centres do not function as intended, do not meet objectives and rely heavily on long term financial support from government.
- The costs of supporting such institutes are significant over the long term, but there is often a long term net gain to the wider economy. This should be considered over a timeframe of at least 10 to 30 years.
- An institute will be considerably more attractive to researchers (visiting and permanent) if it has a high academic reputation, which is based primarily on the reputation and impact of its research staff.
- Establishing a research institute in a remote location is possible, but it is essential to identify and capitalise on external drivers and highlight the unique research opportunities.
- Good transport and communication links are extremely important in attracting researchers.
- Formal links with external universities are vital to increasing the traffic of students and their supervisors to an institute.
- There is clearly scope for further work to be done, outside this contract, to examine in greater detail some of the parallels with these analogous organisations to identify the strengths, weaknesses and lessons learned from their establishment, including selected visits.

7. Considerations for Increased Falkland Islands Research Activity

Having identified and summarised the scope of existing environmental research on the Falkland Islands and linkages with the international research community, here we outline some of the considerations and practical steps involved in growing this sector.

7.1. *Drivers for increased research activity*

A number of factors make the Falkland Islands and surrounding Southern Ocean an interesting and attractive research environment.

- They are well positioned in a unique geographic setting at this latitude, being a relatively pristine grouping of islands and shallow seas, with a cool-temperate climate, remote from any large population or polluting influence.
- It is a perfect location to study and monitor the ecosystem and oceanography of the Patagonian Shelf and southwest Atlantic. This is especially the case given the existing logistics and research links with South Georgia.
- The Falkland Islands and South Georgia are some of the most accessible locations in the Southern Ocean with easy access to a variety of penguins and other sea birds.
- They form part of a continuous latitudinal gradient between the Antarctic and lower latitudes, and are therefore of key interest to evolutionary and climate change studies.
- An existing local network of enthusiastic researchers, in particular in areas of fisheries and conservation, are keen to participate in more collaborative science projects.
- Falkland Islands fisheries authorities are moving to an ecosystem based fishery management approach and wish to integrate other areas of information into their work, including ecology, oceanography, climate, modelling.
- Given the high-rate of environmental change, it is a key location for studying the impact of climate change on biodiversity.
- There is a current need for coordination and provision of baseline measurements of the environment in order to properly assess the impact of changes including oil exploration and climate change.
- The Falkland Islands are an excellent venue to teach ecology and wildlife biology, meaning components of both undergraduate and graduate studies could be based on the Falkland Islands and South Georgia. Combining research with access to facilities, laboratories and real hands-on experience mean excellent opportunities for PhD students.
- There are potential economies of scale with federation of some or all of the Falkland Islands conservation organisations.
- A single, coherent representation of research in the region is likely to increase success at leveraging funding from international foundations.

7.2. *Constraints on increasing research activity*

There are also factors which will limit efforts to establish a research institute and act as a disincentive to new research activity on the Falkland Islands.

- Transport links are currently limited and considered to be at-risk. The MoD air-bridge and commercial LAN-Chile link provide limited flight connections. Despite FIG investigating alternatives and the likelihood of a new air link stimulated by oil exploration requirements, the Falkland Islands cannot be considered well connected.
- Flight costs are also high relative to other locations further limiting travel opportunities and the feasibility of resident staff to attend international meetings.
- It is widely acknowledged that the cost of telecommunications is exceptionally high relative to comparable charges in Europe and North America. Together with the limits in bandwidth and widespread perception of poor performance, this is viewed as a significant restriction to normal scientific working. This also limits possibilities of distributing and sharing data collected on the Falkland Islands.
- There are unique aspects to the geographical location of the Falkland Islands as a research venue, but there are other land masses in the region. Similar efforts to encourage more research activity in South America mean there is competition from neighbouring countries such as Chile.
- It is not possible or cost effective to duplicate top-end laboratories on the Falkland Islands, e.g. with facilities for MMR, gene sequencing etc. As a result 'home' laboratories will always be more attractive to top researchers. The institute must establish opportunities to utilise remote facilities via agreed links with international universities.
- The geopolitical situation in the South Atlantic region is known to cause complications at international governmental meetings (e.g. CCAMLR), in particular needing to avoid any reference to the Falkland Islands. At the scientist to scientist level and at international scientific meetings there is no real problem, but at a government level the issue is contentious.
- Increased research activity requires additional funding. The uncertain nature of current global finances mean that most research budgets are under increasing scrutiny and are not likely to increase in the short term. It is therefore extremely difficult to make defensible predictions about available research funding for Falkland Islands and South Georgia research.
- Changing the established responsibilities for research in the Falkland Islands is likely to be met with some local opposition. Bringing various research themes together raises concerns about dilution of activity, relative priorities and unwelcome influence. It is necessary to ensure any changes are instigated and supported by local research groups when the benefits of a new arrangement have been fully demonstrated.
- Some local research groups have expressed reluctance to fully sign up to an institute until it has a recognised and established capability. Only at this point do they see themselves as willing to participate more fully. These concerns are understandable; therefore it must be possible for local research groups to continue independently, whilst also having the opportunity to be an integral part of establishing the new umbrella structure so they can achieve maximum advantage from it.

However the institute will struggle to work and build reputation if most groups do not engage with it.

- Some perceive the Falkland Islands as an attractive place to work precisely because it is relatively easy to operate independently and opportunistically outside the jurisdiction of a large institute or national operator. It is possible that having an institute as a ‘gatekeeper’ will dissuade some research projects from coming to the Falkland Islands.
- If new research programmes are to involve local researchers it will be necessary to have sufficient skilled people to fill these roles. From the outset it is important to consider raising the skill base by encouraging Honours and Masters Students in relevant subjects to pursue projects in the Falkland Islands as part of their studies. The UK Government and or FIG could consider a scheme to encourage a number of M.Sc. and PhD projects to focus on Falkland Island research needs.

7.3. *Potential development of facilities*

We have identified a number of practical changes that might be made in order to make the Falkland Islands an easier and more attractive place to pursue research programmes.

- **Logistics**

It is clear that most visiting researchers make their own arrangements with regard to travel, accommodation and other logistics. Nearly everyone questioned indicated that this is not an easy process and requires access to some local information. This situation leads to frustration, waste of time and finance and misses opportunities for better use of available facilities.

Employing a logistics coordinator in the Falkland Islands would provide a vital contact point for visiting researchers, advising on travel options, accommodation, permitting requirements and making links with local suppliers of other equipment and services. This single point of contact will act for both the Falkland Islands and South Georgia.

An institute logistics coordinator will also be well placed to liaise with local land owners to arrange necessary access. This will help alleviate occasional hostile attitudes to visiting researchers.

Visiting researchers may be interested in conducting fieldwork outside of the tourist season and negotiate reduced out of season rates. Visiting scientists may be encouraged by lower costs and the tourist industry may appreciate new additional customers for otherwise unused accommodation and boats.

The cost of hiring required facilities, e.g. chartering yacht time to access remote islands, can be prohibitive for a single researcher. However a logistics coordinator with sight of all activities will be able to make linkages and suggestions of joint working and sharing costs.

A further specific role that such a logistics capability could perform is organising the transport of research material and equipment between the Falkland Islands and the visitor’s host institution. This will include the transport and knowledge of regulations associated with transport of live research material. A good deal of relevant experience already exists on the Falkland Islands given the long history of BAS operations there.

- **Operational base**

Whilst a significant amount of research involves fieldwork or time at sea, most visiting scientists will spend time transiting through Stanley or be based there for longer durations. In these circumstances access to office and storage space, and basic laboratory facilities, is extremely valuable and contributes to the smooth running and ultimate success of the research project.

Capacity for this has previously been arranged in a number of the FIG Departments when requested, but making these facilities available as part of the institute would establish a permanent and secure capability for all to use.

Initially this operational base would comprise basic office facilities including ample desk and workshop space to allow maps to be examined and field equipment to be tested and packed. It should also include necessary access to telephones, computers, free wireless internet access, scanner, printer and data projector. Basic laboratory facilities and workshop tools would also be needed. Above all, the most important element is access to good coffee.

- **Additional laboratories**

A variety of laboratories exist at both the Fisheries and Agriculture Department. However most of their capacity is used by the host institution and the facilities are specific to their work. A visiting researcher may not be aware of these facilities or know who to contact to arrange access. Part of the institute's facilities should include arranging access to appropriate laboratory space. This will likely be part of the logistics coordinator role.

Basic lab space may simply be space where field samples can be packed, unpacked, frozen, sorted and prepared for transport, or where field samples can be sorted and packed. Providing and administering this capability should be included as part of the operational base for the Institute.

It is unlikely to be cost effective to quickly build new facilities, such as new wet and dry laboratories. Specific requirements will be driven by project needs and significant investment should not be made until those requirements are well defined, there is an ongoing local requirement and partnering with external institutes cannot provide workable access. An alternative interim solution may be use of specialist containerised laboratories. There is now much experience of these facilities on ships and the British Antarctic Survey is planning to use them at its Rothera base to provide capacity for collaborative projects.

- **Falkland Islands research network**

The various research groups which currently operate in the Falkland Islands appear often to be unconnected and isolated. With the exception of a few instances of working across groups and disciplines, the overall picture is fragmented. The net result risks duplication of work and missed opportunities for joint working and collaborative bids for research grants.

One practical step to remedy this situation is establishing a local research network, providing opportunities for presenting research interests and sharing ideas. Utilising meetings, publications and online social networking tools, it will also engage external and visiting groups. The institute will be a natural host and organiser of this research network with necessary budget for meetings and publications. It will also be responsible for publishing good news stories about successful visits and collaborations. Maintaining the momentum and cohesion of such a network will require ongoing effort which should be within the remit of the institute Director.

- **Knowledge base and geographic information system**

There is currently no accessible up to date information on the various scientific projects being undertaken on the Falkland Islands or of scientific publications related to current and past research. The absence of this information hinders investigations into what research work has already been completed and by whom. Presenting and maintaining this online publication database will provide valuable information on the current state of research, encourage further collaborative work and provide a record of new publications stimulated by establishing the institute.

The Falkland Islands Trust database of Falkland Islands scientific publications¹⁵ represents the most complete catalogue currently available. Updating and maintaining this database and linking it to the SAERI website will provide an essential resource for the institute and the Falkland Islands.

Expanding this online knowledge base to include available topographic maps and aerial photographs (a set from 1956 are held by the Department of Mineral Resources), satellite remote sensing imagery and other relevant datasets (e.g. meteorological data sets) will increase the value of this resource to scientists planning research projects on the Falkland Islands. Efforts should be made to ensure these are online, digital and up to date.

The concept of a comprehensive knowledge base may be further extended to include an online geographic information system. A similar resource exists for South Georgia¹⁶ and allows easy access to and querying of a range of topographic, geospatial and environmental data. It would play a role in policy decisions, compiling state of the environment reports and assessing environmental impact assessments. It may be possible to pursue funding to develop this capability through an OTEP proposal.

- **SMSG vessel and dive support**

The Shallow Marine Survey Group represents a body of considerable experience and expertise for anyone wishing to undertake scientific diving around the Falkland Islands. Access to diving expertise, specifically conforming to European Scientific Diving regulations¹⁷, through the institute is a valuable asset of use to researchers studying the shallow marine environment.

Any improvement and expansion of the diving facilities, for example by adding a dive store or barometric chamber will increase the scope of scientific diving in the Falkland Islands. Current plans to acquire a new dive vessel are viewed very supportively by a number of external researchers, in particular if it was to include some additional equipment for shallow water investigation such as sampling nets, grabs and trawls.

- **Local air transport network**

It has already been highlighted that there is a lack of information outside of the Falkland Islands about transport links within the islands. As previously stated, establishing a logistics coordinator will resolve this and establish a link between visiting researchers and the Falkland Islands Government Air Service (FIGAS).

¹⁵ <http://eservices.afbini.gov.uk/falklandislandpublications/>

¹⁶ <http://www.sggis.gov.gs/home>

¹⁷ European Scientific Diving Committee - <http://www.scientific-diving.eu/>

However there are still limitations to accessing some remote island research sites (e.g. New Island) because of a lack of capital finance required to extend the local runways. Alternative access is via a prohibitively expensive helicopter flight or a lengthy boat ride. If these locations are going to be promoted as part of an increased research effort in the Falklands the transport limitations will need to be addressed.

- **Access to oil industry facilities**

The current oil & gas exploration activity in the South Atlantic may provide some immediate opportunities for researchers. In similar situations exploration companies have provided access to equipment used on site, e.g. access to RoV time for undersea monitoring. They may also provide access to the data they collect as part of their exploration including valuable seismic and coring data.

- **Astronomical observatory**

The geographic location of the Falkland Islands means it may fill a gap in the current coverage of astronomical observatories. With an international community of professional and ‘serious amateur’ astronomers demanding continuous and complete observations it appears an observatory would provide a useful function.

It is common practice that such remote observatories are funded by leasing observation time online with users willing to pay on average c.£100 per hour. One significant limitation of such a facility is the capacity and cost of the necessary high bandwidth internet link.

However this concept is out of scope for an environmental research institute. It is also likely to be limited by infrequent cloud free nights in the Falkland Islands and competition from higher altitude observatories at similar latitudes in Chile.

7.4. The Potential Role of an Environmental Research Institute

Given the options for increasing environmental research including reducing the constraints and improving facilities, elements of the new institute’s potential role are highlighted below. Some aspects are necessary from inception, whilst others are longer term ambitions to be added as the institute grows.

- Lead the development of an overarching environmental research strategy for the Falkland Islands and South Georgia which captures the key research needs for the local economy and environment.
- Coordinate and maintain a local research network, providing a forum which encourages collaboration between different research groups and shared use of resources.
- Develop formal links with international research groups and universities directed by a refreshed environmental research strategy.
- Stimulate the development of new research programmes and partnerships either through funding smaller ‘primer’ research projects or provision of facilities and logistics support.
- Maintain a Governing Board, with local and international representation, to provide direction and assessment of the institutes research programme.
- Become a lead partner responsible for providing independent scientific advice for policy to Falkland Islands Government and Government of South Georgia and the South Sandwich Islands

on subjects including fisheries management, offshore hydrocarbon development and the impact of climate change in the South Atlantic.

- Provide a single interface for the international research community, providing logistics, facilities, liaison with local providers and land owners.
- Promote exchange of skills and expertise between local and visiting scientists to ensure expansion of the local skill base and maximise benefit to the local economy.
- Identify and pursue funding opportunities involving local and international research partners, e.g. European Commission funding.
- Coordinate any enhanced environmental monitoring and research activity related to oil industry development if required by FIG and other stakeholders.

7.5. *Summary*

There is clearly an established baseline of environmental research on the Falkland Islands and South Georgia. This is predominantly driven by local requirements but also includes visiting scientists studying aspects of the environment as part of wider research programmes. It is also clear that the geographical location, high biodiversity, relatively pristine environment and active fisheries offer an excellent location in which to study questions of global relevance, in particular species adaptation to environmental change.

However there are significant barriers to attracting more research activity to the region. These range from practical matters such as limited telecommunications and transport links, to issues related to local and regional politics. Just as significant is the perception that the local research community is fragmented and lacks a common strategy. This contributes to the current situation with relatively few, often short-lived links between Falkland Islands research groups and external partners.

Establishing an institute is an opportunity to bring coordination to the local research efforts and promote a unified interface to the international community. In practical terms this may be achieved through providing better facilities including a logistics capability and encouraging more collaboration.

At a time of uncertain finance for environmental research, an institute will be better placed to pursue additional funding opportunities. Additionally, impending changes to the environment of the Falkland Islands and South Georgia (for example in the short term from oil exploration or longer term due to climate change) will require increased understanding of the environment and more coordinated monitoring of change and impact.

8. Proposed Route to Establishing an Institute

8.1. *First steps*

Based on the current scope of existing environmental research and facilities and the potential to increase this activity, we propose the following steps to establishing a South Atlantic Environmental Research Institute. The goal remains to establish a structure which strengthens the external picture of environmental research in the Falkland Islands. The reinforced structure will provide additional resource to facilitate more collaborative work with international research partners, attract more funded research and improve the local skill base.

The institute will not wholly incorporate existing Falkland Island research groups, but will act as an umbrella organisation for those who wish to be affiliated. The institute will act as a singular interface to Falkland Islands research capacity and concentrate its efforts and resources on increasing international partnerships (Figure 11) and building local capacity where required. It is important that the majority of local research groups are seen to be part of this structure since a continued desire to operate outside of the institute umbrella will add confusion and reinforce the picture of a fragmented research community.

Engaging with the institute will potentially have significant benefits for local research groups. Specifically it offers them additional resource to help pursue new research partnerships, which should result in new income and enhancement of their research capabilities. Any funds allocated to development of research facilities also provide the opportunity to add desirable new infrastructure for their use. A third consequence is improved local communication and cooperation between groups to leverage maximum impact both locally and internationally. It is important that all stakeholders recognise this as their opportunity, which they can direct and where their input is essential. We do not propose the introduction of a new organisation with responsibility to dictate the shape and direction of Falkland Islands environmental research.

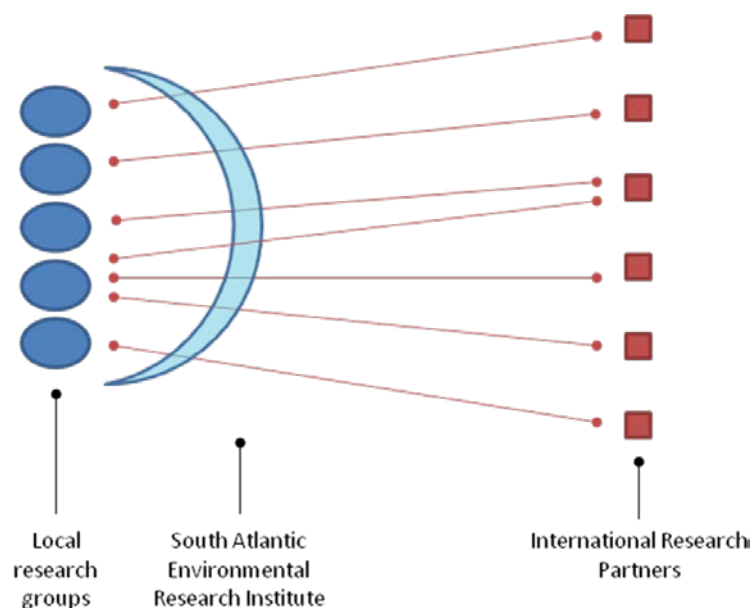


Figure 11: Interface between the international research community and local partners

The proposed steps to be implemented are outlined below.

8.1.1. Establish the formal structure of the South Atlantic Research Institute

We propose establishing a new organisation, called the South Atlantic Environmental Research Institute, as a new company limited by guarantee and registered as a charity. This new organisation, with associated governance structure, will provide the framework for its work and future growth. Full details of the reasoning for this suggestion, including details of governance and legal form, are provided in sections 9 and 10.

8.1.2. Appoint a Research Institute Director

It is essential that the new institute is led by an enthusiastic and dynamic individual. This position will be vital in establishing the new organisation, providing strategic direction, bringing together the local research groups, developing links with international partners and ensuring good communication. The primary focus of this position will entail development of the wider Falkland Island and South Georgia research community in an international context. This will be an incredibly challenging role requiring someone with wide ranging and proven scientific, managerial and political skills.

Given the complexity and challenges, we recommend funds are made available to recruit a full time senior person. It is judged almost impossible to execute this role effectively in a part time capacity while also concentrating on other tasks.

Despite the need for much focus on international linkages, we suggest it is essential this post is based in the Falkland Islands to ensure best possible engagement with local partners. Ideally the individual will have some prior familiarity with the Falkland Islands and South Georgia environmental research activities.

This position should be provided with necessary administration support in order to make best use of their time. If a part-time logistics coordinator post is appointed, the remaining portion of a full-time post could be allocated to the role of PA to the institute Director.

8.1.3. Establish a Governing Board

The new institute will require a Governing Board as part of its formal structure. Details of the composition of the board membership and remit are proposed in section 9.2. The board will be composed of both local and international representatives, allowing it to be fully engaged with local stakeholders and to give proper direction in the international context.

Given the institute Director should be resident in the Falkland Islands; we recommend the Chair of the Governing Board is an external member to ensure a balanced approach when considering strategy and priorities. This individual should be of high calibre with existing international reputation and influence in the international scientific research arena. This position will play an important role in advocating and raising the profile of the South Atlantic Environmental Research Institute on the international stage.

8.1.4. Establish formal linkages with local research groups

Whilst local research groups will continue to operate independently, the success of the institute depends on presenting a unified approach to the international research community. A formal agreement should be established between the institute and local groups to define the relationship and responsibilities of all parties. This agreement will likely take the form of a Memorandum of Understanding which outlines agreed priorities and ways of working together. It is not aimed at

transferring control of local research group interests to the institute, but more simply to agree to work together where appropriate to mutual benefit and in line with an agreed research strategy.

In addition a Falkland Islands research network should be established, engaging with all local research groups and individuals. This will provide an informal forum which encourages collaboration between different research groups, shared use of resources and improved communication of institute activities. Supporting the activities of such a network will require some effort from research groups and individuals, but will result in a more vibrant research environment with a culture of improved communication, sharing of ideas and pursuit of new research grants.

8.1.5. Implement a logistics coordination capability

In the early phase of the institute one of the most practical benefits will be provision of a single interface to coordinate logistics for visiting researchers. Appointing a logistics coordinator as a part time position, working alongside the Director, will allow local and visiting researchers to more easily plan their travel and fieldwork. This oversight will also provide advice on required permitting and allow for better coordination and sharing of facilities between different research groups. This role may be combined with administrative support for the institute, its Director and Governing Board. We anticipate this position will be required as soon as the institute is formally established.

8.1.6. Maintain an online database of Falkland Islands and South Georgia research

Establishing access to an online and up to date database of existing Falkland Islands and South Georgia science projects and research publications will provide a valuable resource to engage the international research community and demonstrate value to the local population. A publication database is currently held by the Falkland Islands Trust (FIT) but needs to be updated and integrated into a new website for the South Atlantic Environmental Research Institute. Due to access to the necessary journals, continued maintenance by FIT on behalf of the institute is recommended as a practical and low cost solution.

8.1.7. Produce a new website and marketing material for the new institute

Promotion of research opportunities and facilities to the international community will require relevant information to be available on a simple but well designed website. Additionally a small range of marketing material (e.g. institute leaflet and marketing brochure) will be required to distribute at international science conferences and by mail.

The anticipated cost for each of these initial implementation steps are detailed in the Finance Plan (Section 11).

8.2. *Options for growth*

While we advocate establishing the institute as a separate umbrella organisation representing and supporting the local research groups, it is worth considering how this picture might evolve in the future. Over a number of years the research and funding environment may change, requiring consideration of alternative structures and funding arrangements. The anticipated expansion of international research partnerships may introduce new requirements which the institute may be best placed to deliver.

Below we briefly describe options which might be considered as options for future growth. However we stress that at this early stage these are only options which would not be possible without careful consideration and ensuring that changes were in the best interests of environmental research efforts in the region.

8.2.1. Establish a new collaborators funding mechanism

A key objective of the institute is to grow by developing new externally funded research projects with international research groups. This may be difficult if no existing work has preceded such a proposal or if there is little incentive for the external research group to consider developing a joint programme of work. These problems may be alleviated by establishing new fund to support small joint research projects to act as primers to develop the basis for larger research programmes. Whilst new funds for this activity have not been identified, this option should be considered in the context of allocating existing finance such as the Environmental Studies Budget and any reorganisation of other funds including the Overseas Territories Environment Programme.

To work effectively, this funding would need to be allocated in an appropriate way with specific conditions. A number of suggestions are outlined below, but the details would need to be considered in greater detail in the future.

- Funding should be allocated to projects involving local and external research partners.
- Joint proposals must involve local partners in a significant and meaningful way. Local partners should not be involved purely as a logistics provider or in a minor research role.
- Proposals should involve external partners and organisations who have not previously worked in the region.
- Proposals must develop an area of research that fits with the Falkland Islands environmental research strategy.
- Funded projects should be relatively small and of limited duration.
- Successful proposals need to include a plan for developing the funded research into a larger program, including identifying an appropriate funding mechanism.
- Only partial funding should be allocated, with agreed matched funding provided by the external research partner or another funding body.

The benefits are clear in targeting some of the available research funds to attract new collaborators and develop larger projects in the region. It would also provide an incentive for external groups to investigate research options in the region and build new linkages with local partners and external funding agencies. A proportion of the funds may be allocated to local Masters or PhD projects contributing to efforts to increase the local skill base. This 'new collaborators' award could be administered by the institute and would directly benefit the finances of local research groups.

8.2.2. Investment of revenue from oil industry development

There are a number of mechanisms where funds to support an environmental research programme are raised from the Falkland Islands oil industry. These might include direct support from petroleum companies for environmental research, a levy on industry to pay for environmental assessments or selling consultancy services to the oil industry. If the institute is providing advice to FIG then the

exact nature of the funding from the oil industry will need to be considered and seen to be independent.

The resulting finance will allow the institute to invest in a wider range of research facilities and options. These decisions will be made by the Director and Governing Board but might consider the following options.

- Expansion of facilities including new laboratories as required by research needs.
- Direct funding of long term research and monitoring projects required to ensure the sustainable management of the Falkland Islands.
- Part funding of research programmes, inviting international partners to contribute a portion of the required finance or agree matched funding with another funding agency.

This could lead to additional funds for local research groups or direct funding of research activity by the institute. However all concerned will benefit from a better resourced research institute with more capacity to develop links to international research partners and industry (Figure 12). Additional funds may allow the institute to develop some research capacity in its own right, either as facilities it operates or research programmes run in collaboration with local research groups. An expansion of the institute in this way may prompt local research groups to become more closely integrated with the institute, while others will decide to continue to operate as affiliated but autonomous groups.

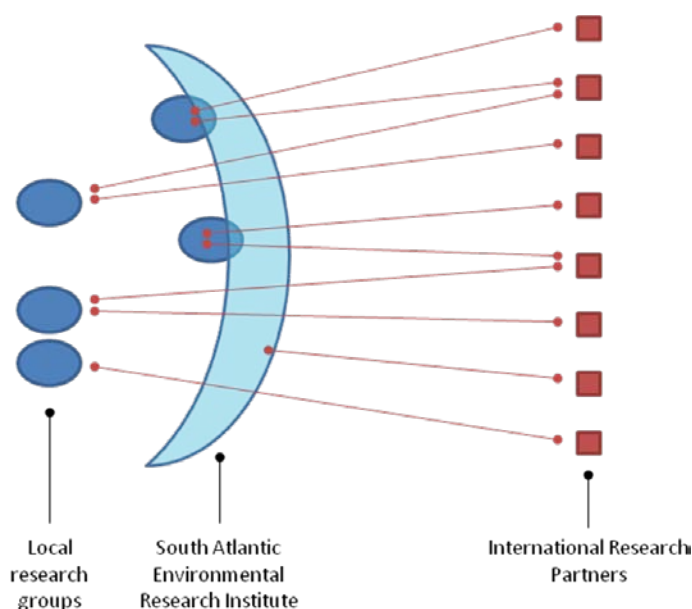


Figure 12: A larger research institute with more international partners resulting from increased investment

On a cautionary note increased investment in facilities is not the only aspect in creating an enhanced research venue which aims to attract more activity. It is also necessary to maintain a credible international scientific reputation and ‘cerebral mass’ in order that other research groups want to participate. Without the correct personnel, empty laboratories and unused facilities create a negative impression to the outside world.

8.2.3. Development of the institute as a 'satellite' facility

The research opportunities provided by the Falkland Islands and South Georgia may be attractive as a research and teaching location for a large university, especially if it has been preceded by growing activity in the region by a number of its senior academic staff. Such a large institute may decide to invest in a satellite facility based in the Falkland Islands and develop it as a location for expansion of its research and teaching objectives (Figure 13).

The advantages of this arrangement include additional external investment, core staff tasked to run it, linked research programmes and established relationships with other international research partners. Importantly a large host institution will also endow its academic and scientific reputation on the satellite institute, providing a reputational boost even to unrelated research programmes in the institute. All of these factors have potential benefits for local research groups affiliated to the institute and the wider environmental research community on the Falkland Islands.

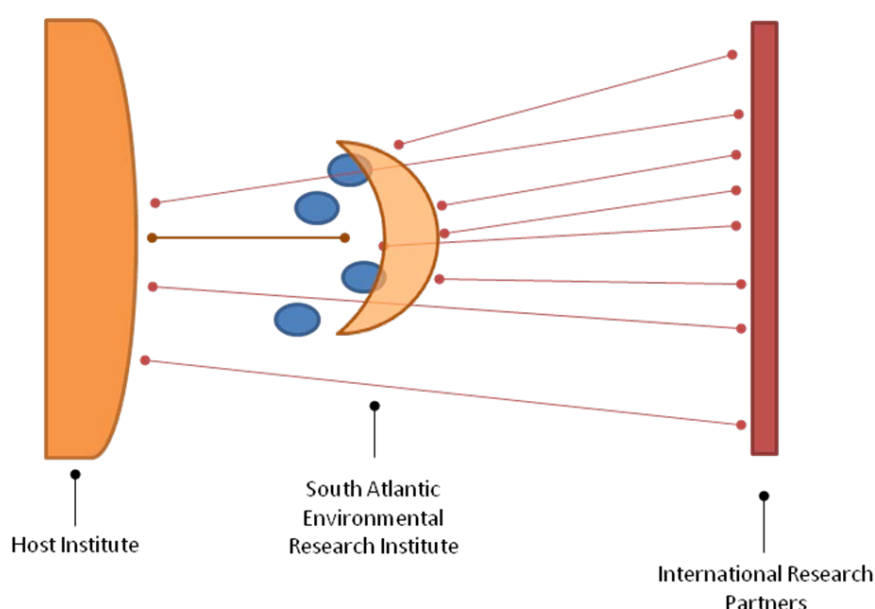


Figure 13: The institute as an element of a larger host institute

However there are aspects of such an arrangement which may be viewed as disadvantages. The external organisation investing in establishing this structure will certainly have an influence on research priorities and strategy, to the possible detriment of local research needs. These local requirements and the activity of local research groups not directly involved would need careful consideration and support to ensure they are not obscured or lost.

8.2.4. Development of commercial and consultancy spin-offs

It is very likely that aspects of environmental research pursued in the Falkland Islands and South Georgia will form the basis of commercial services or professional consultancy which can generate additional income for individuals, local research groups or the institute. This is particularly relevant to oil industry development but may also apply to fisheries, environmental monitoring and other themes.

Given the scope of this study it is impossible to thoroughly investigate each of these potential areas of development to assess the viability of each business model and likely level of income associated with each. In each case a full assessment of the individual business case will be necessary, including

assessment of the intellectual property ownership, freedom to pursue commercial income and the likely beneficiaries of any income.

The specific case of developing an Environmental Impact Assessment consultancy has been raised on a number of occasions and is dealt with in more detail in section 12.4. However this is a complex area and it needs to be established that, even with favourable supporting legislation, it is worth developing an environmental assessment group which will need to compete with very large and established environmental consultancies in order to win any further work beyond the relatively small requirements for the Falkland Islands exploration activities. There is likely to be more mileage in selling environmental expertise to the established EIA providers and this is certainly worth pursuing along with other commercial consultancy spin offs.

9. Governance Structure and Legal Form

9.1. *Introduction*

The objective of this section is to identify the governance structure and legal form that will best support the institute to deliver its vision and mission. It assumes that the institute takes on the form outlined in the previous section, but with enough flexibility to be able to change if any of the alternative “Options for Growth” (Section 8.2) scenarios materialise.

The governance structure is particularly important as it will determine how stakeholders can influence and direct the aims and objectives of the institute. The legal form is a different consideration and needs to take into account issues including: limiting personal liability; taxation; potential funder requirements; and capital funding requirements. Notwithstanding the above the governance structure and legal form need to be as straightforward as possible to keep costs to a minimum.

Before looking in detail at the options it’s important to highlight the key assumptions that will drive any recommendations. The graphic below shows what these assumptions are.

Key Assumptions

- All profit/surplus generated by the Institute will be used for public or community benefit or reinvested in the institute.
- There will be no payment of profits/surpluses paid to investors at all
- Board members will be unpaid and will work for the public benefit of the Institute
- Income sources will be a combination of government grants and research income
- Initially there will be no commercial trading, but this is not ruled out in the future

9.2. *Governance Structure*

The governance structure will be considered first as this will help to drive the legal form of the institute.

There are various governance models to consider, but all have the same basic assumption that there is a Governing Board that is accountable to a set of members. In some cases the Governing Board and members are the same, but it is more usual for there to be a separate membership that has certain powers to hold the board to account. The most obvious example is the way shareholders act as members by voting on company resolutions drafted by the board of directors. Another example is the way members of voluntary organisations elect board members.

The only problem with membership based organisations is that it can be difficult to create a constitution that balances the need to involve the membership, but limits the risk that the members disrupt the organisation excessively. For example, a small group of active members with interests that conflict with those of the organisation can organise themselves to move the organisation in an unwanted direction.

The risk of not having a membership is that the Governing Board is not actively held to account for decisions and actions that affect a broad group of stakeholders. Even the perception of this can lead to a negative public view of an organisation. More importantly a lack of accountability increases the risk of ineffective management and the potential for the organisation to become out of touch with its stakeholders.

Another factor in determining the role of membership is to consider how the organisation has reached its current state. If it has evolved organically from a large group of stakeholders due to a shared common goal it would be inconceivable not to have a broad membership. However, if the organisation is being created to establish a shared common goal it may be impossible or undesirable to identify suitable members in the early stages.

In considering all of the above alongside the other recommendations within this report the authors conclude that at this stage the institute does not need to create a membership separate from the Governing Board.

Membership Structure

It is recommended that the Institute does not operate with a separate membership and governance structure in the first year of operation. However, the Governing Board will be required to develop a suitable membership model for later implementation that will allow the active involvement of national and international individuals and organisations that have an interest in the Institute.

Given that it is not recommended to adopt a full membership governance structure at this stage it is very important that the Governing Board is seen to represent key stakeholders and that individual members are driven by a desire to see a successful institute for the public good.

There are several ways of creating a Governing Board and establishing rules of retirement, re-election, and retirement. The most popular¹⁸ that don't include a broad membership in the process are:

- Oligarchy - the individuals who make up the board are the same people as the members, and new appointments to the board are made by the board. When someone ceases to be on the board, they also cease to be a member of the organisation. This is a straightforward structure and is common to many charities and social enterprises.
- Representative - this is used by organisations that wish to have members who are organisations instead of individuals. For example, the members may be local authorities, charities, etc. Each member then appoints an individual to serve on the board.
- Ex-officio – a person is not elected or appointed to the board but becomes a member of the board simply because of another position they hold.
- Appointed board - here board members may or may not be members of the organisation, and are appointed to provide particular knowledge or skills to the board. Recruitment of board members in this way should be treated with the same care as recruitment of staff.

In the case of the institute the board will need to be constructed taking a hybrid of several of the approaches outlined. This is not unusual with boards often including elected members with further places filled by representatives and/or appointed members with particular expertise.

¹⁸ Source: <http://www.getlegal.org.uk/the-legal-journey/who-is-in-control/introduction-to-governance-structures.html>

The critical factor for the institute is to ensure that key stakeholders make up the board initially and hence it is proposed that the first Governing Board consists of a mixture of ex-officio, representative, and elected members. It is further recommended that at least 2 of the 3 elected members are selected from international research organisations that have a strong interest in a successful institute. It is expected that this will improve the focus of the board as well as immediately broaden the exposure to the institute. There will be a cost attached to bringing the international members to the Falkland Islands, but these are outweighed by the potential benefits. In developing the future membership model for the institute, international representation should be expanded further.

Whilst the precise composition of the board will be determined by the recipients of this report, the authors are confident to recommend the following on the basis of the discussions and input that has been received during the course of this consultation.

Governing Board Membership

It is proposed that there is a ten member Governing Board:

3 x Ex-officio Members

- Director of the Institute
- Head of FIG Department of Natural Resources, Fisheries and Agriculture
- Relevant Member of the Falkland Islands Legislative Assembly

4 x Representative Members Appointed by:

- Falklands Conservation
- New Island Conservation Trust
- Falkland Islands Trust
- Environmental Committee

3 x Elected Members (proposed and elected by other board members)

- At least 2 from international research organisations

A board constructed in this way will ensure that the institute has a diverse membership and still represents the key stakeholders. Including three elected members will allow a degree of independence and accountability, but the long term ambition should be to construct the Governing Board in the most effective way to meet circumstances. Therefore, the constitution of the institute will need to reflect this need for flexibility in the future.

9.3. Legal Form

In terms of the legal form of the institute there are basically two questions to answer. The first is whether to seek charitable status or not. The second is whether to incorporate as a company, and if so, in which form. A further consideration is whether there is an immediate or future need to create more than one legal identity. For example, will there be a need to create subsidiaries to deliver commercial services and re-invest profits in the institute?

Given that the institute is being established as a research centre for the public good it would seem obvious that it should be registered as a charity. Certainly the UK Charities Act 2006 would cover the institute assuming its purpose can be shown to be the “advancement of environmental protection or improvement”.

Charitable status offers several benefits including: avoidance of Corporation Tax on profits generated from environmental research work; facilitating access to grants; facilitating fundraising from the public; and portraying a positive public image. The downside is that there is a level of bureaucracy and strict rules to be followed in maintaining charitable status. This includes: the need for constitutional documents; completion of annual returns; no payment to board members; strict rules concerning the use of assets held by charities; special accounting rules; and clear separation of non-charitable activities.

The view of the authors is that the benefits of charitable status outweigh the restrictions and hence the institute should attempt to register as a charity.

Charitable Status

It is recommended that Institute is constituted as a charity registered with the UK Charity Commission. This will allow the Institute greater access to funding and help to create a positive public image.

If the institute chooses to register as a charity it still needs to make the decision whether to incorporate or not. The main benefit of incorporation is that it limits the financial liability of the members as long as they act legally and within the rules of the organisation. Incorporation also expands opportunities for raising loan capital or share capital depending on the route taken. These benefits arise because the organisation takes on its own legal identity under which it conducts its business. The disadvantage is that it brings a host of rules and regulations that need to be followed in addition to the requirements of the Charity Commission.

There is a new legal form under development called the Charitable Incorporated Organisation aimed at charities that incorporate as companies limited by guarantee, but this route is not currently available.

If the institute did not choose to incorporate the alternatives are to become an unincorporated association or a trust. The unincorporated association route would make the members personally liable for the financial activities of the association, which would act as a disincentive to participate in the board. The trust option is inflexible and would be complex from a legal perspective and is not really designed for the type of organisation that the institute aims to be.

Therefore, although incorporation is unattractive in terms of the bureaucracy it brings, the authors don't believe there is a viable alternative. The main decision is whether to incorporate as a company limited by shares or guarantee.

In reality this is a simple decision because if the institute is registered as a Charity it would be very difficult for it to incorporate as a company limited by shares. These types of companies also find it more difficult to access grant funding as they are perceived as private profit making organisations – which they are in the vast majority of cases. The only advantage enjoyed by a company limited by shares is that they can raise capital through the issue of shares. A company limited by guarantee only has access to loan capital.

Unless the recipients of this report see a potential need for the institute to raise capital through the issuing of shares, it is recommended that the institute is incorporated as a company limited by guarantee. This will mean that a number of guarantors will need to be identified and from a legal

perspective this group of people will be the owners of the company. The members of the Governing Board would not necessarily be guarantors, but it is possible. Note that the financial guarantee given by guarantors is usually a nominal amount of £1.

Incorporation Status

It is recommended that the Institute is incorporated as a company limited by guarantee. This will give legal and financial protection to those involved with the Institute as well as giving a legal personality for the Institute to use to conduct its business.

9.4. *Summary*

In summary, the work done by the authors of the report has identified that the institute should be established as a registered charity incorporated as a company limited by guarantee. At this stage the Governing Board will be considered to be the members of the institute until a suitable membership model can be developed.

The recommended model will be sufficient to support the delivery of the objectives of the institute in its early years, but the constitution of the charity and the articles and memorandum of association of the company will need to be flexible enough to facilitate any change in direction or priorities. Specifically, the institute should be ready to create a trading subsidiary to manage commercial activities that fall outside of its charitable objectives.

10. Operational Structure and Administration

The operational structure and administration function of the institute will be largely driven by the limited financial resources that will be available to it. The crucial role is that of the Director and hence the majority of expenditure must be earmarked for his/her pay and non-pay costs. It is not proposed that the institute directly employs researchers at this stage, but instead acts as a broker linking external research requirements with researchers and logistical capabilities in the region.

The current budget allows for the recruitment of a full-time Director on a competitive salary. The role of Director is crucial to the success of the institute and therefore the investment of time, effort and financial resource is expected to be commensurate with the importance of the role. The Director will be responsible for implementing the strategy set by the Governing Board and for the day-to-day running of the institute. As stated earlier it is recommended that s/he is also an ex-officio member of the Governing Board.

There will be a need for administrative support covering areas such as record keeping, accounts payable, accounts receivable, payroll, submitting statutory and charity returns/accounts, filing, research document storage, and office services. If the institute opts to provide logistics coordination services to visiting researchers then this will also require support from an administrator. Therefore, it is proposed that the institute initially employs a part-time administrator (2.5 days per week) to carry out these functions.

The statutory elements of administering the company and charity can be handled by a local specialist service provider (firm of accountants) for a fee.

We understand that office space has been allocated in Stanley Cottage for use by the new institute. Should additional or alternative space be required, the Falkland Islands Development Company (FIDC) has suggested they will provide office space and possibly office equipment at no cost. It is also possible that FIDC will be willing to provide accounting and administration services, again at no cost.

11. Finance Plan

The contents of this chapter are based on the potential role of the institute as espoused in section 7.4, the detailed activities in section 8.1 and the structure of the institute as described in chapters 9 and 10. It must be made clear that the authors are not in a position to produce a comprehensive business plan showing the volume of revenue streams and associated costs. The activities of the institute are not well enough defined for this to be carried out in any meaningful way. However, it is possible to outline an expenditure budget for the first five years of the institute that will be sufficient to set up and establish the institute as a functional body. In addition this chapter will look at various sources of income that could be leveraged to support the funding of the institute as it grows and develops.

Whilst we note that FIG are already spending money on research activity in the Falkland's it is not proposed in this paper that the research budget should be consolidated and managed by the institute. However, this may well be something for the future should its role and capabilities expand to a position where it can more readily identify the priority areas for research.

It also needs to be noted that the primary role of the institute from a financial perspective is to increase the net economic benefit to the Falkland Islands derived from the research sector. This means that a simple income and expenditure statement for the institute is not sufficient to determine whether it offers value for money or not. For example, funding the institute by charging a membership fee to existing Falkland Island based organisations may appear to be a good idea, but the economic effect in the Falklands is neutral unless the institute generates additional external revenue.

Therefore, the authors propose that the expenditure budget is seen as an investment in the Falkland Island's economy and that the returns should be measured by the economic growth in the research sector and the broader economy. This will require a baselining exercise and on-going monitoring of the value of research activity, not forgetting the multiplier effect on growth in related areas of the economy.

Notwithstanding this method for measuring success, options will be explored for the self-financing of the institute if that is a route which FIG decides to follow.

11.1. Expenditure Budget

The expenditure budget shown below is constructed on the basis of the minimum investment possible to create an organisation that is capable of delivering the objectives outlined elsewhere in this report. The budget has been constructed using the following assumptions:

1. The organisation will not employ researchers directly or provide logistics support directly.
2. A full time Director is appointed on 1 April 2011 on a salary of £50k per annum. Employer employment costs are assumed at 20% of salary.
3. A 50% Part time administrator is appointed on 1 April 2011 on a salary of £7.5k per annum. Employer employment costs are assumed at 20% of salary.
4. Travel costs assume six foreign trips per year for the Director and two return trip to the Falkland Islands for each of two foreign board members.
5. Office space and storage space is provided free of charge by a host organisation.
6. Office costs represent a contribution to the host organisation plus the purchase of office equipment.

7. The publication database charges are paid to an external provider.
8. Printing and publication costs relate to the institute marketing and awareness activities that will be necessary. This includes website design and maintenance.
9. Professional charges cover the statutory and regulatory work associated with establishing and maintaining the governance and legal structure.
10. Expenditure is at 2010 prices.

South Atlantic Environmental Research Institute Business Plan Expenditure Budget for 4 years ending 2014/15					
EXPENDITURE BUDGET	2011/12	2012/13	2013/14	2014/15	TOTAL
Institute Director	60,000	60,000	60,000	60,000	240,000
Administrator and Logistician	9,000	9,000	9,000	9,000	36,000
Travel Costs	20,500	20,500	20,500	20,500	82,000
Office Costs	4,700	2,700	2,700	2,700	12,800
Publication Database	500	500	500	500	2,000
Printing & Publications	8,000	4,000	8,000	4,000	24,000
Professional Charges	10,000	3,000	3,000	3,000	19,000
TOTAL	112,700	99,700	103,700	99,700	415,800

11.2. Economic benefit

As already discussed the investment of £416k over four years must be viewed in the light of the net economic benefit that it brings to the Falkland Islands. The box below is an illustration of the potential net economic benefits of increasing research activity in the Falkland Islands, but it must be noted that this assumes there is excess capacity of research expertise and logistics support currently in the Falkland Islands.

Illustration of the Potential Economic Benefit of Increased Research Activity	
Typical daily rate at full economic cost for UK based researcher	£400
New research days brought to the Falkland Islands over 4 years	600
Gross additional research income (£400 x 600 days)	£240,000
Multiplier effect in the rest of the economy (0.76 x research income) ¹⁹	£182,400
Gross total economic benefit	£422,400

Obviously the above illustration is very simplistic, but when one considers that 3 full time researchers can generate 600 chargeable days each year, a target to generate 600 days research over four years is clearly not unrealistic.

The assumption that there is excess capacity of research expertise is an important one because if it is not present the economic benefits in the research sector will not materialise so quickly or perhaps at all. If the Falkland's can't offer the research skills required by external organisations they will send their own full teams and this will not be so economically beneficial. Nevertheless, this will be acceptable in the short term if capacity can be increased by building on an established base of researchers. Conversely, if a base of research skills do not exist it will be much more challenging to develop expertise that external organisations can trust and would be willing to pay for.

The above example also excludes the impact of an increase in research activity on the logistics and operational support providers in the Falklands. This is important because this sector of the economy will benefit from an increase in research activity whether or not the research is undertaken by visiting researchers or Falkland based researchers. The only proviso is that the institute needs to generate research activity that would not otherwise have taken place.

The economic benefits so far discussed have not explicitly outlined the positive impact on employment that the institute could have. Employment multipliers (same source as output multipliers) suggest that for every job directly created a further 0.46 jobs are created in the economy. Therefore, if the institute created work for five researchers alongside the SAERI Director and Administrator the employment impact on the Falkland Islands would be the creation of 9.5 jobs (6.5×1.46).

In considering different models for the institute and the likely impact on the economy the authors consider that the institute should remain as small, dynamic and responsive as possible. The largest economic returns will be seen if the work of existing organisations can be leveraged at the minimum cost. This requires facilitation, improved joint working, and more networking. Significant increases in the size of the institute such as building infrastructure or recruiting researchers should be avoided until there is a clear imperative from multiple stakeholders – particular those that will pay to use the staff and facilities.

11.3. Self-Funding Options

There are many alternative models for funding the institute and these in turn will vary depending on what the institute looks like or turns into. However, for the purpose of this section the same assumptions used above will apply. Each of the following funding sources can be considered alone or jointly with others.

- **Government Grants**

The institute will rely on government funding initially irrespective of the success in generating revenue from other sources. It is likely that the institute will spend at least 12 months establishing itself both from an organisational and strategic perspective. Whilst this period may identify funding opportunities it's unlikely that any significant revenues will start to emerge until later. In any case, given the nature of the institute it is in the interests of FIG to contribute to its budget to ensure it is able to function as well as to retain a level of influence.

- **Research Grants**

Two of the principal aims of the institute are to maximise the use of existing researchers in the Falkland Islands and to create an environment that attracts new research talent. Therefore, there are two possible research income sources that the institute can consider.

First, it could charge a facilitation fee for linking researchers in the Falkland's to external parties carrying out research in the area. The fee would come from the external grant award and the Falkland's based researcher would work directly with the external researcher.

Second, when the institute has built up its own reputation and that of the Falkland's it may wish to submit research grants in its own name and use local researchers as collaborators. The income going to the institute would be considered a contribution for managing the award. This income source is not likely to become a possibility unless the institute grows into something far more substantial than is currently anticipated as it would involve employing senior researchers.

- **Permitting Fees**

Researchers currently pay no fee for obtaining a research permit to work in the Falkland Islands. Therefore, there is an opportunity to introduce a fee that would apply to all external researchers wishing to undertake research in the Falklands. An annual fee of £200 per researcher could possibly raise up to £10,000 per annum, however, it may act as a deterrent to research. It may also be seen as an unfair income stream given that it is not available to other local research organisations.

- **Membership Fees**

As the institute grows and becomes more of a membership organisation it could consider charging a membership fee. If the fee gave access to publications, data, and operational support it may be seen as attractive to potential researchers and their organisations. Members would also be in a position to influence the direction of the institute, which also has a value. More consultation would be needed to determine an appropriate fee depending on the benefits of membership and the approach of similar organisations.

- **Logistics Facilitation Fees**

A significant part of the institute's role is likely to be linking external researchers with logistics and operational support providers on the Falkland Islands. This could vary from boat hire to hotel occupancy to laboratory use. It would seem reasonable that the organisation benefiting from the growth in use of their facilities paid a fee to the institute. This fee could be in the form of a commission on business generated or an annual fee to be nominated as a preferred logistics provider.

The argument against charging local providers is that there is no apparent economic benefit to the Falkland Islands in moving money from one place to another. However, it is a way of putting an economic value on the logistics function of the institute and hence may still be attractive.

- **Environmental Impact Assessments**

The background to Environmental Impact Assessments (EIAs) as they relate to the oil and gas industry is described fully in section 12.4, including concerns about developing a viable EIA business activity on the Falkland Islands.

EIAs are not restricted to the oil and gas sector, but work in this sector is certainly the most lucrative whilst unfortunately the least predictable. Although there is potential to raise money for the institute

through EIAs it's difficult to see how this can be seen as a core activity. It may be more suited to a standalone company that may or may not be affiliated to the institute.

- **Environmental Levy on Oil and Gas**

The concept of an environmental levy on oil and gas extraction is discussed in section 12.3 and is definitely something that FIG will no doubt be considering. It is arguable to say that the institute should be a major beneficiary of such a levy, but ultimately this will depend on the effectiveness of the institute at the point in time when these funds become available. Therefore, the incentive is there for the institute to demonstrate that it is having a positive impact on the Falkland's economy. If that can be done on £50k a year the prospect of investing greater funds, possibly to boost infrastructure and employ researchers will seem attractive.

- **Charitable Contributions**

The institute as currently envisaged is unlikely to be able to generate direct charitable contributions to its general fund that would help in meeting its running costs. However, acting as lead for environmental campaigns and projects would offer the opportunity to bring in charitable contributions from the private sector (individuals and corporations). This would allow for indirect contributions to overhead costs as well as boosting the public image of the institute.

11.4. Summary

In summary, the institute will require relatively low levels of seed money to establish itself and the potential returns from this investment do seem very attractive. A small increase in research activity will more than pay for the annual £100k investment required. However, it is still a high risk project whose success will depend on the cooperation of a disparate group of organisations in the Falkland Islands – private, public, and charitable. Because of this it is inevitable that the majority of funding in the first few years will need to come from government sources.

Once the institute has demonstrated some level of success and has established itself it will be possible to look at bringing in other sources of revenue. The ability to do this will stem from the value that the institute is seen to be delivering. The imposition of fees and levies that don't appear to give value should be avoided as should mechanisms to transfer monies from other Falkland based organisations to the institute. The value test is important and will be the deciding factor between establishing a white elephant or a successful organisation that the Falkland's can be proud of.

12. Implications of Oil Industry Development

12.1. Issue

The current offshore exploration activity increases the likelihood that the Falkland Islands will develop a significant oil industry in coming years. Whilst associated changes are still years in the future such a development will have implications for the local economy and environment. In the context of an environmental research institute it is necessary to briefly consider the associated requirements for monitoring and opportunities for investment.

12.2. Impact and risk

The arrival of any large industry to a remote location with a small population will have a large potential impact associated with the necessary infrastructure development and sudden increase in population. Oil industry development brings the additional risk of pollution and damage to the environment. These are currently high profile risks following major incidents such as occurred in the Gulf of Mexico in 2010¹⁹ and the widely publicised challenges associated with deepwater prospects in the southern and eastern Falkland basins (Figure 14).

There will inevitably be associated change since even the weekend recreation activities of an increased population will affect the landscape. Understanding any impact on the islands ecology and fisheries requires a good understanding of the current environment and a well defined monitoring programme.

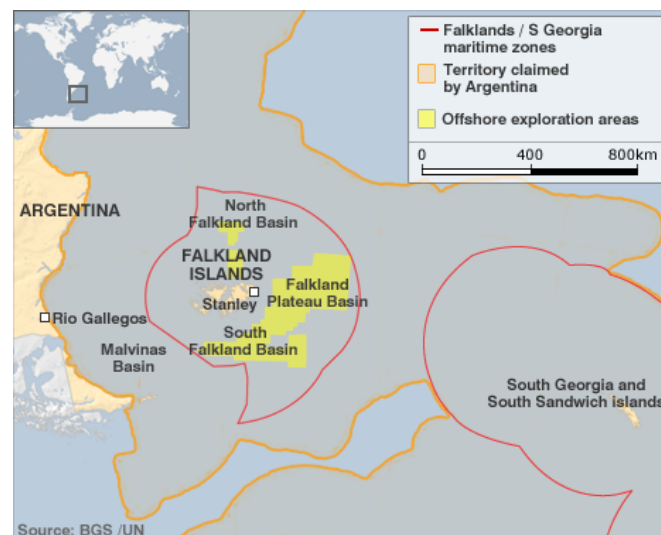


Figure 14: Southern Atlantic maritime zones and offshore exploration areas (graphic courtesy of BBC)

While the significant economic activity associated with oil production might reduce focus on environmental research, FIG should realise the even greater need for improved environmental understanding in order to ensure a sustainable future for the islands.

¹⁹

http://en.wikipedia.org/wiki/Deepwater_Horizon_oil_spill

12.3. Opportunities

In addition to an opportunity for the SAERI to coordinate the required environmental monitoring programme, there may be opportunities to utilise the oil & gas development for the benefit of environmental research. Oil exploration companies have previously granted access to their infrastructure and data for research purposes. This might include RoV (Remotely Operated Vehicle) time for benthic and deep sea research, coring results and seismic data.

It should also be possible to leverage funds from oil & gas companies to directly fund research or facilities. A number of mechanisms should be considered, including an environmental levy proportional to production which was successfully negotiated on the Shetland Islands. FIG has an opportunity to establish the best possible deal for funding environmental monitoring and research, but must also ensure the independence of the SAERI is maintained to avoid any negative impact on its grant funded research activities.

There is a much concern about the environmental damage associated with oil & gas activity, especially following the recent Gulf of Mexico incident. However there is some evidence that oil rig structures and associated no-fish zones provide a new protected habitat for fish. This provides an interesting opportunity to study the rate species adapt to and populate a new environment.

12.4. Environmental Impact Assessments

Submission of an EIA is required by legislation for all offshore hydrocarbon exploration. The introduction of new EIA regulation currently being developed by FIG and a likely increase in hydrocarbon activity will create more work for the Environmental Planning Department (EPD).

The EIA is compiled by the company proposing the development, most frequently contracting this work out to a large environmental consultancy such as RPS Group²⁰. The submitted EIA is then audited by the EPD, often by contracted external reviewers who have the required technical expertise. There has been some criticism of this process in the past because they are not based on accurate local knowledge and the local economy does not benefit. In addition the opportunity is lost to develop local expertise in environmental assessment.

We have considered if there is a role for the institute in this process, either (1) a role in compiling the EIAs or (2) a role at the auditing stage.

- Option 1.
Developing the expertise in the Falklands to perform EIAs will take time and resource to develop. Additionally oil & gas companies will have established relationships with large environmental consultancies that do regular work for them and can provide the necessary skills and expertise. It will prove extremely difficult to change this way of working.

However it should be possible to work with the established EIA providers and offer access to independent local advice and data about the Falkland Islands environment. A great deal of information already exists which needs to be considered as part of a good EIA process. FIG also has an opportunity when considering new EIA legislation to require developers to include local knowledge and expertise as part of the assessment. The institute would make a natural interface

²⁰

<http://www.rpsgroup.com>

for this work and be able to integrate the existing capabilities and data into a coherent offering, which would be charged for.

- Option 2.

Given the independent status of the institute it is well placed to audit any submitted EIA. The local skills and knowledge can be supplemented with training in environmental auditing from professional bodies such as IEMA²¹. The benefits are clear in using local expertise, retaining money in the local economy and expanding the local skill base. As a guide EPD might expect to pay c. £10,000 for an external EIA audit.

There are issues to be resolved with respect to the options outlined above.

- (a) The sale of data and information will need to properly consider data ownership, licensing and copyright.
- (b) Much of this work will require time from staff in other roles which may need to be subcontracted. This expense and extra resource will need to be accounted for.
- (c) The level of potential income from both options will need to be investigated further.

In summary there is an opportunity for the institute to coordinate a new area of economic activity for the Falkland Islands. It is unlikely to underpin the institute finances, but it would offer valuable supplementary income and benefit the local economy. In addition it will improve the current EIA process, offer support to the EPD and provide a focus to grow the local skill base. The remit for any resulting 'Environmental Assessment Group' will equally be terrestrial and coastal as well as offshore marine.

However there are significant concerns about this as a viable business which would need to be investigated in greater detail before any income can be relied on. These concerns include:

- The lack of all necessary skill sets to complete this work.
- The need to be based physically closer to oil industry hubs such as Houston or Aberdeen.
- Established relationships between petroleum companies and large environmental consultancies.
- The potential need for new legislation to require a local provider of EIAs.
- The inconsistency of EIA work from one exploration field such as the Falkland Islands given the sporadic issuing of licence rounds and uncertainties about the level of production.

FIG has an opportunity to establish the necessary legislative basis for this development when determining terms of licences and associated environmental regulation system with the oil and gas companies undertaking exploration work around the Falkland Islands.

The link should also be made between this potential economic development and the baseline long-term environmental monitoring which is required to underpin the necessary research and local expertise.

²¹ Institute of Environmental Management & Assessment - <http://www.iema.net>

12.5. *SOTEAG experience*

Ahead of any anticipated hydrocarbon development in the Falkland Islands and concerns about the associated environmental impact, it is worth considering the experience of the Shetland Oil Terminal Environmental Advisory Group²² (SOTEAG).

Prior to the discovery of oil in the East Shetland Basin in 1972, the culture and economy of the Shetland Islands was primarily based on fishing. Recognising the locations strategic importance to the oil industry and the potential changes that it would bring to the islands Shetland Islands Council promoted legislation²³ which gave them Reserve Powers in dealing with the oil industry and control over developments in and around the islands. SOTEAG was established and involved in the EIA for the oil terminal (Figure 15) development.



Figure 15: Sullom Voe oil terminal

SOTEAG is an independent body with members from academia, the oil industry, government, government environmental agencies and indigenous marine industries. It has developed and maintains a comprehensive scientific monitoring programme²⁴ designed to ensure the health of Shetland's marine and coastal environment by providing early warning of environmental change and advice on required remedial action. It is funded by the Shetland Islands Council and the two oil industry pipeline operators who use the oil terminal.

The scale of oil industry development on the Falkland Islands is currently unknown. The scale of the onshore footprint will likely be less due to increased use of subsea risers and long distance pipelines. Despite these uncertainties the development of a similar independent advisory group should be considered. Similar to SOTEAG it will provide a transparent and open forum for all stakeholders to allow open decision making, know what advice is being tabled and allow it to be challenged.

There is clearly a role for the institute to coordinate and implement any resulting environmental monitoring and research activity. In addition it would have a key role as one of the partners in a similar Environmental Advisory Group or the Environmental Committee assuming its remit includes this.

²² <http://www.soteag.org.uk>

²³ http://www.legislation.gov.uk/ukla/1974/8/pdfs/ukla_19740008_en.pdf

²⁴ <http://www.soteag.org.uk/?/monitoring/>

13. Conclusions & Recommendations

The following conclusions are presented based on this study.

- There is potential for increasing environmental research on the Falkland Islands and South Georgia in a number of scientific areas.
- Developing the Falkland Islands as an international research platform in the South Atlantic would have significant benefit for local economic development and for improving international perceptions of the area.
- There are a number of significant factors which restrict the expansion of research activity on the Falkland Islands and South Georgia including a lack of wider awareness about current research and opportunities presented by the region, limitations in transport and telecommunications links and the perception of a complicated geopolitical situation.
- Current Falkland Islands and South Georgia environmental research activity is perceived to be fragmented. It lacks a common strategy and an obvious point of contact to represent it.
- A new institute provides an opportunity to unite Falklands Islands and South Georgia environmental and research activities together in order to promote clear aims, develop collaborations, provide easier access to the local environment and build local expertise.
- Whilst it is understandable that local groups and organisations will want to retain their identity, the success of the institute will depend on them working together to present a unified structure.
- Establishing and presenting a unifying umbrella structure to the international research community will have significant benefits for local research groups, in particular by providing new resource working on their behalf to develop new international collaborations and funding opportunities.
- While we do not suggest all local research groups should amalgamate with the new institute and it is perfectly possible for them to continue to operate independently, it is necessary for most groups to establish some degree of affiliation and to support the institute in its aims. The alternative is to introduce the perception of another competing organisation which will add further confusion.
- Establishing an institute is an ideal opportunity for local research groups to own and steer the process for their own benefit in order to maximise their advantage from the additional resource.
- Having the correct person as Director is vital for the success of the new institute. They will primarily face externally to promote and develop the local research capability internationally. They must engage with local and international research groups, implement an appropriate strategy agreed by local research interests, pursue international funding opportunities, and ensure good communication with all stakeholders. This will be a challenging full-time position for a very capable individual with great enthusiasm for the task.
- Developing research and teaching links with international research organisations and universities is vital to expand collaborations and provide opportunities to develop local expertise.

- Attracting new international researchers may be limited by the number of researchers with the remit and responsibility to pursue funding for research on the Falkland Islands and in South Georgia.
- The current global financial situation adds to the difficulty of estimating the level of external research income the new institute will earn. We anticipate that opportunities for external research income will decrease over the next 3-5 years. However upturn in economies in the east may provide opportunities for collaboration and investment with countries such as China and Korea.
- Where possible external research projects should involve local partners and build on existing expertise to ensure the local skill base is enhanced. The new institute needs to avoid being used solely as a logistics provider. Development of new research collaborations could be stimulated by establishing a new collaborators award to part fund small 'primer' projects which would involve both local and external partners.
- There is an opportunity for environmental monitoring of the Falkland Islands to benefit financially from hydrocarbon exploitation in the region. This will not materialise for several years and the institute should position itself now to take maximum advantage of this development as it takes off.
- Research projects in the Falkland Islands should benefit from access to data and equipment accessible because of current hydrocarbon exploration.
- Investment in new research facilities should be driven by definite user requirements and only if partnering with external institutes cannot provide workable access.
- The institute will be well placed to coordinate independent expertise and information in relation to hydrocarbon exploitation. It will also be well placed to lead an environmental advisory group (e.g. independent review of EIAs for oil industry projects) if required in the future.
- A beneficial consequence of establishing an institute representing all current local environmental research interests is improved communication and awareness of synergies between local groups.
- Implementing a long term environmental monitoring programme will ensure the collection of proper information against which to measure the impact of factors such as hydrocarbon exploitation or climate change. The resulting datasets will also be valuable in the context of environmental impact assessments.
- It is necessary to develop a critical level of research activity and associated reputation in order to develop significant partnerships. This quality mark may be inherited if the institute is established as a satellite facility to a larger established institute. But this would mean the aims and objectives of the institute are driven from outside of the Falkland Islands.
- All examples of analogous research institutes were driven by external requirements and sustained by majority government funding. In all cases, regardless of the mechanism of government funding, there was an established and supported political will to finance and develop the research capability.
- The development of and benefits from a research institute should be considered over the long term of the next 10 to 30 years.

- We note that FIG are already spending money on research activity in the Falkland's but do not propose that the research budget should be consolidated and managed by the institute. However, this may well be something for future consideration should its role and capabilities expand to a position where it is responsible for overall environmental strategy and the priority areas for research.

Given the benefits of pursuing expansion of environmental research together with the significant barriers to achieving this, we propose a gradual implementation and make the following recommendations.

- ❖ Establish an institute to establish a single coordinated interface for environmental research on the Falkland Islands.
- ❖ Appoint a suitable Director and Governing Board for the institute according to the recommendations provided in sections 8 and 9.
- ❖ Appoint a part-time logistics coordinator based in the institute to facilitate researchers working on the Falkland Islands.
- ❖ Ensure availability of necessary administrative support for the Director and Governing Board.
- ❖ Ensure the Chair of the Governing Board is a high profile external international figure able to assist with promoting the institute.
- ❖ Include responsibility for the new institute as part of the portfolio of a Member of the Falkland Islands Legislative Assembly. This should include working together with FIG to establish the requirement and benefits of long term government funding for the institute.
- ❖ Define a formal relationship between local research groups and organisations and the institute in the form of a Memorandum of Understanding.
- ❖ Develop a strategy for Falkland Islands environmental research to act as guidance for funding decisions and support for research collaborations. This should be done in jointly with all local stakeholders and take account of existing frameworks and new monitoring requirements.
- ❖ Establish a local research network to provide opportunities for all involved in environmental research to present recent developments promote activity, develop collaboration and encourage shared use of resources.
- ❖ Establish an online database of Falkland Islands research projects and scientific publications and request that Falkland Islands Trust maintain this resource on behalf of the institute. Also, require all visiting and local researchers to provide details of their research projects and scientific publications so they may be included in the research database to be held by the institute.
- ❖ The Director, in partnership with affiliated research groups, should establish a plan for pursuit of new collaborative opportunities and formal linkages with international research groups.
- ❖ Investigate in greater detail the funding opportunities open to researchers on the Falkland Islands and South Georgia and determine the level of external research funding the institute should aim to attract.

- ❖ Establish a new collaborators award to provide part funding to encourage local and external groups to establish new research projects in the region.
- ❖ Develop a plan to address the opportunities, funding and role for the institute resulting from hydrocarbon exploitation in the region.

14. Appendix A: Terms of Reference provided by FIG

Technical Assistance to the devising of a Business Plan & Financial Forecasts for a 'South Atlantic Environmental Research Institute'

BACKGROUND

Ongoing work on an Economic Development Strategy for the Falkland Islands includes the importance of diversification beyond the current three main legs of the economy (agriculture, fishing and tourism) in order to provide improved resilience. It is recognised that the Knowledge Economy provides an ideal way forward if practicable as it helps address the locational challenges (isolation and distance to markets etc) of the Islands in addition to providing the potential for high added value locally. Highly developed states all emphasize knowledge as a core economic ingredient going forwards.

After much thought and discussion between key public and private sector stakeholders it was suggested that the most practicable way to develop a knowledge economy for the Islands was to grow from existing activity in Fisheries research and Conservation/Environmental science. The Islands already have significant activity levels and strengths in these fields. Developing them will provide a low risk approach, and environmental science and conservation are strong growth areas internationally. A method for expanding activity in these areas was suggested as being to create a 'South Atlantic Environmental Research Institute' to facilitate and funnel work in the environmental science arena. All those involved in discussions to date have supported the concept of a Falkland Islands based research institute that also extends to potentially South Georgia Island and other South Atlantic areas.

A research institute is felt to be both economically advantageous and potentially viable. In economic terms, such an institute could:

- localise work currently taking place overseas or undertaken by overseas contractors or staff for whom much of the economic value add of the activity is lost to the economy
- reduce costs of essential activity by reducing the reliance on overseas organisations
- increase the scientific work undertaken in the Islands by gaining research funding directly or in collaboration with other institutions
- enhance the value of local scientific activity through developing from largely a fieldwork centre to one where most of the range of academic activity can take place (and thus improving the economic value)
- make better use of limited local resources through coordination and sharing of facilities and assets
- establish strong brand identity for itself (and for the Islands) which over time encourages more value and allows it to compete for valuable consultancy work overseas in addition to locally

In terms of viability, the optimum development path would appear to be:

- An Institute with a clear distinct brand identity but developed and governed as a partnership of several local organisations.
- All of these organisations and others being prepared to contribute to, draw from, and share through an appropriate mechanism resources and research – a collaborative agenda
- Focused on Environmental research and conservation (both marine and terrestrial).

DESCRIPTION OF THE ASSIGNMENT

The Falkland Islands Government need to be professionally supported in the preparation of a Business Plan inclusive of a set of financial forecasts analysing the feasibility and potential performance of a South Atlantic Environmental Research Institute if it was to be established in the Falkland Islands. This comprehensive Business Plan will be underpinned by realistic volume and financial assumptions that are arrived at by working with key stakeholders within the Falkland Islands and also potential overseas partners. It shall make clear whether the Institute is deemed financial feasible, provide a short-, medium- and long-term financial forecast and detail the key next steps in establishing it.

The main audience for this document shall be the Falkland Islands Government, with a funding decision for the Institute being based on the output of the assignment. Further local stakeholder and potential investors shall also be provided the final report including its recommendations.

Objectives

- To produce a well reasoned Business Plan that covers financial, operational and structural issues for establishing a collaborative South Atlantic Environmental Research Institute to be based in the Falkland Islands.
- To perform desk research into successful models adopted elsewhere in the world for Research Institutes of this nature (guidance can be provided on suitable examples).
- To include within this Business Plan professional recommendations on the best corporate structure of the Institute.
- To advise the next key steps in establishing the Institute assuming that it is deemed financially worthwhile to do so.
- To initiate contact with a number of key potential partners and advice on their level of support for the Institute and advise on potential investors in the project.

Expected results

- The presentation of a comprehensive Business Plan document that can be utilised by the Political decision making body to analyse and understand the following:
 - Up-front and ongoing investment requirements.
 - Likely break-even point.
 - Sustainability of the project.
 - Potential public and private sector partners.

- Short and longer-term development path of the Institute.
- Best fit corporate structure.
- Key Falkland Islands and overseas stakeholders to be aware that a South Atlantic Environmental Research Institute is to be established and the possible financial implications.
- A final version of the Business Plan will be presented to the Falkland Islands Government no later than 1st August 2010, or 30 working days after the end of the visit to the Falkland Islands, whichever is the later.

Dates & Location

Starting period

Indicative start of the project is foreseen to be early **June 2010**.

Foreseen duration & Location

The technical assistant's mission will be a set number of working days spread over a maximum of 2 month period (to be determined with Consultant(s)). Depending on the background and qualifications of the consultant(s) there would most likely be a need for a visit to the Falkland Islands towards the start of that two month period.

Once this 'fact-finding' mission was completed, the remainder of the assignment would be completed from the consultant's normal place of work.

15. Appendix B: Briefing Note Provided Ahead of Stakeholder Interviews

Discussions on the proposed South Atlantic Environmental Research Institute

The establishment of a South Atlantic Environmental Research Institute (SAERI) is currently under consideration by the Falkland Islands Government (FIG). To inform this decision it is necessary to have a clear picture of the economic and structural options for such a new organisation. The British Antarctic Survey (BAS) will be undertaking work to provide this information between August and October 2010. As part of this work Andrew Fleming from BAS will be visiting the Falkland Islands to meet with groups who may have an interest in the development of a Research Institute.

The purpose of these meetings is to ascertain the interest and potential involvement of groups already working in the Falkland Islands. Specifically we wish to address the following questions.

- What is your reaction to the idea of establishing a Research Institute in the Falkland Islands?
- Do you see a potential role for you as part of an institute?
- What facilities and infrastructure do you see as being available or necessary to develop?
- What current links do you have with visiting or local research groups?
- What do you see as being the existing strengths and main ‘selling point’ of the Falkland Islands for the international research community?

These details, especially the last question, will allow us to develop the potential scope of the Research Institute and establish the key research areas and facilities to be promoted to the local, UK and international research community. From this we will be able to determine the market demand for a research institute based in the Falkland Islands and propose viable structural and financial models.

I look forward to some interesting discussions later in August.

Andrew Fleming

British Antarctic Survey

July 2010

16. Appendix C: External Research Groups with Falkland Island Research Interests

- Queens University Belfast & Agri-Food and Biosciences Institute
- University of Magallanes (UMAG), Chile
- University of Aberdeen, School of Biological Sciences, UK
- Alfred Wegner Institute for Polar and Marine Research, Germany
- Max-Planck Institute for Ornithology, Germany
- Royal Society for the Protection of Birds, UK
- Joint Nature Conservation Committee, UK
- Royal Botanic Gardens, Kew, UK
- ISPA University Institute Marine Sciences Department, Portugal
- British Antarctic Survey, UK
- British Geological Survey, UK
- University of Washington, UK
- Wageningen University, Netherlands
- University of Bath, UK
- University of California, Davis, USA
- Botanical Gardens Heidelberg, Germany
- Institut für Spezielle Zoologie und Phyletisches, Germany
- Dunstaffnage Marine Laboratory, UK
- Wildlife Conservation Society, USA
- Iowa State University, USA
- Elephant Seal Research Group, Italy
- Memorial University of Newfoundland, Canada
- German Oceanographic Museum Stralsund, Germany
- Penn State University, USA
- University of Antwerp, Belgium
- California State University, USA
- Kings College London, UK
- Smithsonian Institution, USA
- University of Otago , New Zealand
- Moss Landing Marine Laboratories, USA
- University of Rennes , France
- University of Liverpool, UK
- Oxford University Dept Zoology, UK
- University East Anglia, UK
- The Natural History Museum, UK
- Netherlands Institute of Ecology, Netherlands

17. Appendix D: List of Stakeholders Interviewed

Name	Organisation & Position
John Barton	Director, Falkland Island Department of Natural Resources
Mark Belchier	British Antarctic Survey
Ian Boyd	Director, Scottish Oceans Institute and NERC Sea Mammal Research Unit
Paul Brickell	Falkland Islands Department of Fisheries & SMSG
Judith Brown	SGSSI & SMSG
Lynn Buckland	Falkland Islands Development Corporation
Paulo Caltry	ISPA University Institute, Portugal
Sarah Chaloner	MoD Conservation Group
Jan Cheek	Falkland Islands Legislative Assembly Member
Heather Christie	Foreign & Commonwealth Office
Victor Clarke	Foreign & Commonwealth Office, Overseas Territories Directorate
Lewis Clifton	New Island Trust
Martin Collins	Senior Executive, Government of South Georgia & South Sandwich Islands
John Croxall	Birdlife International
Craig Dockrill	Chief Executive, Falklands Conservation
Ian Dunn	British Antarctic Survey, BAS Board Member, Corporate Services
Emma Edwards	Falkland Islands Legislative Assembly Member
Mervyn Freeman	British Antarctic Survey
Christop Held	Alfred Wegner Institut, Germany
Dominic Hodgson	British Antarctic Survey
Ad Huiskies	Netherlands Institute of Ecology
Duncan Lunan	Astronomers of the Future Club
Jim McAdam	Queens University Belfast & Agri-Food and Biosciences Institute
Mac McArthur	Falkland Islands Department of Agriculture
Steve Manders	Falkland Islands Development Corporation
Eugene Murphy	British Antarctic Survey

Rick Nye	Foreign & Commonwealth Office, Head of Governor's Office, Stanley
Nick Owens	Director, British Antarctic Survey
Antony Payne	FI Environmental Planning Department
Lloyd Peck	British Antarctic Survey
Tara Pelembe	JNCC, UK
Richard Phillips	British Antarctic Survey
Sally Poncet	South Georgia Surveys
Petra Quillfeldt	Max-Planck Institute for Ornithology, Germany
Nick Rendell	FI Environmental Planning Department
Phyll Rendell	Falkland Islands Minerals Department
Mike Richardson	SOTEAG, UK
Alan Rodger	British Antarctic Survey, BAS Board Member, Science Strategy
Gunnar Sand	Director, University Centre in Svalbard
Dick Sawle	Falkland Islands Legislative Assembly Member
Beth Scott	University of Aberdeen, UK
John Shears	British Antarctic Survey, BAS Board Member, Operations and Engineering
Roy Smith	MoD Conservation Group
Roger Spink	Director, Falkland Islands Company
Georgina Strange	New Island Trust
Ian Strange	New Island Trust
Phil Stone	British Geological Survey
Clare Stringer	RSPB
Tim Thorogood	Chief Executive, Falkland Islands Government
Phil Trathan	British Antarctic Survey
Paul Trowell	Falkland Islands Tourist Board
Stuart Wallace	Falkland Islands Fisheries Companies Association
David Walton	Falkland Island Trust
Jon Watkins	British Antarctic Survey
Anton Wolfaardt	JNCC