

Darwin Plus: Overseas Territories Environment and Climate Fund Annual Report

Important note *To be completed with reference to the Reporting Guidance Notes for Project Leaders:
it is expected that this report will be about 10 pages in length, excluding annexes*

Submission Deadline: 30 April

Darwin Plus Project Information

Project Ref Number	DPLUS023
Project Title	Building capacity for habitat restoration in the Falkland Islands
Territory(ies)	Falkland Islands
Contract Holder Institution	Falklands Conservation
Partner Institutions	Falkland Island Government, Stanley Nurseries, Royal Botanic Gardens Kew (UK) and the Natural History Museum (UK).
Grant Value	£107,967
Start/end date of project	April 2014 – June 2016
Reporting period (e.g., Apr 2015-Mar 2016) and number (e.g., AR 1,2)	April 2014 – March 2015
Project Leader	Dr Andy Stanworth
Project website	www.falklandsconservation.com/projects/habitat-restoration
Report author and date	Dr Stuart W Smith

1. Project Overview

The project seeks to enhance capacity to restore eroded or otherwise degraded plant habitats using locally sourced native seeds in the Falkland Islands in the South Atlantic (Fig.1). Inappropriate land management across the Islands, both historic and current (i.e. converting land to cropland, burning and/or grazing), has led to a loss of vegetation, exposing the soil to wind and rain erosion. Natural plant re-colonization is slow on eroded soil due to strong winds, semi-arid climate and harsh soil substrate. Re-vegetation has been achieved either through planting *Poa flabellata* (Tussac) tillers or sowing non-native pastoral species (Kerr 1994; Miller *et al.* 2000; Cris *et al.* 2011). However, plant establishment following both these approaches has been inconsistent with particular difficulty in restoring vegetation on some of the harshest eroded soil types, such as bare clay (Wilson *et al.* 1993). Due to these limitations, as part of this project we are trialling the use of native seeds adapted to the soil and climate of the Falkland Islands, which are potentially a more effective tool for re-vegetation locally.

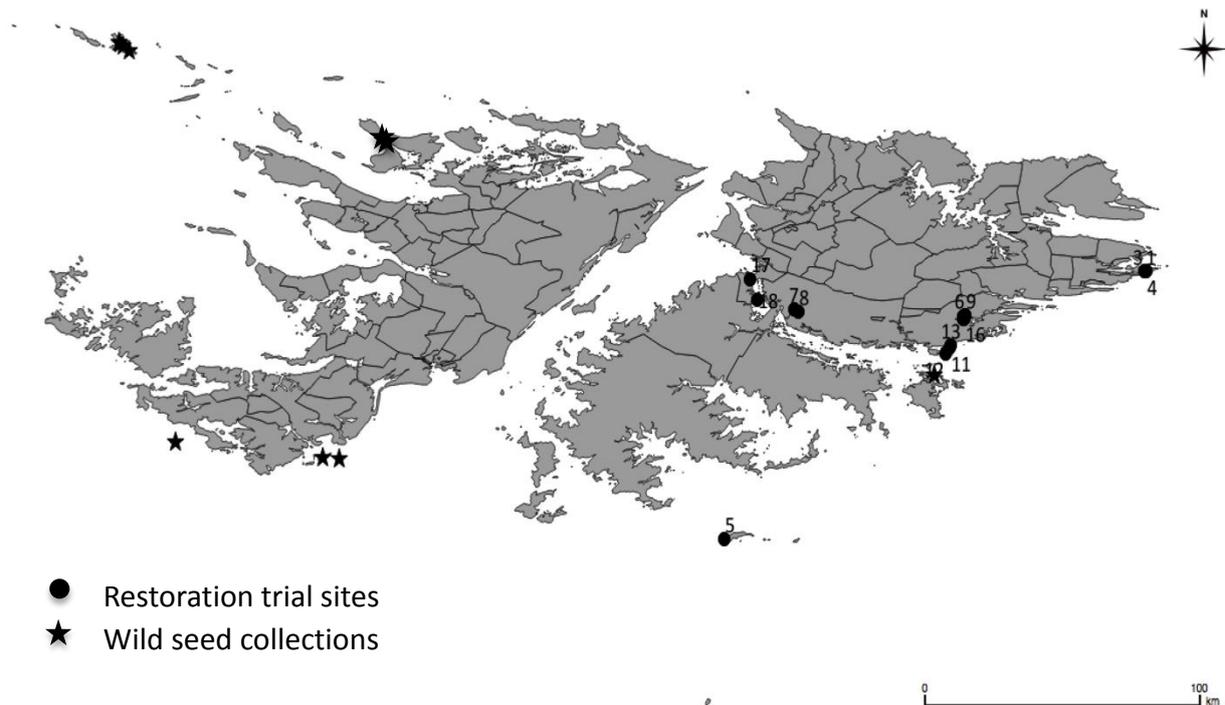


Fig 1. The Falkland Islands with farm boundaries outlined. Circular symbols represent locations of 16 habitat restoration trial sites on East Falklands as well as the Fitzroy pilot and an additional site on Sea Lion Island (site 5). Star symbols represent locations of wild collections of native seeds on West Falklands harvested during 2014/2015 growing season.

In 2013-2014 a restoration pilot study demonstrated that native plant seeds could recolonize bare clay. Building on this work, the current project aims to:

- (1) Produce re-vegetation protocols using native seed mixtures on different eroded soil types
- (2) Collect wild native seeds from West Falklands, adding to seeds already collected from East Falklands as part of 2012-2013 Challenge Fund project (EIDCF014)
- (3) Select species for larger scale production and develop a business plan for continual seed production in the future
- (4) Bulk up the seed stock available for local restoration and stockpile for a local landowner to take up larger-scale production.

From these objectives we plan to provide a source of seeds and guidance of best practice to farmers and landowners that wish to re-vegetate eroded soil using native seeds.

2. Project Progress

2.1 Progress in carrying out project activities

The Project Officer started three months later than initially planned due to recruitment, in mid-July 2014. Despite this, the Project Officer has implemented the majority of the planned activities for this year's project outputs.

Activities associated with Output 1, production of re-vegetation protocols, were the primary focus for the initial months. Between August and December 2014, the Project Officer designed and established an Island-wide restoration trial across East Falkland. In collaboration with statistical consultant Brian Bond, pilot results were analysed to guide the final experimental design. Following multiple site visits by the Project Officer, 16 sites were selected in East Falkland representing eroded soil types commonly found across the Islands: clay, peat and sand (including land previously cleared). Using a split-factorial experimental design across the sites, we are testing the effectiveness of sowing native seeds in combination with low-cost farmyard treatments - sheep dung, sheep dags (wool off-cuts) and

geotextiles (Fig. 1). Following activities under output 1.3 and 1.4, the Project Officer has continued to monitor the pilot (Fig. 1) and Island-wide restoration trial. These monitoring activities have taken more time than scheduled, due to limited assistance from staff at the Department of Agriculture resulting from staff shortage (see section 2.5).

With regards to output 2, wild seed collection from West Falkland, approximately half of the target species have been collected during this growing season (December 2014 – March 2015). Collections have been made from remote islands off West Falklands including: Grand Jason, Bird Island, Arch Island, Albemarle Rocks, Philimore Island and Saunders Island. Six of the 15 target species have been collected from the wild during the 2014/2015 growing season, across 10 collections (Fig. 1). Despite the limited breadth of species seeds collected, the project is ahead of schedule with all the collections already having undergone post-harvest processing and shipment to the Millennium Seed Bank (MSB) Kew (see proforma in Annex). As the Project Officer was employed three months later than the intended start date, there have been fewer collections of seeds from West Falkland and these will occur in the next growing season (see amended work plan Annex Table A1).

To meet the planned activities for outputs 3 and 4, selection of species for large-scale production for the development of a business plan and bulking the seed stockpile, it was necessary to establish the Native Seed Hub at Stanley Nurseries in October 2014. Over 2100 plants were planted comprising 13 target species used in the native species seed mixtures for restoration trials. Plants at the Native Seed Hub have been monitored weekly since establishment to collect phenological data (timing of flowering, fruiting and ripening) and meteorological data. As plants were established in single event, there is no data on ease of cultivation of species. Nevertheless, further germination trials have been conducted using sand, building on our knowledge of cultivation of these species in peat from the Challenge Fund EIDCF014. Harvesting seeds from the Native Seed Hub has been key to addressing activities 4.1 collecting large quantities of seed, with 52% of the individuals across species planted producing seed and all individuals having successfully established. These seeds have been harvested and undergone preliminary processing and drying and are waiting further cleaning and processing. Due to organisational uncertainties and restructuring at MSB Kew, we were unable to identify a suitable candidate for in-country training visit (Output 4.2). However, by maintaining good communications with Kew we are in the process of selecting a Kew representative to visit the Islands to provide seed collecting and processing training (see amended work plan Annex Table A1).

2.2 Project support to environmental and/or climate outcomes in the UKOT's

Through this Darwin project we are developing a practical and low-cost method that can be readily used by farmers and landowners to re-vegetate severely eroded soils across the Falkland Islands. By sowing native seeds in combination with supportive treatments, multiple species can establish on severely eroded soils. This method overcomes limitations of previous restoration approaches, such as planting tillers of single species only on organic soils. From the Island-wide restoration trial we are in the process of identifying appropriate restoration methods for different soil types. As part of the restoration trial we are measuring soil properties and soil microbiology in collaboration with the Natural History Museum, UK (see Section 3 below) and this directly address a key knowledge gap identified in the Falkland Island Biodiversity Strategy 2008 – 2018 (FIG 2008). In addition, the majority of the Falkland Islands is dominated by peat/peaty soils which represent the densest form of terrestrial carbon (Lal 2012). Re-vegetation of eroded peatlands using native seeds has the potential to protect and retain soil carbon, therefore presenting a significant opportunity to mitigate UK Overseas Territories land derived CO₂ emissions (Salisbury & MacCarthy 2014). Building a stockpile of native seeds through continuing wild collections and rearing seeds in the Native Seed Hub in Stanley, we are also mitigating the potential threat of invasive species that might occur through the use of non-native pastoral seed mixtures (FIG 2008). This project is improving the Falkland Islands' capacity to manage the vegetation and soil, offsetting greenhouse gas emissions and reducing the risk of introducing more invasive species into the Islands.

2.3 Progress towards project outputs

(1) The production of re-vegetation protocols using native seed mixtures on different eroded soil types

Thus far, the Project Officer has targeted the establishment of restoration trials to provide evidence for the production of re-vegetation protocols using native seed mixtures. Restoration trials have been established across 16 sites on East Falklands across four farms: Cape Pembroke, Fitzroy, Goose Green and Saladero (Fig. 1). Beyond the scope of the original project proposal we have established an additional trial site on Sea Lion Island, a national nature reserve (Fig. 1; site 5). Effective treatments used in combination with applying native seeds were selected from the pilot study and included applying sheep dags (wool off-cuts), sheep dung, coir geotextiles and their combinations. Differing from the pilot study that used wooden pallets, coir geotextiles have been used as part of the wider restoration trial due to logistical ease of application and monitoring (see discussion in Section 5).

After only 3 months, six treatments have shown significant increases in total plant cover across all soil types in comparison to no seed and treatment controls (linear mixed model, $X_2 = 51.27$, $df = 14$, $p < 0.001$; Fig. 2 and Annex Fig. A2). It is important to note that this is an interim analysis, prior to using a more powerful statistical analysis with a full year of data. Nevertheless, thus far the most effective treatment is sowing native seed in combination with sheep dung, dags and geotextile, which has increased total plant cover on average by 7.9% across soil types. To date, soil type has had little influence on plant cover; however, plant canopy cover was negatively correlated with soil temperature range (maximum minus minimum) (linear mixed model, $X_2 = 4.27$, $df = 15$, $p = 0.039$). Plant canopy cover was greater for plots with a lower soil temperature range suggesting that effective treatments create a stable microclimate for plant germination and establishment. Following continued monitoring in 2015, our Island-wide study will identify the most effective native plant species and treatments for establishing on eroded soil.

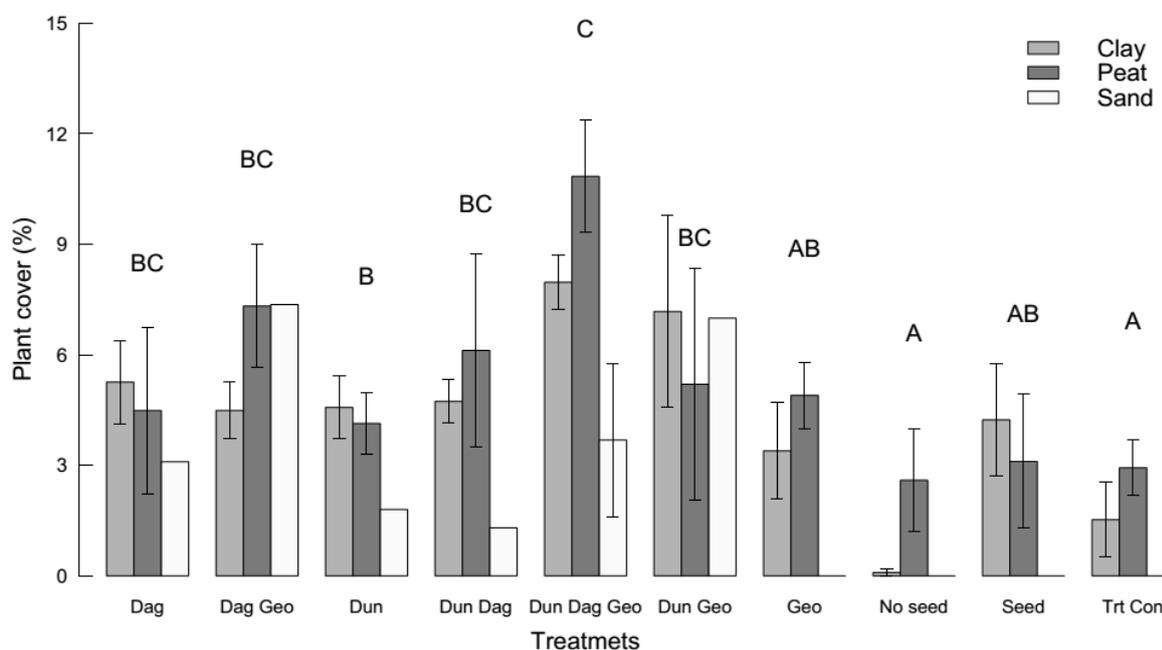


Fig.2. Average total plant cover (after cotyledon growth phase) for different restorative treatments, across three soil types clay ($n = 4$), peat ($n = 3$) and sand ($n = 1$). Treatments include: (1) sheep dags; (2) dags and geotextile; (3) sheep dung; (4) dung and dags; (5) dung, dags and geotextile; (6) dung and geotextile; (7) geotextile; (8) no seed; (9) seed and (10) treatment control – applying sheep dung, dags and geotextile without seed. Treatments with different letter combinations are significantly different (Tukey, $p < 0.005$). Errors bars are ± 1 S.E.

The pilot has been running for an additional year and effective treatments, namely the combination of native seeds, dung and dags, have established a plant community covering 69% of previously bare clay (see Annex Fig. A2). In addition, from the pilot study it is worth noting that key colonising species are

positively correlated to total plant cover, notably grasses *Elymus magellanicus*, *Poa alopecurus* (Peat and Sand ecotypes) and *Festuca magellanica* (see Annex Fig. A3).

Given these initial positive germination and establishment results as well as results from the pilot study we are confident of providing re-vegetation guidance to farmers and landowners by the end of the project.

(2) Collection of seed from West Falkland

Due to a delayed start date of the Project Officer by three months, other outputs namely the establishment of an Island-wide restoration trial were prioritised for the first growing season with the intended purpose of demonstrating the effectiveness of native seeds for restoration. Nevertheless, wild native seeds were collected for six of the intended 15 species from West Falklands (see Fig. 1 and proforma in Annex). Nonetheless, seeds have been collected from remote islands off West Falkland including: Grand Jason, Bird Island, Arch Island, Albemarle Rocks, Philimore Island and Saunders Island. Following a change of request to push back fieldwork funds into 2015/2016, wild seed collections will be made on main West Falkland in the next growing season. Therefore as part of output 2.5, only seeds of species collected during this year will be planted in the Native Seed Hub in 2015/2016 and collections of remaining species from West Falklands will be used as a stockpile for further restorative work.

(3) Selection of species for larger scale production and develop a business plan for continual seed production in the future; (4) bulking up the seed stock available for local restoration and stockpile for a local landowner to take up larger-scale production.

Since establishing the Native Seed Hub at Stanley Nurseries as part of this project, the Project Officer has collected much-needed phenological data for 14 native plant species. Weekly monitoring has identified peak flowering, fruiting and ripening times for each species as well as collecting supplementary meteorological data that may help explain how such timings vary year to year. As part of output 4, the Native Seed Hub has increased the seed stock of all but one of the planted species. The project is on track for having sufficient data regarding cultivation and management of these native plants to produce a cost analysis and business plan for the end of the project. The Project Officer is also attending the National Native Seed Conference in Santa Fe, NM, USA in April 2015 and the World Conference on Ecological Restoration in Manchester, UK in August 2015, to learn about other organisations' and countries' approaches to establishing native seed production and habitat restoration.

Despite this progress, there is concern from the Department of Agriculture and some farmers as to the likelihood of large-scale native seed production being taken up within the Falkland Islands (see Section 2.5). Issues have been raised including: lack of knowledge and awareness, insufficient facilities and impetus from landowners and farmers to rear native plants for seeds. The Project Officer is directly attempting to fill knowledge gaps with regards to the production of native seeds, raise awareness through public outreach (see Section 3) and in-country training as well as procuring seed processing equipment, such as the seed aspirator purchased following a project change of request to capital funds. Importantly, this Darwin Project will also bulk up a seed stock that can be used to start native seed production. The challenge will be to create an environment where farmers or landowners would be willing to take up large-scale production of native seeds within the timeframe of the project (Output 4.4 and see Section 2.5). A discussion between farmers, landowners and stakeholders organised by the Project Officer will be address this issue via a consultation in January 2016 (see Section 2.4 below).

2.4 Progress towards the project outcome

The project is on track to increase capacity to restore eroded or otherwise degraded habitats in the Falkland Islands using locally sourced native seeds. After the first year of the project, we have established an Island-wide restoration trial, which will provide a scientifically rigorous evidence-base on how best to use native seeds and supportive treatments for re-vegetating different types of eroded soil. In terms of filling the knowledge gap, raising awareness and acquiring equipment and training we are

making progress for making the production of native seeds more viable in the Falkland Islands. There is interest locally for eroded soil to be restored; for example, we have established restoration trial sites outside the scope of the original project at Fitzroy and Sea Lion Island. However, to sustain re-vegetation efforts requires a continuous supply of native seeds that are either collected from the wild or produced locally on a large-scale. We need to identify a route whereby the Native Seed Hub can be managed beyond the timespan of the project as well as creating an environment encouraging landowners or farmers to produce seeds from native plants. To address these issues a public consultation will be held after January 2016 where we will present and discuss results from the Island-wide restoration trial and explore, together with key stakeholders, strategies for going forward and supporting further restoration efforts.

2.5 Monitoring of risks

Table 1. Risks identified in the application for the project (1, 2, and 3) and risks identified during the project (4,5 and 6).

Description of the risk	Likelihood the event will happen (H/M/L)	Impact of the event on the project (H/M/L)	Steps the project has taken to reduce or manage the risk
(1) Poor yield of seed from the Native Seed Hub	L	H	The Project Officer undertook training at the Millennium Seed Bank in establishing a Native Seed Hub. Staff from Stanley Nurseries who have expertise in growing native species reared plants prior to planting. In the first year, all plants have established and 52% of individuals produced seed.
(2) No landowner can be found to take on large scale production of seed	H	M	There is a higher likelihood that landowners would be unwilling to produce native seeds on a large-scale. To address this issue we plan to raise the profile of the habitat restoration trial and the importance of using native seeds and establish more demonstration sites such as on other farms (i.e. Fitzroy, Sea Lion Island). In-country training for seed production and processing will be advertised to farmers. The Project Officer is attending the Native Seed Conference in Santa Fe, NM, USA in April 2015, and will also gain ideas for strategies to encourage seed production.
(3) Project officer terminates employment before end of contract	L	M	Pre-existing strong linkages have been formed with partner organisations that should sustain the knowledge gained thus far in the project.
(4) Insufficient bandwidth for terrestrial habitat restoration due to oil exploration	H	M	For many government departments, attention has been diverted to responding to environmental assessments prior to oil exploration. Despite limited time commitments, representatives of the EPD have been on site visits and kept informed of project progress.
(5) Staff shortages and high staff turnover at the Falkland Island Government	H	M	Throughout the first year of the project the Department of Agriculture has been without an Agronomist and only recently filled the post of Senior Agricultural Advisor. A lack of staff has limited the interaction with this project. The

Department of Agriculture			Project Officer has continually attempted to keep junior staff members involved in the project through site visits and regular progress reports and these will continue.
(6) No in-country training by the MSB Kew	L	H	During the year there were concerns that MSB Kew may be unable to provide in-country training on seed processing due organisation restructure and therefore difficulties in identifying a suitable candidate. Nevertheless, these issues have been resolved and we are currently identifying the most suitable candidate to conduct in-country training in the Falkland Islands.

3. Project Stakeholders

External stakeholders and collaborators

UK-based project collaborators have shown strong support for the project throughout the first year. The Project Officer met with collaborators at the Royal Botanic Gardens Kew, MSB, statistical consultant Brian Bond and Dr Anne Jungblut from the Natural History Museum (NHM) during training in London, UK, in July 2014. Dr Jungblut was also involved as collaborator in the EPD funded restoration pilot, studying changes in the soil microbial community following re-vegetation. In February 2015, Dr Jungblut visited the Islands as part of her Shackleton Scholarship funded research, surveying eroded soil across a selection of sites of the Island-wide restoration trial. Dr Rebecca Upson, who is based at Kew, also visited the Islands in March 2015 as part a EU-BEST climate change project and visited restoration trial sites as well as the Native Seed Hub and discussed continued Kew involvement in the project. The project has also greatly benefited from the involvement of Alexandra Davey at MSB Kew (former 2012-2013 Challenge Fund project officer - EIDCF014) who has regularly contributed to progress reports and requests for information throughout the project.

In-country stakeholders, farmers and landowners

Involvement of project partners in the Falkland Islands has been more problematic because of other time commitments primarily due to shortage of staff and oil exploration (see Section 2.5). The Agronomy Assistant, Erica Berntsen has been kept regularly informed of the restoration trial through progress reports and has visited a selection of the trial sites in August 2014 and January 2015, while Nick Rendell, Environment Officer at the Environmental Planning Department (Falkland Islands Government), visited sites at Cape Pembroke in September 2014 and March 2015. Despite his time constraints, Nick Rendell has been supportive of activities to expand trial sites, granting permission for re-vegetating the Sea Lion Island national nature reserve as well as pushing forward permission to erect fencing at Cape Pembroke (see Section 5). The Project Officer met all of the project partners and landowners involved in the restoration trial during August 2014. All farmers and landowners directly involved in the restoration trial have been met regularly during site visits, kept informed of progress via emails and will be receiving a brief report in April 2015 with preliminary trial results.

4. Monitoring and evaluation

During the reporting period, Dr Rebecca Upson at Kew, Erica Berntsen at the Department of Agriculture, Brian Bond, independent statistical consultant, and Alexandra Davey at MSB Kew (former 2012-2013 Challenge Fund project officer - EIDCF014) have been included in regular weekly to bi-weekly progress reports focusing on the experimental design of restoration trial. These reports have become monthly to bi-monthly during the busy period of monitoring trial sites and collecting native seeds from West Falklands. The use of these reports has enabled regular feedback and reviews of the project progress against planned activities and outputs. Due to staff shortages at the Department of Agriculture it was decided not to establish a steering group at the start of the project. This will be

reassessed if a new agronomist is employed during the period of this project. Given the importance of identifying a stakeholder willing to produce seeds on a large scale, a consultation will be held after January 2016 with farmers, landowners, Stanley Nurseries, Department of Agriculture, Environmental Planning Department and any other interested parties. This consultation will be held after collections and analysis of species-level results from the Island-wide restoration trial, thereby having evidence to support the use of native seeds for restoration.

5. Lessons learnt

Developing a low-cost and effective re-vegetation toolkit

Treatments need to be low-cost but effective for farmers and landowners to be willing to adopt re-vegetation techniques. The initial pilot study on eroded clay took advantage of the large supply of wooden pallets on the Islands to cover germinating seeds. Following analysis of the pilot study, results showed wooden pallets significantly increased plant establishment and cover. However, up-scaling this treatment to an Island-wide trial was deemed logistically unfeasible. Instead, the Project Officer sought advice from other conservation agencies and institutes involved in restoration (e.g. Moors for the Future, UK, Cranfield Soil and AgriFood Institute, UK, and The East Africa Sisal Company Ltd.) and identified geotextiles as a potentially effective alternative treatment. Derived from coconut husk, coir geotextile matting provides durable, lightweight and biodegradable soil cover. Coir geotextile is relatively low cost, £2.25 m⁻² (plus shipping costs), and has thus far proved effective in enhancing plant germination and establishment (see Section 2.3). Covering trial plots with matting instead of wooden pallets also helps in monitoring the plots without unnecessary disturbance to the established plant community, which occurred when lifting up the pallets. We highly recommend the use of geotextiles in future restoration projects as a more affordable and practical tool for re-vegetating eroded soil.

Erecting fencing on restoration sites in conservation areas

Important for excluding unwanted disturbance, fencing can be the single most expensive element of restoration projects as well as laborious to construct and maintain on a large scale. In addition to this, we struggled with gaining permission to erect fencing to exclude large (i.e. horses) and small (i.e. hares) herbivores to allow seeds to germinate and establish on one particular site, namely Cape Pembroke near the capital Stanley, East Falkland. Government owned and part of Stanley Common, Cape Pembroke is legally defined as a conservation area. Unbeknownst to the Project Officer at the start of the project, permission was formally required to erect fencing on Cape Pembroke from the FIG Lands Committee. A letter requesting permission was issued in October 2014; however, the committee deferred permission over concerns that areas of the Common would no longer be accessible (mainly by land-rovers) due to the fencing. This prevented establishing three sites by December 2014 as part of the Island-wide field trial, limiting restoration experiments to sites that already had fencing. With hindsight, the Project Officer would have pursued permission for fencing far earlier in the project. With support of Nick Rendell, Environment Planning Department, and legal support, hare-proof fencing will now be constructed around the already established trial sites by the end of April 2015, with a second request to the Land Committee pending. Future projects of this nature need to ensure permission for fencing is granted far in advance of any restoration activity.

6. Actions taken in response to previous reviews (if applicable)

Comments on the initial application: *'the advisory group...wonders how you will address the greatest risk in the business plan: that the cost of producing seeds may well exceed the willingness of landowners to pay? This appears to be quite a high risk. Might it be mitigated by government action to either subsidise production or require the landowners to take action against eroding bare land?'*

The risk of a lack of willingness by landowners to take up the production of native seeds has been noted and upgraded to a higher level of risk than in the original application (see Section 2.5). To address this, we are currently collating evidence in order to highlight the effectiveness of using native seeds to restore eroded land. This will be followed by a stakeholder consultation with key stakeholders, such as

the Department of Agriculture, Environmental Planning Department, landowners and farmers, in January 2016. This consultation will directly address the issue of how to ensure native seed production and procurement beyond the immediate timespan of this project. Attending the National Native Seed conference in the USA in April 2015 and the World Conference on Ecological Restoration in Manchester, UK in August 2015, the Project Officer is also seeking first-hand knowledge and lessons learned from other researchers and practitioners regarding how to sustain native seed production for restoration.

7. Other comments on progress not covered elsewhere

Re-vegetation using native seeds provides a response to the problem of soil erosion on the Falkland Islands, yet it does not address the main underlying cause, namely land-use management. In conversation, farmers have referred to sowing native seeds as a 'sticky plaster solution', the idea being that if eroded soil is re-vegetated in one area but the land is inappropriately managed, then other areas will soon become eroded. A growing group of farmers, as well as the Department of Agriculture, have started using holistic grazing management, a form of high intensity - short duration - rotational grazing that mimics natural herds as developed by Allan Savory (Savory, 1999). Anecdotal evidence suggests that this management strategy increases grassland diversity, improves soil quality and accelerates plant colonisation of eroded soil. Therefore, **investigations are needed that integrate sowing native seeds with holistic grazing management**. For instance, native seeds could be sown when 'the land is resting' to ensure that they germinate and survive. This approach would also benefit from avoiding the use of fencing that has been shown to raise issues with some landowners and could also be easily adopted by a growing group of experimental farmers keen to use alternative approaches to land management. Integrating restoration by native seed sowing with holistic grazing management could be seen as an approach that may accelerate habitat restoration across the Islands.

8. Sustainability

Through outreach activities a broad sector of the Falkland Islands community have been made aware of work undertaken as part of this Darwin project. At the start of the project in July 2014, Falklands Conservation presented a poster at Farmers Week introducing the project. Following this the Project Officer presented preliminary results from the pilot study and detailed activities for the year, in the Spring edition of the Wool Press, a quarterly newsletter for Falkland Islands farmers, published in October 2014. Recently, the Project Officer highlighted the progress of the restoration trial to farmers and landowners and gave out free packets of native seeds at Rural Business Association agricultural show (see Annex Fig. A4). The Project Officer has also engaged with external practitioners, including a visit to restoration trial sites with a group of agricultural students from Universidad de Magallanes, Chile, who were on a summer placement at Stanley Nurseries. Throughout the project, the Project Officer has benefited from the help of many local Falklands Conservation volunteers who have helped in establishing the Native Seed Hub, trial sites and collecting seeds.

The Project Officer has undertaken several school visits during the year. In December 2014, marking the International Year of the Soil, he planted two native Boxwood shrubs with pupils at the Falkland Islands Community School (FICS) and Infant and Junior School (IJS) to raise awareness for re-vegetating the soil. This was followed by social-media coverage by Falklands Conservation and the British Society of Soil Science (in the society's magazine and via twitter). An article highlighting the importance of Falkland Islands' soil and the habitat restoration project was also printed in the December 2015 Falklands Conservation newsletter. There have been two further school visits to IJS and the Mount Pleasant School at the Mount Pleasant military complex to teach pupils about native plants and seeds on the Falklands (see Annex Fig. A4).

Within the academic and research community, the project was included in an oral presentation by Falklands Conservation during the Falkland Islands Science Symposium, 17 – 24 January 2015. The symposium was filmed and will be shortly broadcast as part of Boxmedia's 'Unveiling the Islands'. Networking at the symposium raised awareness of the importance of studying terrestrial ecosystems in the Falkland Islands. Furthermore, the Project Officer will be giving an oral presentation entitled 'Restoring peatlands using native seeds, sheep dung and daglocks in the Falkland Islands' at the

National Native Seed Conference, Santa Fe, USA in April 2015 and the World Conference on Ecological Restoration in Manchester, UK in August 2015.

On the ground, farmers involved in the project, such as the manager at Saladero have started to use typical farmyard waste, namely sheep dung and dags, to restore bare clay. Restoration trial sites at Bertha’s Beach and Cape Pembroke are tourist hotspots for locals and military personnel and the Project Officer has been asked by the military and EPD to create information boards for visitors. Likewise, Stanley Nurseries wish to have information boards about species growing in the Native Seed Hub. In the short-term, displays at restoration trial sites and Native Seed Hub will be a legacy of the restorative activities undertaken as part of the project. Nevertheless, in the second year of this project we will produce information booklets that will act as a long-term reference guide to best practice for re-vegetation using native seeds to farmers and landowners.

9. Darwin Identity

The Darwin Initiative logo has been presented on the project website and funding has been mentioned in writing on the poster at Farmers Week and all publications (i.e. the Wool Press and Falklands Conservation newsletter). Government departments and research organisations are familiar with the Darwin Initiative with several projects currently active in the Islands. As part of this project, the Darwin Initiative logo will also be presented to an international audience outside the Islands, when the Project Officer gives an oral presentation at the National Native Seed Conference, USA in April 2015 and the World Conference on Ecological Restoration in Manchester, UK in August 2015.

10. Project Expenditure

Table 1 Project expenditure during the reporting period (1 April 2014 – 31 March 2015)

Project spend (indicative) in this financial year	2014/15 Grant (£)	2014/15 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs				This underspend was due to the Project Officer starting 3 months late through recruitment processes. Darwin has approved the change to the 2015/2016 budget.
Consultancy				
Overhead				Underspend due to later start date of the Project Officer through recruitment. Darwin has approved a change to the 2015/2016 budget.
Travel and Sub				Underspend due to later start of the Project Officer, which has affected travel to undertake wild seed collections on West Falklands. Darwin has approved a change to the 2015/2016 budget.
Operating costs				Underspend was due to a later start date of the Project Officer and fewer field trips to collect seeds and therefore less spend for shipping seeds to MSB Kew.
Capital items				We requested a change of capital

				to acquire a moisture probe and seed aspirator instead of a seed drill. However, the seed aspirator was more expensive (~£1500) than expected. This overspend will be compensated by underspend in operating costs and travel and subsistence.
Others (Please specify)				
TOTAL	63,838	51,189		

11. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes

I agree for the Darwin Secretariat to publish the content of this section (please leave this line in to indicate your agreement to use any material you provide here)

Soil erosion depletes the most basic of all natural resources. Peat is the dominant soil type across the Falkland Islands and is globally the densest store of terrestrial carbon. However, as nutrient poor ecosystems, peatlands are particularly vulnerable to degradation and erosion following inappropriate land management. As part of the Darwin Initiative project, 'Building capacity for habitat restoration in the Falkland Islands' (2014 – 2016) we are investigating a novel approach to re-vegetate soil using native seeds and low-cost restorative treatments. Thus far, building on the knowledge from our Island-wide restoration trial, sowing native seeds in combination with sheep dung, dags (wool off-cuts) and coir geotextiles has been identified as the most effective treatment to increase native plant cover across several eroded soil types including: bare clay, peat and sand. Based on results from the pilot study established in 2013, which uses similar treatments, we anticipate increases of plant cover up to 69% and greater across the Island-wide trial after a year. Wider adoption of sowing native seeds with restorative treatments will improve the Falkland Islands capacity to manage the vegetation and soil, offset greenhouse gas emissions and reduce the risk of introducing more invasive species into the Islands through the sowing of non-native pastoral species.

To increase the availability of native seeds required for local restoration on the Falkland Islands, we have created the first Native Seed Hub at Stanley Nurseries. In October 2014, the Native Seed Hub was established planting 2400 plantlets, comprising 14 species all of which have successfully established. All but one species has produced seed in the first year, with 52% of individuals seeding. The Native Seed Hub has been monitored on a weekly basis providing much-needed phenological data (flowering, ripening and fruiting time) of native species in the Falkland Islands. This information can be used when rearing plants on a larger scale. Additional seeds have been sourced from the wild with 10 collections made from remote islands off the coast of West Falklands and shipped to the Millennium Seed Bank Kew for further cleaning and processing. From the Island-wide restoration trial and stockpiling of native seeds, we will be able to provide a source of native seeds and guidance of best practice to farmers and landowners that wish to re-vegetate eroded soil locally.

References

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