Darwin Plus: Overseas Territories Environment and Climate Fund

Final Report

Important note *To be completed with reference to the Reporting Guidance Notes for Project Leaders: it is expected that this report will be a maximum of 20 pages in length, excluding annexes*

Darwin Project Information

Project Ref Number	19-028
Project Title	Addressing the threat of Invasive Species in Pitcairn Overseas Territory
Territory(ies)	Pitcairn Islands
Contract Holder Institution	Royal Society for the Protection of Birds (RSPB)
Partner Institutions	Pitcairn Natural Resources Division (NRD)
Grant Value	£287,060
Start/end date of project	15 April 2012 to 30 March 2016
Project Leader Name	John Kelly
Project website/Twitter/Blog etc.	http://www.rspb.org.uk/community/ourwork/b/biodiversity/archive/2015/10/26/science-expedition-to-henderson-island-to-investigate-invasive-rats-part-10.aspx
Report author(s) and date	John Kelly, 26/08/2016

1 Project Overview

The Pitcairn Islands UK Overseas Territory, comprising of Pitcairn, Henderson, Ducie and Oeno Islands, located in the South Pacific Ocean, boasts unique biodiversity of global significance. Henderson Island, a UNESCO World Heritage Site, supports the entire breeding populations of four globally threatened land birds, and is the only known nesting location of the Endangered Henderson petrel. Oeno Island holds breeding populations of the Endangered Phoenix petrel and important numbers of Murphy's petrels. All four islands in the Pitcairn group are Important Bird Areas (IBAs). One of the principal threats to the Pitcairn Islands, and other islands in the Pacific region, is the impact posed by invasive non-native species. Rats and other mammalian predators are well known for their impact on islands, and other less obvious species such as plants and invertebrates can also cause major changes to island ecosystems. Invasive non-native species are also known to have a significant economic impact on many economies and islands world wide. When starting this project, it was unclear if the presence of rats and other invasive pests on Pitcairn Island (the only inhabited island of the group) had a significant socio-economic impact in terms of lost crop production and ongoing control costs, as well as negatively affecting quality of life.

The risk of new invasive non-native species arriving from French Polynesia to the Pitcairn Islands group is significant. Furthermore, the outer islands of Henderson, Oeno and Ducie are threatened by the spread of invasive non-native species already established on Pitcairn Island.

This project was initially designed following the 2011 attempt to eradicate rats from Henderson Island. The intention was to verify the outcome of this endeavour, share results more widely across the Pacific, develop capacity in the Cook Islands and Kiribati and, at the request of the Pitcairn community itself, begin scoping the feasibility of eradicating rats and cats from Pitcairn Island. However, shortly after award, the project was hit by a major setback when the RSPB received reports that a rat was filmed on Henderson Island. This required a reworking of the project to include a rapid response expedition to Henderson and subsequent redesigning of the planned follow up expedition to understand the impact of a rebounding rodent population and potential causes of the failed operation. The project also included a review of biosecurity on Pitcairn Island to aid improvements of biosecurity into the islands and between the islands.

1.1 Overview of project work outside the Pitcairn Islands

Within the wider Pacific region the same threats from invasive non-native species exist forming a major part of conservation efforts in the area. These threats are often most severe in countries with limited resources and capacity, including the Cook Islands and Kiribati.

Kiribati supports outstanding marine and terrestrial biodiversity values including globally important seabird populations in the Phoenix Islands Protected Area (PIPA) and southern Line Islands. Since 2008 Kiribati has been undertaking island restoration in the PIPA and at Kiritimati beginning with removal of invasive species, particularly rats. This project was designed to build capacity to ensure rats and other invasive non-native species do not reinvade Kiritimati and the PIPA, and that other invasive species are not spread around Kiribati.

The project contributed to conservation planning for two of the outer islands in the **Cook Islands**. The work was in two parts – firstly undertaking a workshop to scope a biosecurity action plan for Suwarrow and secondly to survey Takutea motu as a first step in assisting the Takutea Trust to restore Takutea. Suwarrow National Park is an important seabird breeding atoll in the Northern Cook Islands. In 2013 the National Environment Service undertook a rat eradication attempt on the atoll to protect and enhance its biota. This Darwin project was designed to develop tools needed to ensure that Suwarrow remains free of invasive non-native species.

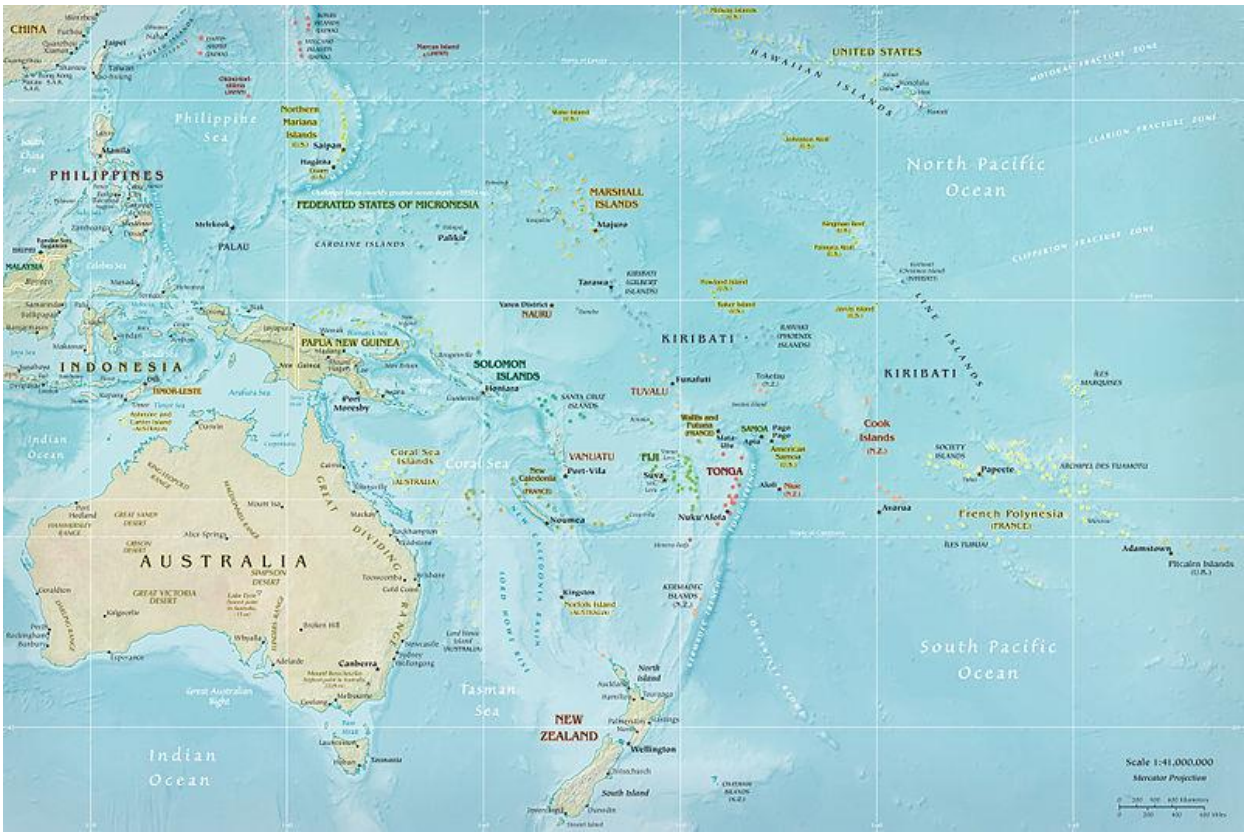

Figure 1: Location map showing Pitcairn, Cook Islands and Kiribati. Source Wikimedia.

2 Project Achievements

2.1 Outcome

This project aimed to maintain, monitor and advance solutions to reduce the negative impacts of invasive non-native species in the Pitcairn Island group, whilst sharing experiences, capacity and best practice with other Pacific countries and territories.

Despite the setback in its original design, the project did achieve its intended outcomes and exceeded the original plan by supporting a six-month expedition to Henderson Island. The outputs from this project are informing a strategy towards restoring Henderson Island and empowering Pitcairn community to restore their island, should they wish to pursue this course of action. The outcomes of the project are:

- Increased capacity among Pitcairn Islanders to maintain the pest-free status of Oeno, Ducie and Henderson islands.

- As part of this project, a Pitcairn Islander, Sue O'Keefe, worked as an assistant in the Pitcairn Natural Resources Division (NRD) in order to support the development of biosecurity legislation (all previous biosecurity legislation having been previously removed, leaving Pitcairn's vulnerable natural environment exposed). She also provided specific support on various policies in Pitcairn.

- Increased understanding of the biodiversity benefits of rat eradication on Oeno. While further monitoring will be required to develop a robust dataset, preliminary results indicate that the seabird nesting population has increased significantly since the eradication of rodents from the atoll.

- The assessment of biosecurity practices resulted in the identification of a number of weaknesses with recommendations to improve biosecurity currently being drafted.

- A baseline for which to measure any change in social attitudes towards invasive non-native species and their impact on the lives of Pitcairners.

- Biodiversity monitoring transects were established for birds, lizards and rats on Pitcairn Island. Depending on costs and availability, these transects will be run seasonally by islanders Carol and Jay Warren.

- We now have a greater understanding of the socioeconomic impact of rats from Pitcairn Island and how invasive species impact on the lives of the community.

- A feasibility study for the potential eradication of rats from Pitcairn Island was conducted with the project declared technically feasible. The results from the survey conducted indicates that there is strong support for a rat eradication and slightly less support for a cat eradication, mainly due to issues with the risk of poisoning to pet cats and the likely explosion in rat numbers should the rat eradication fail.

- Increased biosecurity capacity in Kiribati with key stakeholders to build on previous biosecurity capacity building work at PIPA, Kiritimati and at Tarawa. The project focused on identifying specific biosecurity actions needed at Kiritimati and Kanton. This was extended in 2016 to include additional actions in the Gilbert Islands. The completed action plan provides guidance to Kiribati as a whole, identifies actions required at key sites within the country and activities which should occur in conjunction with trading partners.

- Increased understanding if the distribution of invasive species and management options. Practical work at Kiritimati included surveillance of a pest-free motu; surveillance and management advice for an existing incursion (yellow crazy ant); workshops to review principles of biosecurity and identification of invasive non-native species and their likely sources, pathways and arrival points; and actions needed to prevent their invasion of Kiribati. This included a site visit to the Kiribati Port Authority complex to evaluate risks and needs for improving local biosecurity. Related work included a community awareness day presented by local government staff to importers.

- Increased biosecurity capacity in the Cook Islands achieved through a workshop held among key stakeholders in Rarotonga (the largest of the Cook Islands with the capital/chief town of Avarua) to develop the framework for a biosecurity action plan for Suwarrow. The biosecurity workshop involved three days of planning with staff of agencies (Quarantine,

Environment, Port, and Warehouses) and Te Ipukarea Trust (local NGO). This planning initially involved a revision of basic biosecurity principles before developing risk assessments for Suwarrow based on the participants' collective knowledge of potential invasive non-native species and their sources, pathways and risks of reaching Suwarrow.

- Increased understanding and ownership of biosecurtity practices through identified actions for agencies to mitigate the chances of invasive non-native species incursions at Suwarrow The plan identifies the agencies responsible for the plan with National Environment Service leading supported by Biosecurity, Customs, Police and other agencies.

- A pathway analysis by which invasive non-native species could invade Suwarrow and at what level of risk was undertaken; important tasks that are needed to minimise the possibility of invasive non-native species invading; surveillance measures needed at Suwarrow in order to enable early detection of incursions; and responses to the more likely incursions that could be experienced at Suwarrow.

- Planning for possible Takutea restoration with initial meetings with Trustees at Atiu followed by a biodiversity survey of Takutea. This involved general surveys of vegetation and birds and targeted surveys of rats and crabs. A further meeting with the Trust was held to consider options for management which ranged from "doing nothing" to rat eradication and strengthening biosecurity.

2.2 Added value outputs

As part of the expedition to Henderson Island, the research team conducted the first ever study into marine plastics on the East Beach of Henderson Island. This was in addition to the requirements of this project.

- The United Kingdom's status as a party to the Convention on Migratory Species (CMS) has been extended to the Pitcairn Islands. The Henderson petrel is listed on Appendix I of the CMS, and is only known to breed on Henderson Island. This project allowed the first ever detailed study of the breeding biology of the Henderson petrel with results published in a peer reviewed paper (see Oppel *et al.*, 2016). Prior to this project, very little was known about the breeding biology of this species. This project provided the first description of the length of incubation shifts, the chick feeding frequency, duration of chick feeding visits, and information on the foraging range of Henderson Petrels. This study contributes to an improved understanding of the natural history of this Endangered CMS listed species. There is currently no evidence that the conservation status of the Henderson Petrel has deteriorated since it was listed as Endangered by the IUCN.
- Two scientific papers (one published, one in prep) describing the methodology and the quantity of plastic on Henderson East beach.
- One scientific paper discussing the herpetofauna of Henderson Island.
- This project also provided the opportunity for another Darwin project to survey the marine environment adjacent to Henderson Island. This proved to be significant added value for that Darwin project as it resulted in savings by foregoing the costs associated with chartering a vessel.

2.3 Long-term strategic outcome(s)

The long-term goal of this project was that the biodiversity and socioeconomic benefits of pest eradication in the Pitcairn Islands are understood, maintained, advanced and shared.

A key threat to the biodiversity of the Pitcairn Islands is invasive species. This includes species that are already present on one or more islands but could spread to other islands where they are not present and species that are not yet present in the territory. Improving biosecurity awareness, capacity and action is a key requirement for the islands.

The project provided training and a technical review of biosecurity. This project also aided the identification of obstacles that will hinder effective implementation of biosecurity actions on Pitcairn. Understanding of restoration options and effective approaches to prevent new species from arriving on island and spreading between the islands is vital to preserve the biodiversity of this small UKOT.

The results of this project have been inputted into a recent review of biosecurity legislation on the Pitcairn Islands. The project leader and the RSPB have made recommendations for improvements and these are now being considered.

Restoring Henderson Island is the only way to prevent the continued decline of its seabird species. This project has significantly contributed towards an expected second attempt to restore the island. The data collected will inform the decision making process, contribute to a planned independent and expert-led feasibility assessment of the proposed restoration effort and underpin the research requirements leading to any future operation.

This Darwin project contributed to three separate expeditions to Henderson Island – one of the most remote and uninhabited islands in the Pacific Ocean. The third expedition was the longest research expedition since the Sir Peter Scott Commemorative Expedition of 1991/92. The approach taken by the project leader identified savings in a number of activities in the original project proposal, allowing additional work to be carried out.

The project was designed to share experiences and best practice with two additional Pacific Island countries. The original intention was to facilitate the exchange of knowledge between Pitcairn islanders and other Pacific Islands. It was hoped that Pitcairners would be able to travel to these islands or at least a regional conference/meeting. Upon investigation, this option was discounted on account of the costs involved and the time requirements off island for a member of the NRD. This was instead delivered through contracting biosecurity experts to provide training and develop the planned studies.

Some lessons learnt during this project would modify any approach to working towards the restoration with Pitcairn to ensure the community feel empowered. The biodiversity gains of a cat and rat eradication on Pitcairn Island are potentially significant, the island could support regionally significant populations of breeding birds, as well supporting increased populations of endemic species that are currently likely impacted by rats and cats (e.g. the Endangered Pitcairn reed warbler *Acrocephalus vaughani*). However, the community interests identified during this project will require an approach where the community is at the centre of any restoration plan. This may mean external organisations taking a ‘back-seat’.

The socieo-economic impact of invasive species on the economy of the Pitcairn Islands is minor in comparison to the major economic challenges this community faces to ensure sustainability. The Pitcairn economy is currently largely dependent on direct investment from the UK government, the EU and NGO’s. With severely depleted economic activity, any economic impact caused by invasive species is difficult to quantify but small in comparison to what a more diverse economy would experience. Members of the Pitcairn community noted the nuisance impact of these species, the impact on their crops, the damage caused to their homes and the challenges living on a small island with invasive species.

2.4 Outputs

The project had 4 main outputs:

1. The biodiversity benefits and ecological impact of pest eradication on Henderson and Oeno are understood and evaluated, and lessons learned for future eradication attempts are investigated.
2. Capacity is built in the Pitcairn Islands to maintain the pest free status of Henderson, Oeno and Ducie Islands.
3. The feasibility of eradication of pests on Pitcairn Island is assessed and continued support for Henderson Island assessed.

4. Eradication benefits shared and capacity built to deliver post eradication monitoring and island restoration studies at two additional partner organisations in the Pacific.

Bearing in mind the changes made to the project, the project achieved these outputs and they are already informing future work. Changes produced as a result of the work undertaken during the project and supporting indicators/means of verification include:

- Two expeditions to Henderson Island were organised during 2012 to follow up rat sightings and assess impact on bird populations. Means of Verification included an unpublished expedition report (Annex 4); data collated in databases held by the RSPB.
- A follow up expedition to Henderson and Oeno islands was completed in 2013 to establish and further monitor the impacts of rat eradication operations (failure and success). Means of verification include unpublished expedition reports (Annexes 5 and 6); data collated in databases held by the RSPB; peer reviewed paper (Amos *et al.* 2016)
- Long-term methods were established for monitoring the biodiversity changes on Henderson and Oeno. Means of verification include fixed sample plots established on Oeno and Henderson detailed in unpublished report (Annexes 5 and 6) with guidelines produced to allow repeat of these (Annexes 6 and 7).
- Biosecurity measures on Pitcairn Island have been assessed, with recommendations made to improve biosecurity and informing new biosecurity legislation on Pitcairn Island. Means of verification include unpublished report (Annex 8 and 9)
- Due to a combination of the failure of the Henderson Island eradication attempt, the logistical difficulties of identifying and moving two Pitcairners off island for an extended period and costs associated with this, a modified approach was taken. Two Pitcairn government staff received training in biosecurity, ecological survey and monitoring, and planning for eradication/control of invasive non-native species on island by a regional expert (Annex 8)**.**
- Ecological monitoring protocols were developed for Pitcairn government. These have not been acted upon due to lack of capacity and financial resources on Pitcairn while major work is undertaken to redevelop the port. Means of verification detailed in unpublished report (Annex 8).
- Community face-to-face engagement held to discuss potential Pitcairn Island wide pest eradication. Means of verification provided in unpublished reports (Annexes 8, 9 and 10).
- A socioeconomic and social attitudes towards invasive species study completed to assess livelihood benefits of pest eradication on Pitcairn. Means of verification provided in unpublished report (Annex 10).
- A feasibility study was carried out to assess Pitcairn suitability for pest (cat and rat) eradication. Means of verification provided in unpublished report (Annex 11).
- An unpublished operational plan for the eradication of cats and rats was prepared (Annex 12). The original proposal considered that two major preparatory actions be identified in the Pitcairn feasibility study, funded and initiated. However, this was not progressed as there are no active plans to eradicate cats or rats from Pitcairn Island. Recommendations were made on how best to take forward cat and rat eradications projects, either led by or in partnership with the community. Workshops with Pitcairn project staff were held on Pitcairn.
- A six month expedition to Henderson Island was carried out between May and November 2015. This expedition was designed to increase our understanding of the ecology of this island, rodent ecology and other factors that will influence the feasibility of restoring this island (Annex 13). The results of this expedition will be published in peer reviewed papers with some already published (see Annex 2 for details).

- In May 2014 a workshop was held among key stakeholders in Cook Islands (Rarotonga) to develop the framework for a biosecurity action plan for Suwarrow. Means of verification provide in an unpublished report (Annex 14) and letter of appreciation from Kelvin Passfield, Technical Director, Te Ipukarea Society (Annex 15).
- Takūtea is an uninhabited c.1 km^2 island situated in the Cook Islands southern group. It is an internationally Important Bird and Biodiversity Area because of high seabird values comprising 10 breeding species including regionally significant numbers of Red-tailed Tropicbirds and Brown Boobies. A feasibility study was developed during this project which identifies management and restoration options range. Means of verification provided in an unpublished report (Annex 16).
- In May 2014 a workshop was held among key stakeholders in Kiritimati to build on previous biosecurity capacity building work at PIPA, Kiritimati and at Tarawa. The workshop focused on identifying specific biosecurity actions needed at Kiritimati and Kanton and this was extended in 2016 to include additional actions in the Gilbert Islands. The means of verification are provided in unpublished reports (Annexes 17 and 18).

2.5 Sustainability and Legacy

This project has greatly contributed to our understanding of the challenges in restoring both Henderson and Pitcairn islands. It is clear that an additional expedition to Henderson Island will be required before this restoration effort can be brought operational once again. However, the results have helped design the next actions and frame a planned independent feasibility study.

The outputs from this project have informed new biosecurity legislation for Pitcairn Island. While still not finalised with a number of technical issues in drafts produced at the time of writing, this is expected to provide more sustainable biosecurity on the Pitcairn Islands.

Pitcairn Islands, as one of the smallest UKOTs, is largely dependent on financial support from the UK government, the EU, Darwin Initiative and the NGO sector for its funding of biodiversity projects. Under these circumstances, it will be difficult to demonstrate the long-term sustainability of short term project work. Depending on the capacity on island, government, NGO's and other relevant stakeholders will have to work together to support this small community protect the globally significant biodiversity found on these islands.

Pitcairn

Any planned restoration of Pitcairn Islands will face challenges. Some members of the community have expressed significant reservations about eradicating cats before or concurrently to rats. This follows the failed eradication attempt in 97/98 with the community experiencing a rapid increase of rats. However, the method used to eradicate rats would have a significant impact on cats and it would not be technically feasible to protect the extant population of cats on island during any rodent eradication operation.

We have chosen not to publish the results of these feasibility and operational studies carried out on Pitcairn Island. There is a risk that publication of these results could be interpreted by the community as intention to act without their prior agreement. Rodent and cat eradication from Pitcairn Island would benefit the biodiversity of the island and improve the quality of life for the community. Careful planning is required. This planning would require buy-in from the community with clear 'break' points designed into the process so that if objections to the proposed action mounts, resources can be effectively redeployed.

Biosecurity on the Pitcairn Islands is not yet established to a demonstrably sustainable level. Despite progress made during this project, legislation is not yet fit-for-purpose and funding for biosecurity implementation on an ongoing basis is not secure. Additionally, as is the common on many small islands, biosecurity implementation creates potential conflicts between members of the community responsible for enforcement and those wishing to import goods or species. An additional consideration is capacity in a small island territory dependent on outside financial aid/investment.

Two members of the Pitcairn community were involved in the six month expedition to Henderson Island and two members of the community were trained in biosecurity. There are

now fewer that 50 islanders inhabiting Pitcairn Island so this represents a significant proportion of the population.

Henderson

Henderson Island is a remote uninhabited island that is rarely visited by scientists or the local Pitcairn community. The expeditions to Henderson Island were designed to increase our understanding of rodent ecology, island ecology and factors that may have a bearing on any proposed second eradication attempt.

The research programme on Henderson Island was not only designed to boost our knowledge of this island but also to help the wider island restoration community understand challenges faced in eradicating rodents from tropical islands.

Cook Islands

The biosecurity workshop held in the Cook Islands involved three days of planning with staff of government agencies and Te Ipukarea Trust. The workshop identified actions needed by agencies to mitigate the chances of invasive non-native species incursions at Suwarrow and was followed up with meetings with Port Authority and government agencies. The plan produced by this project identifies the agencies responsible with NES leading supported by Biosecurity, Customs, Police and other agencies.

A pathway analysis by which invasive non-native species could invade Suwarrow and at what level of risk was undertaken; important tasks that are needed to minimise the possibility of invasive non-native species invading; surveillance measures needed at Suwarrow in order to enable early detection of incursions; and responses to the more likely incursions that could be experienced at Suwarrow.

Planning for possible Takutea restoration involved initial meetings with Trustees at Atiu followed by a survey of Takutea. A further meeting with the Trust was held to consider options for management which ranged from “doing nothing” to rat eradication and strengthening biosecurity. Funding has not yet been secured for future work but this project has developed the required information needs for any future restoration of Takutea.

Kiribati

In Kiribati, the Department of Agriculture has the mandate for biosecurity matters at the national level. There is however a need for support and cooperation of key stakeholders including the Ports Authority, shipping agencies and importers at Kiritimati and Tarawa. In fact Kiribati is a network of three archipelagoes and 23 islands, all of which depend on strong national and international cooperation for effective biosecurity. The approach taken in the development of biosecurity for Kiribati was to align the plan with legislation, identify governance structures and ensures all stakeholders understood their requirements. This approach was intended to ensure uptake of recommendations and sustainability of the plan.

In Kiribati, it was noted that significant improvements in resourcing, awareness and attitudes are needed by Kiribati to effectively manage invasive non-native species issues.

3 Project Stakeholders/Partners

The Government of the Pitcairn Islands and the Pitcairn Islands Natural Resources Department (NRD) were involved in this project from the planning through to completion. Informal meetings were held with the NRD while plans and proposals were presented to the Pitcairn Island Council for input and approval to proceed.

The wider Pitcairn community was engaged in the project when Dr Grant Harper visited the island to undertake the economic and social attitudes assessment. This involved meetings and face-to-face discussions about invasive species and how they impact on people’s lives.

The geographic scope of the project required effective working with other organisations based in the Pacific region. The project built on an ongoing collaboration between the RSPB, the Pitcairn Natural Resource Department (NRD) and with the Pitcairn community. We entered into

partnership with Eco Oceania Pty Ltd, BirdLife Pacific and the Pacific Invasives Initiative to deliver required work in both the Cook Islands and Kiribati during the financial year 2014/15.

We entered into partnership with Biodiversity Restoration Specialists (NZ) Ltd to deliver biosecurity training, develop the rodent and cat eradication feasibility study and undertake field work in relation to the economic impact assessment of invasive species on Pitcairn Island during August – September 2014.

This project also contributed to another Darwin Plus project in Pitcairn. We shared ship time with the *Developing a sustainable marine and fisheries management plan for the Pitcairn islands* Darwin Plus project.

The training provided to the Pitcairn community by this project was well received. Feedback from Michele Christian at the Natural Resources Division received *via* the FCO was positive: *'The training provided to the NR Division staff was valuable and I'm pleased to say Grant was very impressed with the amount of knowledge the staff have on bio security matters, obviously there are a couple of things that need to be tightened up which we are currently addressing. The feedback from Grant was very useful and thank you to RSPB. I support future efforts by RSPB in providing training to Pitcairn'*

4 Lessons learned

We consider that the results of this project have significantly improved our understanding of the issues facing the Pitcairn community with any proposed restoration programme of that island, improved our understanding of Henderson Island ecology, improved our understanding of Oeno Atoll and the benefit of removing rodents may, and supported key biodiversity projects in both the Cook Islands and Kiribati.

The remoteness of Pitcairn Islands and the infrequent availability of berths on the vessels creates significant issues for planning off-island training for any member of the community. There would be a need to spend a significant proportion of time off-island and this will not always be supported. Projects such as this may have to provide training on island and work with the community to identify the best approach at the time.

The draft feasibility study and operational plans produced for the eradication of cats and rats from Pitcairn Island have not yet undergone an independent review and are not made available online, as would be expected and consistent with best practice. This reflects the fact that there are no active plans to eradicate these species until community concerns can be resolved. The priority for planning any eradication project must be community engagement and acquiring support by empowering the community. Understanding and addressing concerns raised will be challenging and may require on-island presence for an extended period undertaking targeted consultation and answering queries raised. This would be challenging if uncontrolled rumours spread on island.

We are confident that the right expertise was used in this project. The approach taken by the project leader identified experts and suitably qualified people for every component of the project.

All outputs: John Kelly provided project management, procurement and recruitment, emergency planning for expeditions, fundraising support, project design, logistical support, and coordination for all aspects of the project.

Output 1:

- Mike Brooke, Thomas Churchyard, Tara Proud, Sue O'Keefe and Pawl Warren provided input and deliver into the 2013 expedition to Henderson and Oeno. Mike led the 1991/92 expedition to Henderson Island so is considered the foremost expert on this island. Sue and Pawl are members of the Pitcairn community with significant experience living and working on Henderson while Tom and Tara are qualified and experienced in island, rodent and seabird ecology.

- The on-island team for the six-month expedition to Henderson Island represented a mixture of experienced staff to lead on work and more recent graduates to help delivery. The team also include two key members from the community. In alphabetical order, the team consisted of: Angus Donaldson, Neil Duffield, Alice Forrest, Sarah Havery, Sue O'Keefe, Steffen Oppel (Team Leader Phase 1), Jennifer Lavers, Lorna Mackinnon, Gregory McClelland (Team Leader Phase 2), Andrew Skinner, Nicholas Torr and Pawl Warren.

Output 2 and 3: Grant Harper, an island restoration expert with a significant track record working on this type of project and previously on Pitcairn was appointed to lead on the review of biosecurity for the Pitcairn Islands; the development a feasibility study and a draft operational plan for the eradication of rats and cats from Pitcairn Island.

Objective 4: Steve Cranwell, Souad Boudjelas, Bill Nagle and Ray Pierce are all regional experts in invasive species management with substantial experience working in the Cook Islands and Kiribati.

The expedition to Henderson Island identified a number of issues that were not considered in the original proposal to the Darwin Initiative. A key lesson is that future plans to spend an extended duration on this or any remote island must include adequate time for preparation and training of team members (e.g. suitable advanced first aid training, backup water supplies). One issue that we encountered is that there are a limited number of qualified first aid trainers in the UK able to provide the advanced training needed to deploy personnel to such a remote setting. Often the default is mountain first aid training. The experience from this project is that that type of training is insufficient for the environment and the remoteness. Organisations must consider this in their planning and provide sufficient time and resources for to prepare staff. This will increase costs of any project but reduces risks for the personnel and the organisation.
For this project, the emergency evacuation plan was consulted on with key stakeholders and Pitcairn Island Council, Pitcairn Island Police Officer, New Zealand Coast Guard and the Pitcairn Island Office prior to beginning the project. The benefit of this approach was proven when a tsunami alert was issued ensuring that the Foreign and Commonwealth Office, New Zealand Coast Guard and the French Polynesian Coast Guard all knew to contact the project manager to cascade relevant information.

To improve communications from Henderson to the UK, a review of available and practical technologies will be required before every expedition. A suitable antenna will be required for any future expedition to this island.

The original project leader of this Darwin project left the RSPB during the course of this project. Once appointed, the new project leader undertook a full review of the project to identify if it was on target to achieving its objectives and devise an approach to ensure the project could be successfully completed on budget and with maximum benefit for the territory.

The timeframe for the project was realistic but thanks to the Darwin Initiative's flexibility with the original plan, we were able to deliver an additional expedition to Henderson Island. This would not have been possible without Darwin Initiative support and willingness to provide a no cost extension to the project. However, the inability to carry over significant amounts of money to subsequent financial years created a challenge with budget management. If not carefully managed, the current restrictions could be a significant risk to future Darwin projects.

At one point in the project, there was a need to make a number of changes sequentially and in close succession, as information became available that opened up new more cost effective delivery mechanisms. This created a dynamic project management environment. The change management process could be improved in this type of scenario with direct face-to-face

communication with the key decision makers at the Darwin Initiative. This would provide an opportunity to explain the rationale and changes proposed with critical decision points.

When embarking on an extended expedition to Henderson Island, projects should always consider employing willing and able members of the Pitcairn community. A key lesson from the 2015 expedition is the benefit of hiring, even on a part time basis, these team members at least one or two months prior to their departure. This would allow greater opportunity to prepare for the endeavour and ensure adequate time to complete pre-deployment checks and packing.

4.1 Monitoring and evaluation

This project did undergo a number of significant changes.

- Change in project design to account for the failed rodent eradication and include a rapid response expedition to the island to verify the reported sighting.
- Change in project leader following the departure of the original leader.
- Change in the approach to delivery of a number of elements which resulted in cost savings. This allowed consideration and delivery of an additional six-month expedition to Henderson Island. This expedition resulted in an extension to the project for an additional year.

Internal project management meetings and planning discussions were held with partners and between key RSPB staff involved in the project. A fixed schedule was not required as the project required a more adaptive approach with meetings held depending on need.

During the six-month expedition to Henderson, weekly update calls were held with the team allowing issues to be raised and solved.

Delivering of the six month expedition to Henderson Island required a significant amount of planning for safety, methodology development, delivery, ethical review, employing qualified staff and much more.

The results of components of the project are being drafted into peer reviewed papers and published.

4.2 Actions taken in response to annual report reviews

Feedback in annual reports was supportive of the approach taken. No major changes were required.

One issue mentioned in annual reports related to this project's approach to address poverty alleviation. While efforts were made to understand the impact invasive species are having on the economy and lives of Pitcairn, it was not possible to address directly poverty issues or their drivers. Moreover, this small community is largely dependant on UK government aid and tourism for income. Biodiversity projects result in important income generation for individuals involved but usually only during the life of the project. This project investigaged the feasibility of eradicating rodents from Pitcairn Island. Any project will most likely result in more prolific crop yields, prevent food spoilage and prevent damage to houses but the benefits accrued will be small if compared to what would be experienced by larger economies. Eco-tourism has potential to provide income to the community by bringing tourists to the islands to see the unique wildlife and cultural heritage, but this was outside the scope of this project.

5 Darwin Identity

The Darwin logo and identity was used in all materials, reports, presentations and newsletters produced during this project. The funding support from the Darwin Initiative has been/will be acknowledged in all relevant published scientific peer reviewed papers arising from the project.

The support of the Darwin Initiative was publicised on Pitcairn and to the Pitcairn Island Office. The support of the Darwin Initiative was publicised with stakeholders in both the Cook Islands and Kiribati. Contractors and partners involved in the project were regularly made aware of the funding support from the Darwin Initiative.

Pitcairn is a small UKOT with very limited capacity to manage the significant and globally important biodiversity assets found there. The importance of the Darwin Initiative in supporting biodiversity projects in this territory is acknowledged by the NRD.

6 Finance and administration

6.1 Project expenditure

Current Year's Costs	**2015/16 Grant (£)**	**2015/16 Total actual Darwin Costs (£)**	**Variance %**	**Comments (please explain any variance)**
Staff costs (from Section 5)			+ 4%	
Consultancy Costs				
Overhead Costs			+ 4%	
Travel and subsistence			- 2%	
Operating Costs				
Capital items (from Section 7)				
Others (from Section 8)				
Audit costs			0%	

Staff employed (Provide name and position)	**Date work commenced and finished in 2015/16**	**Proportion of this time spent on this work**	**Cost to Darwin (£)**
John Kelly, Project Leader	April 2015 – March 2016	22% (inc co-funding)	
Jonathan Hall, Project Assistant	Sept 2015 – Dec 2015	2% (inc co-funding)	
Alex Bond, Research Scientist	April 2015 – March 2016	18% (inc co-funding)	
TOTAL (must match Staff Costs total in Section 6)			

6.2 Additional funds or in-kind contributions secured

Source of funding for project lifetime	**Total (£)**
Private donations towards the 2015 Henderson Island expedition	
Grant from the David and Lucile Packard Foundation	
Farallon Islands Foundation	
British Birds	
Increased RSPB in kind contribution for 2015 expedition,	
BirdLife International contribution towards Objective C	
TOTAL	

Source of funding for additional work after project lifetime	**Total (£)**
Updated feasibility study for the eradication or rats from Henderson Island received from RSPB donors.	
TOTAL	

6.3 Value for Money

This project achieved all of its intended outcomes in one of the most remote UK Overseas Territory and in the Cooks and Kiribati. The outputs will help inform future restoration effort on Henderson Island UNESCO World Heritgate Site and enable Pitcairn Island community to pursue a restoration of their island, should they so wish.

The project increased our knowledge of the breeding biology of the CMS listed Henderson petrel.

We provided significant value for money in terms of identifying the most cost effective delivery options and additional matched funding amounting to £251,000. This would not have been possible without the support of the Darwin Initiative and Eilidh Young in approving our approach to the project and change requests.

The solar generators used on Henderson were purchased by Sue O'Keefe and Pawl Warren at the end of the project. Their experience of using this equipment on Henderson was positive. If this continues on Pitcairn, this may result in more uptake of solar generators with other members of the community. This could provide cheaper and more sustainable power generation capacity.

Annex 1 Standard Measures

Code	Description	Totals (plus additional detail as required)
Training Measures		
1	Number of (i) students from the UKOTs; and (ii) other students to receive training (including PhD, masters and other training and receiving a qualification or certificate)	
2	Number of (i) people in UKOTs; and (ii) other people receiving other forms of long-term (>1yr) training not leading to formal qualification	
3a	Number of (i) people in UKOTs; and (ii) other people receiving other forms of short-term education/training (i.e. not categories 1-5 above)	i. 4 ii. 10
3b	Number of training weeks (i) in UKOTs; (ii) outside UKOTs not leading to formal qualification	i. 2 ii.
4	Number of types of training materials produced. Were these materials made available for use by UKOTs?	
5	Number of UKOT citizens who have increased capacity to manage natural resources as a result of the project	4
Research Measures		
9	Number of species/habitat management plans/ strategies (or action plans) produced for/by Governments, public authorities or other implementing agencies in the UKOTs	3
10	Number of formal documents produced to assist work in UKOTs related to species identification, classification and recording.	2
11a	Number of papers published or accepted for publication in peer reviewed journals written by (i) UKOT authors; and (ii) other authors	ii.
11b	Number of papers published or accepted for publication elsewhere written by (i) UKOT authors; and (ii) other authors	iii. 4
12b	Number of computer-based databases enhanced (containing species/genetic information). Were these databases made available for use by UKOTs?	1 Yes
13a	Number of species reference collections established. Were these collections handed over to UKOTs?	1 – inverts from Henderson Island No – Pitcairn does not have the resources to hold this collection
13b	Number of species reference collections enhanced. Were these collections handed over	

Code	Description	Totals (plus additional detail as required)
	to UKOTs?	
Dissemination Measures		
14a	Number of conferences/seminars/workshops/stakeholder meetings organised to present/disseminate findings from UKOT's Darwin project work	
14b	Number of conferences/seminars/ workshops/stakeholder meetings attended at which findings from the Darwin Plus project work will be presented/ disseminated	2
Physical Measures		
20	Estimated value (£s) of physical assets handed over to UKOT(s)	
21	Number of permanent educational/training/research facilities or organisation established in UKOTs	
22	Number of permanent field plots established in UKOTs	
23	Value of resources raised from other sources (e.g., in addition to Darwin funding) for project work	

Annex 2 Publications

Provide full details of all publications and material that can be publicly accessed, e.g. title, name of publisher, contact details. Mark (*) all publications and other material that you have included with this report

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Nationality of lead author	Nationality of institution of lead author	Gender of lead author	Publishers (name, city)	Available from (e.g. weblink, contact address, annex etc)
Journal	Lavers, J.L., S. Oppel, and A.L. Bond. 2016. Factors influencing the detection of beach plastic debris. Marine Environmental Research 119: 245-251	Australian	Australian	Female	Elsevier, Amsterdam	http://www.sciencedirect.com/science/article/pii/S0141113616301064
Journal	Oppel, S., J.L. Lavers, A.L. Bond, and G. Harrison. 2016. Reducing the primary exposure risk of Henderson crakes (*Zapornia atra*) during aerial broadcast eradication by selecting appropriate bait colour. Wildlife Research 43: 298-303	German	British	Male	CSIRO Publishing	http://www.publish.csiro.au/paper/WR15198.htm
Journal	Amos, W., H. J. Nichols, T. Churchyard, and M. d. L. Brooke. 2016. Rat eradication comes within a whisker! A case study from the South Pacific. Royal Society Open Science 3:160110.	British	British	Male	The Royal Society Publishing, London	http://rsos.royalsocietypublishing.org/content/3/4/160110
Journal	Oppel, S., A.H. Donaldson, A.K. Forrest, J.L. Lavers, G.T.W. McClelland, A.L. Bond, and M. de L. Brooke. Population status and breeding biology of the Henderson Petrel after a failed rat eradication on Henderson Island. Emu (Accepted 11 August 2016)	German	British	Male	CSIRO Publishing	http://www.publish.csiro.au/view/journals/dsp_journals_pip_abstract_scholar1.cfm?nid=96&pip=MU16029

There will be additional publications arising from this project but are not ready at the time of reporting.

Annex 3 Darwin Contacts

To assist us with future evaluation work and feedback on your report, please provide details for the main project contacts below. Please add new sections to the table if you are able to provide contact information for more people than there are sections below.

Ref No	
Project Title	
Project Leader Details	
Name	John Kelly
Role within Darwin Project	Project Leader
Address	RSPB, The Lodge, Potton Road, Sandy SG19 2DL
Phone	
Fax/Skype	
Email	
Partner 1	
Name	
Organisation	
Role within Darwin Project	
Address	
Fax/Skype	
Email	
Partner 2 etc.	
Name	
Organisation	
Role within Darwin Project	
Address	
Fax/Skype	
Email	