Department for Environment Food & Rural Affairs

DARWIN INITIATIVE

Funded by UK Government

Darwin Initiative Main Project Annual Report

To be completed with reference to the "Writing a Darwin Report" guidance: (http://www.darwininitiative.org.uk/resources-for-projects/reporting-forms). It is expected that this report will be a **maximum** of 20 pages in length, excluding annexes)

Submission Deadline: 30th April 2018

Darwin Project Information

Project reference	23-003
Project title	Eradicating invasive species from the highest priority Caribbean island
Host country/ies	Antigua and Barbuda (with Montserrat)
Contract holder institution	Fauna & Flora International
Partner institution(s)	Department of Environment (Government of Antigua and Barbuda), Environmental Awareness Group, British Mountaineering Council, Wildlife Management International Ltd.
Darwin grant value	£ 285,000
Start/end dates of project	Apr 2016 – Mar 2019
Reporting period (e.g., Apr 2017 – Mar 2018) and number (e.g., Annual Report 1, 2, 3)	Apr 2017 – Mar 2018; Annual Report 2
Project Leader name	Dr Jenny Daltry
Project website/blog/Twitter	e.g. https://www.facebook.com/RedondaRestoration/ ; https://www.faunaflora.org/projects/redonda-restoration-programme; https://environment.gov.ag/news/article/24
Report author(s) and date	Dr Jenny Daltry, April 2018

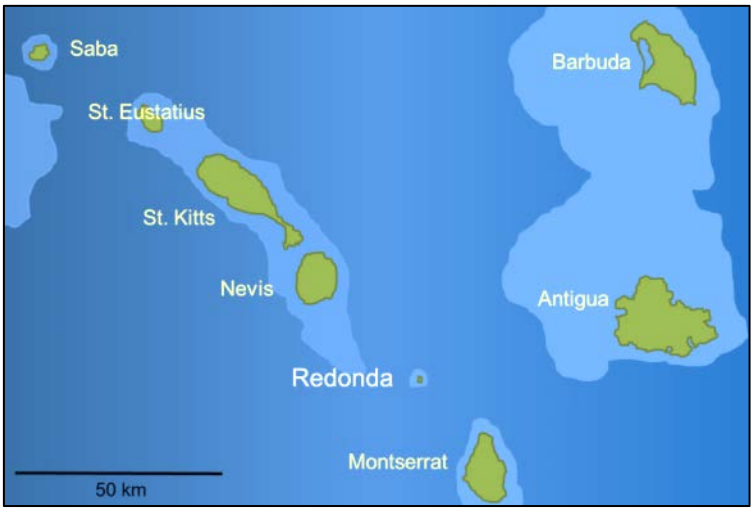
1. Project rationale

Caribbean islands cover only 0.15% of the Earth's land area, yet have accounted for 10% of the world's bird extinctions, 38% of mammal extinctions, and >65% of reptile extinctions since 1500. At least two-thirds of extinctions on islands have been attributed to invasive alien species, especially rats, mongooses and other mammals from the Old World.

This is the first Darwin Initiative project to address such species on a Caribbean island outside of the UK Overseas Territories. Redonda is a small island 56 km Southwest of Antigua and 23 km Northwest of Montserrat. The urgent need to save its biodiversity from invasive alien mammals was confirmed through regional workshops attended by governments, NGOs and academics from 23 Caribbean nations in 2009 and 2015, which identified Redonda as the top priority for restoration due to its critically endangered wildlife and excellent prospects of success. The island was prized by Britain for its seabird guano until the outbreak of World War I forced its mining community to leave. Redonda has been a dependency of Antigua & Barbuda since 1967, but is now uninhabited and rarely visited except by a handful of artisanal fishers and British volcanologists who use the island as a fixed observation point for Montserrat. It is a difficult island to get to, being remote and encircled by high, crumbling cliffs and scree slopes.

Although only 1.5km long and less than 80 hectares in surface area, Redonda supports rare and important biodiversity. These include five endemic reptile species— four of them Critically Endangered— and an uncertain number of endemic invertebrates and plants. The island has been designated an Important Bird Area because of its globally significant, but dwindling, seabird colonies. Pre-project surveys by FFI and our partners confirmed that the diversity and abundance of the island's native fauna and flora were still in sharp decline due to feral goats *Capra hircus d.* (an unusual, long-horned breed from Spain) and over 5,000 black rats *Rattus rattus*. The island has become so severely deforested and eroded that even the surrounding reefs were choked and broken by heavy soil run-off and falling rocks.

This Darwin project aims to eradicate the rats, translocate the goats to Antigua (where the Department of Agriculture will study and preserve this rare breed), and expedite the recovery of native species and habitats. This project has firm backing from civil society and the governments of Antigua & Barbuda and Montserrat, who share a common vision for Redonda as an internationally recognised centre for island restoration, conservation and research.



(Above) Aerial photograph of Redonda in July 2016. (Left) Map showing the location of Redonda. Pale blue indicates shallow banks that formed land bridges between islands during the Pleistocene, but Redonda has always remained fully isolated**.**

2. Project partnerships

This Darwin project is coordinated by Fauna & Flora International (FFI) with the four core partners named on the proposal: the Department of Environment (DoE, the lead agency representing the Government of Antigua & Barbuda), the Environmental Awareness Group (EAG, lead local NGO), Wildlife Management International Ltd (WMIL, New Zealand-based company specialising in invasive species eradications) and British Mountaineering Council (BMC, which provides technical support for work on cliffs). FFI has worked with all four organisations before, including more than five years collaborating to research and develop this island restoration project.

The project's core management team comprise Dr Jenny Daltry (FFI) and three senior Antiguans: Dr Helena Jeffery-Brown (DoE), Natalya Lawrence (EAG) and the Project Coordinator, Shanna Challenger. Ms Challenger is jointly employed by FFI, DoE and EAG: a novel arrangement that continued to work in the project's favour by enabling her to readily access facilities and support from all three institutions whenever needed. This all-female core team is further supported by the Project Steering Committee: a body of 23 expert advisers, including representatives from all the partners and other key stakeholders, such as the Fisheries Division, Forestry Unit, National Parks Authority and the private sector (see Annex 4 for details). The Project Steering Committee continued to meet every quarter through Year 2 to review project progress, resolve problems and discuss upcoming activities. This arrangement has worked very well to date and this Darwin project is fortunate to be able to draw on such a wide range of willing hands, expertise and influence.

Building on Year 1, relationships between FFI and the aforementioned partners and other agencies represented on the Steering Committee continued to be harmonious and fruitful throughout Year 2. Our staff and interns enjoy working together and learning from each other,

and recognise that each individual and partner brings valuable skills and knowledge to this project. Whenever there were potential risks and challenges— such as the exceptionally powerful hurricanes in Q2 and the unforeseen early General Election in Q4— all of the agencies and stakeholders willingly pulled together to keep the programme running as smoothly as possible. FFI's partner agencies have in turn helped to bring in additional sources of support where needed through our wide network of contacts, nationally and internationally. For example, in Year 2, Global Wildlife Conservation contributed equipment to the project and its senior staff assisted with wildlife monitoring.

Compared to Year 1, during which more than a dozen Britons were heavily involved in fieldwork for many months, the national partners handled a far greater proportion of day-to-day activities in Year 2, especially biosecurity monitoring and outreach. For example, while the entire Steering Committee was involved in designing the Redonda biodiversity monitoring plan, outreach strategy and the island biosecurity plan, their implementation in Year 2 was chiefly carried out by trained EAG and DoE personnel with only occasional inputs of advice and assistance from international members of the project team where needed. This marks a very welcome progression in both the local capacity and local ownership of this project.

3. Project progress

3.1 Progress in carrying out project Activities

The project continued to make steady progress following the enormous amount of work accomplished in Year 1 to launch the project and remove invasive alien species. Below is a summary of our progress against the agreed timetable (excluding activities scheduled for Year 3 only):

Output 1 Alien invasive vertebrates (rats and goats) successfully removed from Redonda, with systems in place to prevent (re)invasions

1.1 Complete Operational Plan and SOPs to remove goats and eradicate rats (COMPLETED).

See Year 1 Annual Report.

1.2 Capture and transfer goats from Redonda to enclosed government farmland on Antigua (COMPLETED)

Our bold operation to remove the starving feral goats from Redonda began in Year 1 under the direction of Peter Haverson, a livestock and animal control expert from the UK. As explained in our proposal, the government's Department of Agriculture requested that they be captured alive where possible so that this rare and potentially useful breed could be studied and conserved on Antigua. Captured goats were translocated by helicopter to Antigua, where most of them have been housed at a purpose-built facility run by the government's Veterinary & Livestock Division. A second, smaller group (orphaned kids and other individuals that needed specialist care) is housed at Animal Ark, a veterinary centre managed by Dr Fiona Francis on Antigua. All of the goats were in poor condition on Redonda, being thin and evidently malnourished from birth, and some of the weaker ones died shortly after capture despite the veterinarians' best efforts. Animals that could not be moved from the island (e.g. older males in obviously poor health) were humanely shot, with government permission and in accordance with protocols approved by the Royal Police Force of Antigua & Barbuda. At the start of Year 2, Mr Haverson removed the last three known individuals from the island, and subsequent surveys by Mr Haverson and other team members have not found any goats remaining. Blood samples tested in Year 2 confirmed that the breed is of Spanish origin, and closely related to those of the Canaries and Cape Verde islands.

1.3 Establish baiting grid on Redonda and eradicate rats (COMPLETED)

As reported previously, the last known rats on Redonda were detected and destroyed in the second week of March 2017. No more signs of any rodents have been seen since, despite ongoing biosecurity checks (conducted at least once every quarter, Activity 1.4) and additional, intensive island-wide surveys using a battery of detection tools (camera traps, tracking plates, flavoured wax blocks, etc.). The most recent search was conducted over four days in March

2018. All evidence points to the rat eradication operation having been fully successful, but the project team plans to conduct another very intensive survey in Y3 Q1 before formally declaring the island to be rat free. It is considered best practice to wait at least one year in the Tropics (two years in temperate countries) without seeing signs of rats before confirming the eradication to have been successful. This conservative 'rule' is based on the assumption that while it might be easy to overlook a few individuals that had survived, a year is sufficient for any survivors in a Tropical environment to have multiplied through several generations and become conspicuous.

1.4 Establish biosecurity surveillance system to prevent incursions, and monitor Redonda every 2 months to verify no invasive vertebrates remain (UNDERWAY)

FFI and our partners have set up a biosecurity system for Redonda that encompasses all three key elements of biosecurity: (a) prevention, (b) detection and (c) response. As one important element of this, 39 permanent bait stations were installed on Redonda ahead of schedule at the end of Year 1 to detect and kill rodents. Each station comprises a rugged plastic bait box raised above the ground on a 15 cm pedestal. This design was first developed by FFI on other Caribbean islands to allow entry to rats while curbing access by land crabs that would otherwise raid the bait (the bait we use is harmless to invertebrates, but it is important there is always enough bait in the stations to combat rodents). The boxes contain a minimum of 80 g of Klerat™ bait and chocolate-scented rubber cubes that are checked and, where necessary, replenished once a quarter (and whenever the project team travels to Redonda for any other purpose). Most of the station pedestals were directly bolted to the bedrock with the aid of a rock drill, making them very stable and resistant to hurricanes (as was proved when Hurricane Maria struck Redonda in Q2). Other aspects of the biosecurity system were devised during a workshop in Q2, including securing an agreement from Caribbean Helicopters Ltd to quarantine equipment and screen their helicopters and passengers to help prevent possible non-native seeds, insects and other organisms from reaching Redonda. The two-day workshop also served to educate key stakeholders about how invasive species can travel to and endanger island ecosystems. Many participants were surprised to learn that even familiar Antiguan insects and reptiles could pose a danger to the endemic Redondan counterparts (and perhaps vice versa). Fortunately, because the island is remote and difficult to access, we could identify only a few, and mostly very controllable, pathways by which invasive species could arrive. The biosecurity manual was written in 2017 and will be finalised in Year 3, after some further tests.

1.5 Publish technical report(s) detailing the methods, results and any lessons learned from Output 1 (UNDERWAY)

The final technical report on the goat removal operation was produced in Q1 and only remains to be copy-edited before it is publicly disseminated. The interim report on the rat eradication operation was also produced in Q1 for internal reference, and the final report was produced in Q2. This also requires copy-editing before being published. The project team also produced a suite of illustrated progress reports that were disseminated to the Steering Committee members and other interested stakeholders and highlight some of the challenges and lessons learned.

Output 2 Monitoring system established to measure the responses of fauna, flora and ecological processes to the removal of alien invasive vertebrates

2.1 Project scientists design and agree standardised methods to monitor birds, reptiles, bats, invertebrates, plants, soil and microclimate (COMPLETED)

The manual of methods was prepared in Year 1 but continued to be reviewed and improved through Year 2. As noted previously, we have expanded the scope of the monitoring programme to include the surrounding marine life because of (a) the discovery that the marine habitats have been heavily impacted by rock falls and run-off from the severely eroded island (which should improve measurably now that rats and goats have been removed) and (b) the need for baseline marine data to support the designation of Redonda and the surrounding sea as a 'ridge-to-reef' protected area (Output 3). Mindful of the relatively high cost of travelling to Redonda, we have concentrated on using relatively rapid techniques that can be more easily sustained in the future and combined with trips conducted under other Outputs where possible.

2.2 Conduct monitoring as per 2.1 during the grant period (before and after removing the goats and rats) (UNDERWAY)

During Year 2 the project team, including FFI, EAG and Government staff and volunteers, conducted several trips to monitor the island's ecology. The monitoring programme covers a range of taxa and other components of this ecosystem including: Birds (whole colony seabird counts, five permanent seabird transects, species checklist, and land bird point counts, conducted at least once a year); Reptiles (over 100 point counts for lizards conducted at least once a year, with more intensive mark-recapture studies every 5 years); Invertebrates (using 14 pitfall traps and 2 Malaise nets in fixed locations, conducted at least once a year); Plants (compilation of a species checklist and fixed point photos taken from 20 sites at least once a year); Fish (using 8 transects at 10-metre depth); Coral reefs (using 8 fixed photo quadrats); and Soil properties (evaluated in fixed locations once a year using a professional field testing kit). The project was also gifted a drone from Global Wildlife Conservation in Q2, which is proving invaluable for both monitoring and communicating the changes in vegetation and birdlife across the island, including areas too dangerous to access on foot. Because Year 1 had been so busy, with all team members heavily occupied with the task of removing both rats and goats from this challenging island, Q1 and Q2 allowed more time to catch up with processing data from the baseline monitoring in Year 1 and collating a reference collection of invertebrates and lichens (using specimens) and a photographic library of plants. The most recent, intensive round of monitoring was conducted in Q4, the data from which will be analysed in Year 3.

Findings at the start of the project had confirmed the catastrophic decline in bird populations, reptile populations and vegetation cover on Redonda, which we attributed largely to the heavy impacts of the voracious goats and rats. In Year 2, after removing the alien mammals, we observed very promising signs of recovery, including a sharp increase in the abundance of invertebrates and plants (including hundreds of new trees), the endemic lizards have more than doubled, and at least one species of bat, Audubon's shearwaters and nine land bird species have naturally recolonized the island. The growth in vegetation presents an additional challenge for monitoring the island's biodiversity, however, because visibility distance is falling (e.g. lizards are harder to see among undergrowth than on the previously bare ground). Some of the animal survey methods that had worked perfectly in Year 1 therefore had to be adjusted in Year 2. In early 2017, and again in early 2018 (Year 2, Q4), we hosted a team of herpetologists from Harvard, Yale and the National Museum of Natural History in Paris to study how removing invasive mammals affects the population sizes, ecology and even evolution of the island's endemic and Critically Endangered lizards: The scientists also confirmed the very significant increases in lizard population size. They plan to return every few years.

MS Excel files have been developed to store and share data, and all georeferenced data are being entered into EIMAS, the national DoE database, to support decision making. The manual of the monitoring methods used on Redonda has been updated to support consistency in the methods used from one year to the next, even if field personnel change over time. The field personnel have begun adopting the KOBO Toolbox to streamline the routine collection and storage of standardized field data.

2.4 Publish technical reports detailing the results and lessons learned from Output 2 (UNDERWAY)

The project team and collaborating scientists have worked on additional publications from the biodiversity surveys, including a paper presented to the annual conference of BirdsCaribbean in Cuba in Q2 and a peer-reviewed scientific paper accepted by *Outlooks on Pest Management* in Q4. The latter covers the methods used to eradicate rats as well as the preliminary findings from monitoring wildlife on the island.

Output 3 Redonda becomes a protected area in accordance with the Sustainable Island Resource Management Zoning Plan for Antigua & Barbuda, with an effective structure to manage its ongoing ecological recovery and sustainable use

3.1 Complete stakeholder consultations in Antigua and Montserrat (COMPLETED/ ONGOING)

Stakeholder consultations continued in Antigua during the reporting period with a wide range of interested individuals and organizations. In Q1, senior members of the team travelled to

Montserrat to discuss various aspects of the project with the Department of Environment, Department of Agriculture and local fishers. The latter corroborated the opinion of Antiguan fishers that the fish around Redonda are prone to carry ciguatera, which may explain why our first marine surveys found almost no evidence of fishing in this area (a rarity in this part of the world). Montserratian fishers told us they occasionally come to Redonda to catch big fish to win fishing competitions, but let them go afterwards rather than risk eating them. In Q1, the Project Leader returned to St Kitts & Nevis and spoke with local fishers and tour operators who sometimes venture near Redonda, which can be seen clearly from Nevis. Although the workplan in the original proposal indicated these consultations would cease after Year 1, we agreed active engagement with stakeholders in all three countries should be ongoing, especially in light of the need for regional cooperation to safeguard the island and its biodiversity under Output 3.

3.2 Prepare and submit technical proposal to Cabinet to designate the Redonda Environmental Protected Area (EPA) (UNDERWAY)

The submission is now scheduled for Year 3 in accordance with agreed changes to the log frame (Annual Report for Year 1). The project team conducted further preparatory work in addition to the stakeholder consultations (3.1), including consulting the DoE's legal expert on the legal options and process for establishing a protected area (the project Steering Committee decided the Redonda should ideally be protected under the Environmental Protection Act of 2015, because that would allow for both the island and its surrounding sea to be protected and managed for the primary purpose of biodiversity conservation) plus meetings with a protected area expert from the UK, Michael Appleton (Vice-Chair of the World Commission on Protected Areas and Director of Protected Areas, Global Wildlife Conservation) for practical training and guidance on planning and managing a new protected area. An internal document on the steps for establishing the new protected area has been prepared as a result of these consultations. Because the proposed protected area can include the sea around Redonda (potentially as much as 1,500 km^2), our team hoped to use Q3 or Q4 to conduct more extensive marine surveys using a grant from the Waitt Foundation, in collaboration with the Fisheries Division. However, this had to be pushed back to early Year 3 because of the major hurricanes in Q3 and persistent adverse sea conditions in Q4. Marine surveys were not planned as part of the Darwin project, but will help to strengthen the outputs.

Output 4 National capability to plan, manage and implement and monitor invasive species projects is raised, supported by enhanced technical skills and greater public awareness and cooperation

4.1 Plan multi-media campaign to communicate project to the public on Antigua and Barbuda and neighbouring states (COMPLETED in Year 1)

See Year 1 Annual Report.

4.2 Implement campaign, including media releases, signage on Redonda and phone-in radio shows, and evaluate impact on public (UNDERWAY)

The Darwin project received further coverage from a wide range of media groups, many of which centred on how the invasive species were removed (e.g. the BBC in Q1: http://www.bbc.co.uk/ news/world-latin-america-39748831) and increasingly on Redonda's native wildlife. The Project Coordinator made multiple appearances on national radio and television to present Redonda and the project. Both she and Natalya Lawrence (EAG) gave numerous presentations to local stakeholders, schools, church groups and other target audiences across Antigua. Redonda and the project also featured in a wide range of Antiguan tourism magazines (many of which are distributed to almost every hotel room in Antigua), *Zing* (LIAT regional airline inflight magazine), *Caribbean Beat* (Caribbean Airlines inflight magazine), the EAG annual calendar, FFI's magazine, blogs by team members, and much more. In Q4, the Project Leader, with assistance from the FFI Communications staff, produced a major article about the project for BBC Wildlife magazine, which will be published in May 2018. Online, new pages about the project was put on the websites of FFI (www.faunaflora.org/projects/redonda-restoration-programme) and DoE (e.g. https://environment.gov.ag/news/article/24), and a Facebook page was set up by the Project Coordinator to share project news and updates (Redonda Restoration Programme). A paper from the project was presented at the

BirdsCaribbean conference in Cuba in Q2 (Lawrence, Challenger, Bell, Daltry & Steele, 2017: Relocating feral goats and eradicating Eurasian ship rats to save Redonda's birds) and Jenny Daltry gave a keynote presentation on "Restoring Redonda" to the FFI Annual General Meeting at the David Attenborough Building in Cambridge in Q3. It is almost impossible to estimate how many people have been reached to date by all these means, but within Antigua, we believe more than 90,000 people would have heard about the project through national media.

Feedback received to date has been very positive and supportive. The impact of this activity will be more formally assessed in Year 3, by repeating the questionnaire survey from 4.1.

4.3 Analyse training needs of field personnel (COMPLETED in Year 1)

See Year 1 Annual Report.

4.4 Conduct training classes and on-the-job mentoring for local personnel participating in eradication and biosecurity activities (UNDERWAY)

Further meetings and workshops led by the project team throughout Year 2 introduced more than 30 Antiguan government and NGO technical staff to practical methods for preventing, detecting and eradicating invasive alien species. These were reinforced with hands-on work to monitor and maintain the permanent bait stations on Redonda (Activity 1.4).

4.5 Conduct training classes and on-the-job mentoring for local personnel participating in biodiversity monitoring (UNDERWAY)

More than 30 nationals participated in wildlife training and surveys in Year 2, including government staff, NGO staff and students (Activity 2.2), and more have signed up to participate in Year 3. Because the number of people who can travel to Redonda for practical training are constrained by the cost of helicopter transport, in Q1 we trialled running reptile and seabird surveys on islands much closer to Antigua and easier to access by boat. This was successful and, although there are some substantial differences in terms of species composition and terrain, we plan to conduct further training exercises on and around Antigua that will help further build local conservation capacity.

4.6 Local technicians participate in project meetings and key field activities with FFI training and mentoring where needed (UNDERWAY)

From the start of this project, FFI staff have worked alongside more than 30 Antiguans from government agencies, NGOs and the private sector. Sixteen are members of the Project Steering Committee and most are colleagues from government agencies and NGOs. During Q1 and Q2, more than 20 Antiguans participated in key technical workshops and fieldwork, most frequently Shanna Challenger, the Antiguan ecologist who serves as Project Coordinator. Ms Challenger has learned many important aspects of project management, including budget management and facilitating workshops, by working alongside the Project Leader, Dr Jenny Daltry, and FFI's Eastern Caribbean Projects Coordinator, Sophia Steele, and attended a one-week conservation project management training course in Cambridge in Q3. We also strongly encouraged and enabled our Antiguan colleagues to gain additional training from other organisations where appropriate. For example, Ms Challenger received training on drone use from Global Wildlife Conservation in Q2 and proposal writing from the National Climate Finance Advisor in Q3, while Natalya Lawrence attended a sponsored course on endangered species management from Durrell Wildlife Conservation Trust in Jersey.

Output X Project Management

X.1 Project inception meeting (COMPLETED Year 1)

See Year 1 Annual Report.

X.2 Project Steering Committee meetings (UNDERWAY)

The Project Steering Committee was formed at the Inception Meeting in Year 1, Q1, and continued to meet every quarter in Antigua throughout Year 2. Meetings are typically held in the main meeting room of the DoE in St John's. As reported earlier, smaller sub-units or working groups have been established to help plan and review specific areas of the project including biosecurity (representatives from FFI, EAG, DoE, WMIL and Caribbean Helicopters Ltd),

managing the feral goats removed from Redonda (led by the Department of Agriculture, which now has the animals on Antigua) and marine surveys (FFI, EAG, DoE and Fisheries Division).

X.3 Project biannual reports/ donor technical and financial reports (ONGOING)

Reports produced by FFI during Year 2 included the internal FFI annual report for 2017, the final technical and financial reports to National Fish & Wildlife Foundation, two more reports to the Taurus Foundation, the second half-year report to Darwin Initiative, and illustrated updates to the Betty Liebert Trust and other private sponsors.

X.4 Monthly financial accounts (ONGOING)

FFI maintains detailed accounts of spending each month, which are available for inspection at any time. Expenditures through the EAG (local partner NGO) are managed through a separate bank account for this project. The Project Coordinator oversees spending through this account and reports to the Project Leader every month.

3.2 Progress towards project Outputs

Output 1: Alien invasive vertebrates (rats and goats) successfully removed from Redonda, with systems in place to prevent (re)invasions:

At the start of this project, the primary threats to Redonda were the presence of a small but destructive herd of feral goats (around 60 confirmed in pre-project survey) and at least 5,000 black rats. The operations to remove both species appear to have been fully successful, and the project indicators and means of verification are still applicable (Annex 1). No goats or rats remain on Redonda, based on the best available evidence (indicators 1.1 and 1.2), and the rare breed goats from the island have been housed on enclosed government farmland on Antigua since the end of Year 1 (indicator 1.3).

The last known rats on Redonda were detected more than 12 months ago, at the end of Year 1 (although the baiting operation continued for several weeks more as a precaution), while the last known goats were removed at the beginning of Year 2. In total, more than 40 goats from Redonda were captured alive. Most were taken to a new purpose-built facility on Antigua managed by the Veterinary & Livestock Division, apart from orphaned kids that were housed at the AnimalArk veterinary practice headed by Dr Fiona Francis. At the time of writing, the goats are feeding well in captivity on Antigua and have become used to being handled, and several more kids have been born. Intensive searches conducted by project personnel at least once a quarter (May, August and December 2017, and March 2018) have not detected any rats or goats remaining on Redonda. In accordance with international best practice, however, Redonda will not be officially declared pest-free until a final, even more comprehensive check has been conducted at least one year after completing the operations (i.e. in Year 3 Q1).

In addition to removing rats and goats, project members killed the non-native *Casuarina equisetifolia* tree to prevent the spread of this notorious alien (the tree was ring-barked and injected with glyphosate in Year 1 Q4, and a small section that still showed signs of life was sawn off in Year 2 Q2). Thirty-nine permanent bait stations were installed by the project team in March/ April 2017 to help prevent reinvasion by rodents (the stations are checked and replenished at least once a quarter). Other aspects of the biosecurity system were developed and reviewed through workshops and fieldwork in Year 2 Q1 and Q2 to safeguard the island from invaders. This entails a number of elements, including pest control around the helicopter station on Antigua to reduce the risk of invasive aliens hitching a ride to Redonda, stringent inspections of all personnel and gear before departure, and training field personnel on how to detect and act on alien incursions.

Output 2: Monitoring system established to measure the responses of fauna, flora and ecological processes to the removal of alien invasive vertebrates:

At the start of the project, limited baseline data were available on the ecology of Redonda other than the approximate size and location of nesting seabird colonies, the density of two endemic lizard species, and a preliminary checklist of land birds, vascular plants and invertebrates (see Bell & Daltry 2014). The project indicators and means of verification are still valid (Annex 1):

Rapid methods have been established for monitoring short- and long-term changes in major taxa and abiotic characters (indicator 2.1) and the status of major taxa and soil composition has been monitored before and after removing the goats and rats (indicator 2.2).

The methods launched in Year 1 were repeated in Year 2 to monitor birds (diversity and abundance of both seabirds and land birds), lizards (abundance and ecology), invertebrates, plants (diversity and abundance), soils (moisture, composition and fertility), ambient temperature and relative humidity. This work has gone well with one exception: all but one of the eight data-loggers for monitoring ambient temperature and humidity were destroyed by water damage, apparently sustained during or after Hurricane Maria in late Q2.

The project team will continue monitoring the biotic variables using techniques that can be swiftly learned and applied by local technicians. To supplement the rapid programme, we are collaborating with scientists from Harvard University on an in-depth long term study of the Critically Endangered lizards (entailing at least 10 days per year on Redonda), and with the Natural History Museum in London to survey and monitor the island's rare and unusual lichens.

Output 3: Redonda becomes a protected area in accordance with the Sustainable Island Resource Management Zoning Plan for Antigua & Barbuda, with an effective structure to manage its ongoing ecological recovery and sustainable use:

At the project start, Redonda was fully state-owned as a dependency of Antigua & Barbuda, but not actually a protected or managed by this country in any way. Project indicators and means of verification still stand (Annex 1): A management committee has been established (indicator 3.1), and the project team is still working towards getting Redonda designated as the country's first Environmental Protected Area, encompassing the land and surrounding sea by end Year 3 (indicator 3.2), and preparing the management plan (indicator 3.3).

Capitalising on the interest stirred up in the island in Year 1, the project team has conducted a series of consultations and workshops, with expert input from the DoE legal specialist and international protected area specialist Mike Appleton, to develop a consensus on the process for protecting the island and its management objectives. There is certainly now very strong awareness and support for the island and at least part of the surrounding seas to become a nature reserve. Nobody has expressed any objections to this, but it is yet to be determined how far the area would extend out to sea and whether it will require on-site staff or can be managed to a large extend using remote surveillance technology. We are anxious that there are a few possible external issues that may disrupt the schedule for Year 3, including: the fact that the people of Barbuda are still reeling from the impacts of the Q2 hurricanes and, with many of them still homeless, they will probably be less willing or able to participate in the protected area planning process this year (section 11); the marine boundaries of Caribbean countries are currently being reviewed and renegotiated with the Ocean Governance Committee (this may affect how far the protected area extends out to sea); and, as mentioned previously, uncertainty over how long the Cabinet will take to reach a decision after being presented with the protected area proposal and justification. The fact that Redonda would be the first protected area to be established under the Environment Act makes it particularly difficult to predict where some of the stumbling blocks might be. It has been suggested that the island could be covered more quickly with a Protection Order in the interim.

Importantly, even though this island is not yet formally protected, it is state-owned and in practice it is already being treated as a strict nature reserve by the government, NGOs and the helicopter company. Any requests from scientists and tourists to visit the island are now being very closely scrutinised by the DoE, in consultation with the Project Coordinator, before being approved, and no specimens or samples may be removed without permits, which are rarely given. Typically, all visitors are now required to be accompanied by the coordinator or another member of the project team to ensure their safety and good behaviour. Even if persons travel to Redonda by boat without permission, they will find getting onto the island is almost impossible due the 'access gully' having been reshaped and destabilised by recent rock falls.

Output 4: National capability to plan, manage and implement and monitor invasive species projects is raised, supported by enhanced technical skills and greater public awareness and cooperation:

At the start of this project, there was some relevant capacity among a small pool of Antiguans— chiefly staff and volunteers of the EAG, with whom FFI has worked on previous projects to remove rats and mongooses from offshore islands. The indicators and means of verification still stand (Annex 1). The project team has to date trained more than 30 persons from Antigua on invasive species control (more than the target of 20 by Year 2, indicator 4.1), more than 30 persons from Antigua trained on ecological monitoring (more than the target of 20, indicator 4.2), 1 local student has begun preliminary studies toward her MPhil degree (indicator 4.3) and 8 persons from Antigua have gained increased skills and experience in managing projects and conservation sites (more than the target of 5 persons, indicator 4.4). Most of the beneficiaries are NGO staff, government staff, and local volunteers.

As clear evidence of their rising capacity, in Q1 the EAG secured a competitive grant from USFWS NMBCA to restore at least two more islands around Antigua using some of the tools and skills gained from Redonda. They have proceeded to conduct surveys to a high standard and develop rat eradication operational plans for the additional islands, which are to be implemented in Year 3 with NMBCA funds. Moreover, the EAG team has begun teaching local island owners how to keep island pest-free. Mention must be also made of the Project Coordinator Shanna Challenger, who has rapidly become a very accomplished conservation practitioner and a great ambassador for this project and for conservation in Antigua & Barbuda more widely. In 2017, Ms. Challenger was named by Caribbean Airlines as one of the top 25 "Caribbean Achievers" in recognition of her environmental work through this Darwin project.

While we have not yet surveyed the percentage of local people who know about the project and are able to explain why Redonda merits conservation (we aim to influence at least 75% of the population, indicator 4.5), it is difficult to find anyone in Antigua who has not heard that work is taking place to restore Redonda. Members of the project team are often stopped in the street and asked how the work is going. Comments received from local citizens in response to updates from the project point to a strong sense of pride and ownership of these achievements. For example, some of the comments received from local citizens on discovery of new trees growing on the island included:- "*So inspiring what your team is doing*" (Nicole J.), "*I am truly excited about this project guys, I have always wondered about our little island neighbor, now you guys are really enlightening us*" (Patrick C.), "*This Is Soo Awesome, Great Job This Is Amazing How Antiguans Are Doing Bigger And Better Things And Front Runners Of The Caribbean*" [sic] (Sonia A.), "*Great news and a heart felt thank you... Just look at what we can do once we work together*" (Vasky S.).

3.3 Progress towards the project Outcome

The project Outcome is "*The permanent removal of harmful invasive species triggers the recovery of endemic species, habitats and ecological processes on Redonda, and enhances Antigua & Barbuda's natural capital and conservation capacity*". Further, strong progress was made towards this in Year 2, and all three indicators have been reached, even exceeded:

0.1 *No invasive mammals remain on Redonda by project end*: The last known rat was killed in early March 2017, and the last known goats were removed in April 2017. The project team has also removed an invasive plant, the tree *Casuarina equisetifolia*.

0.2 *Net increase by at least 10% in abundance of fast-breeding native species by Year 3:* Monitoring using point count methods, validated by more detailed mark-recapture studies, have shown that the density of the endemic Redonda ground lizard *Pholidoscelis atratus* and Redonda tree lizard *Anolis nubilus*— both of which are Critically Endangered species— has doubled and tripled respectively in barely 12 months since rats and goats were removed. Invertebrate monitoring data from Q4 are awaiting analysis but preliminary observations are that many species have increased very significantly— certainly more than doubled in abundance— in the same period.

0.3 *Net increase by at least 10% in vegetation cover by Year 3.* Analysis of monitoring data in March 2018 is yet to be completed, but it is evident from site visits and photographs that the vegetation cover has increased by more than this. Many areas that were bare at the start of the project are now covered in grasses and herbaceous plants: these were still evident even by the height of the dry season in Q4. One of the most remarkable

changes has been in the germination and growth of hundreds of new young native trees in many parts of the island, which we believe to be the first new trees to have successfully grown here in many, many decades.

Based on these indicators, the project could be said to have accomplished its overall outcome within only two years. However, it is important to complete the remaining project activities and outputs in Year 3, including working towards the formal protection of Redonda, to make certain these positive results are robust and sustained.

3.4 Monitoring of assumptions

Outcome: Assumption 1— Recent scientific research is correct in identifying rats and goats as the primary drivers of biodiversity loss on Redonda, and that at least some of these changes are reversible if the aliens are removed: This assumption appears to have held true. Indeed, since rats and goats were removed in 2017, there have been dramatic increase in wildlife populations and improvements in overall habitat quality on the island. At the start of this project, for example, there were only two species of land birds on the island: peregrines (2 individuals) and zenaida doves (6 individuals), but since the rats were culled, there are now dozens of birds and the number of recorded species has jumped up to 11 (the additional nine species being the Caribbean elaenia, pearly-eyed thrasher, bananaquit, yellow warbler, American kestrel, scaly-necked pigeon, Caribbean martin, grey kingbird and barn swallow, all of which are native to this region). At least one unidentified species of bat has also been seen. This rapid, natural recolonization is consistent with findings from other islands that have been cleared of invasive mammals (e.g. Dog Island in Anguilla, which was cleared of rats by FFI and local partners in 2012). During the same period, the populations of lizards have increased very significantly (the Redonda ground lizard population has doubled in number and the Redonda tree lizard has tripled) and, although monitoring data from Q4 are yet to be analysed, preliminary observations points to even greater increases in invertebrates and plants. Hundreds of young tree seedlings have already emerged on previously barren slopes, most of them hardy native fig trees *Ficus citrifolia*: a keystone species that will help to stabilize the cliffs and support arboreal species and tree-nesting birds. The island's soils are acidic but are remarkably fertile thanks to the seabird guano and the underlying volcanic bedrock. At the time of writing (March 2018), some of the new trees are already more than 50cm tall.

Output 1: Assumption 1— Rats on Redonda are susceptible to the same bait and baiting methods that have been successfully used on other Caribbean islands: This assumption appears to have held true. The rat eradication operation on Redonda looks to have been fully successful using Klerat™ bait distributed all over the island at intervals of not more than 30 metres. Rats showed no hesitation in taking the bait in Year 1 and there was no sign of any of them being resistant to the toxin. 12 months have now passed since the last two rats were detected.

Output 1: Assumption 2— No unusual and severe weather events during critical stages (this project will avoid conducting important activities during the hurricane season, especially August through October): This assumption is essentially correct. Despite the fact that this region was struck by two exceptionally powerful hurricanes in September 2017 (Q2), the impact on this project was relatively light because our team was well prepared for possible storms at this time of year and nobody was in the field at that time. See further comments in Section 11.

Output 2: Assumption 1— Long term monitoring strategy accurately predicts the future human and other resources available to implement it: This assumption appears to be robust. Many persons in the government agencies and NGO have expressed keen interest to monitor Redonda, but most are reluctant to stay on the island for long periods or venture off the main trails. Consequently, we have pitched the monitoring programme towards rapid techniques, most of which can be completed in 1–3 days, with permanent transects and quadrats focused on the safest areas that can be accessed with minimal climbing expertise. Inevitably, there is some uncertainty over the resources for travel to Redonda after the Darwin

grant ends, but ongoing monitoring should be factored into the protected area management plan and budget (Year 3).

Output 3: Assumption 1— Continued cooperation among stakeholders: This assumption is important and still looks robust. Redonda holds a powerful fascination for many Antiguans and Barbudans: Redonda is their third sister island and looks completely different to the rest of the country, yet few have been able to visit it. As reported previously, the project team refers to the typically very swift response to any requests or invitations to meetings about this project as "the Redonda Effect". We have been overwhelmed by the interest and offers of assistance, and it is especially pleasing to see such willing and positive cooperation between the government, civil society and private sector within Antigua. Many individuals and groups have found themselves working together for the first time.

Output 3: Assumption 2— Government willingness to protect Redonda, in accordance with its own national land use plan and legislation: All of the relevant government agencies have senior representatives on the Project Steering Committee, including DoE, National Parks Authority, Forestry, Agriculture and Fisheries, whose have concurred the island should and can be protected, primarily for the purposes of biodiversity conservation. We are not aware of any decision-makers who would disagree, but more work will need to be done in Year 3 to determine the protected area boundary (i.e., how far the area extends out to sea) and develop the management plan.

Output 4: Assumption 1— Trained expertise remains in Antigua & Barbuda and Montserrat: This assumption is unfortunately impossible to guarantee, but we aim to train a relatively large number of individuals—especially persons who are already in full time employment in relevant agencies— to maximise the chance that enough will remain in positions afterwards to apply the skills and knowledge gained from this project for the benefit of biodiversity conservation. Already, the project has mentored and trained more persons that the minimum targets showed in our proposal, but naturally some individuals are more proficient than others. Further training opportunities are planned in Year 3.

Output 4: Assumption 2— Increased knowledge results in positive attitudes and behaviours: While it is beyond the scope of this project to prove this assumption to be universally true, we have seen a number of examples within this project where information has changed attitudes and behaviours. For example, many persons in Antigua who were at first opposed to the idea of removing the feral goats from Redonda (on the grounds that goats can be useful and/or perceived to belong on the island) changed their minds after being shown photographs and other evidence that the animals were starving to death on the island. Similarly, local and international scientists affiliated to this project have become more aware and conscientious about making sure they do not inadvertently transport seeds, insects or other non-native species to Redonda, after learning they could pose a serious threat to native wildlife on the fragile, recovering island. The very conspicuous improvements on the island over the past 12 months provide a very useful, vivid illustration of why island biodiversity really needs to be safeguarded from alien invaders.

3.5 Impact: achievement of positive impact on biodiversity and poverty alleviation

The project is already well on its way to achieve its proposed impact: "*Significant recovery and regeneration of threatened species and habitats on Redonda is a source of national pride and directly informs and inspires other Caribbean nations to eliminate harmful invasive species*".

Having removed invasive rats and goats from the island, Year 2 saw wildlife populations increasing and conspicuous improvements in the overall habitat, including a forest of new trees emerging (see section 3.3). While these are still early days for Redonda, experiences gained from this project are already being transferred by our team to other projects, including the UK Overseas Territories where three islands are being cleared of invasive rodents in the Turks & Caicos, and three in Anguilla. The latter include the Darwin Plus project (DPLUS060) which involves several members of the Redonda project team, including Jenny Daltry (FFI is an

implementing partner), Elizabeth Bell (who is spending many weeks in Anguilla as the Rat Eradication Team Leader) and three Antiguans (Shanna Challenger and biosecurity monitors Tahambay Smith and Sean Lee, who have each spent at least one week volunteering on the Prickly Pear Cays). FFI and the Redonda project team also facilitated the transfer of rodent bait to Anguilla in Q4.

The primary focus of this project on Redonda is biodiversity conservation rather than poverty alleviation. No-one lives on the island and it will take some time before it may be safely used for tourism or other purposes. However, the rare-breed goats that have been relocated to Antigua are now being studied and bred by the Veterinary and Livestock Division, which proposes to distribute their relatively hardy offspring to farmers in Antigua, Barbuda, Montserrat and other countries that wish to have them. A genetics study in Year 2 confirmed the goats to be of Spanish origin and distinct from the other breeds on Antigua.

4. Contribution to the Global Goals for Sustainable Development (SDGs)

This project principally addresses SDG 15 (*Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss*), and the permanent removal of highly destructive goats and rats from Redonda (Output 1) is already serving to directly combat desertification, and halt and reverse land degradation and halt biodiversity loss. The island should soon become protected under Output 3, and this project has a great opportunity to also address SDG 14 (*Conserve and sustainably use the oceans, seas and marine resources for sustainable development*) by also protecting the surrounding seas. Marine surveys in Year 1 confirmed fears that the near-shore reefs are being severely impacted by erosion from the island, but this threat will diminish as vegetation recovers in the absence of goats and rats.

5. Project support to the Conventions, Treaties or Agreements

Under the Convention on Biological Diversity, the project is notably addressing article 8(h) "*Each contracting Party shall, as far as possible and as appropriate, prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species*". This project has removed three highly damaging invasive alien species from Redonda (black rat, feral goat, casuarina tree) and is helping to transfer the necessary knowledge, skills and contacts to more local persons to support biosecurity for this and other key sites. The project also helps to deliver Article 8(a,d,f), including eliminating the main threats to, and protecting the entire range of, Redonda's Critically Endangered endemic reptiles (which are now increasing as a result), and Articles 7, 12 and 13. Redonda is biogeographically unique and this project is working towards safeguard a significant proportion of Antigua & Barbuda's biodiversity.

In January 2018 (Q4), Jenny Daltry participated in a CARICOM-wide review of progress against the Aichi Biodiversity Targets, and the Redonda Darwin Project was highlighted as an example of where the Caribbean nations are making good progress (it contributes to multiple targets, including 1, 5, 9, 12, 13, 15 and 19). This project also honours the Nagoya Protocol on Access and Benefit Sharing requirements and principles. Notably, we have repatriated goats from Redonda to Antigua where this rare breed— which is inferred to be more drought-tolerant than other local breeds—is being conserved, bred and utilized as a genetic resource for livestock farmers.

The Focal Point in Antigua and Barbuda for the CBD, ABS and CITES Management Authority is the Director of Environment, Diann Black-Layne. The DoE is the lead government partner in this project, and our Project Coordinator is based at the DoE head office. Ms Black-Layne provided a letter of support for the Darwin proposal and continues to be kept abreast of project activities and outputs. Most recently (Q4), for example, the Project Coordinator met with Ms Black-Layne to discuss plans for establishing Redonda as a protected area. As further evidence of her interest and support, she has encouraged the project team to access new GEF funding (2018–2020) to support the conservation of Redonda.

6. Project support to poverty alleviation

Poverty alleviation is not a major goal of this project because, as explained in the proposal, Redonda is uninhabited and rather remote. However, the reviewer of our first annual report remarked that "*there may well be indirect effects in Antigua & Barbuda of which Redonda is a dependency. The long term goal of establishing the island as a showcase for ecological protection and recovery will require the support and infrastructure of Antigua & Barbuda thereby bringing socio-economic benefits*". This may well be true.

In Year 2, the project team also scrambled assistance to help Barbuda (see Section 11), where many residents sadly lost their homes and almost all their possessions to Hurricanes Irma and Maria and were forced to abandon the island. While this action was not a direct result of the Redonda project's outputs, the fact that our project had skilled and well-connected personnel and equipment nearby meant that we were well placed to offer emergency support.

7. Project support to gender equality issues

The project has been successful in ensuring local women are actively involved in all aspects of project planning and implementation, from junior to senior levels. For example, all four members of the core project management team are women (including the Project Coordinator and lead representatives from FFI, DoE and EAG); the Project Steering Committee currently has 8 women and 15 men; the core Rat Eradication Team comprised 3 women and 6 men; the Goat Removal Team is comprised of 2 women and 1 man; and most of the ongoing biodiversity monitoring and biosecurity fieldwork in Year 2 was implemented by 5 women and 3 men. Across the project, the gender ratio is close to 50:50. We will continue to ensure both sexes have equal access to training and other opportunities from this project.

8. Monitoring and evaluation

Regular and impartial monitoring and evaluation are necessary to help this project operate effectively and capture the lessons learned. The Project Steering Committee (Section 2) met every quarter to review project progress, help to resolve any problems and discuss upcoming activities. Within this, technical working groups have formed to discuss and review specific aspects of the project, and additional experts from Island Conservation, Global Wildlife Conservation, Island Resources Foundation, among others, have been consulted and involved in reviewing project plans and other technical outputs (e.g. the operational plans for removing rats and goats, the biosecurity plan and biodiversity monitoring manual).

Progress against all four project outputs was monitored throughout Year 2. Naturally, special attention was paid to monitoring whether any rats or goats remained on Redonda (Output 1). This entailed a number of visits (at least once every quarter, for up to one week per visit) to conduct search for the animals and their droppings, tracks and other signs, and use detection tools such as the permanent bait stations, tracking plates, non-toxic lures and camera traps (Activity 1.4, using methods described in the Redonda Biosecurity Plan).

Considerable effort was also devoted to measuring the project's impacts on the island's wildlife and habitats (Output 2). In Year 1, we established measures and protocols for monitoring the flora, fauna and their changing environment, including standardised measurements of soil, microclimate, plants, invertebrates, reptiles and birds (Activities 2.1 and 2.2). All of these were repeated in Year 2, but with some small adjustments where necessary. For example, the fixed point surveys for Redonda ground lizards were originally set at a 10-metre radius—the active lizards being easy to spot on the bare ground— but the rapid recovery of vegetation has reduced their visibility distance to only 2 or 3 metres in many areas. Also, one of the seabird monitoring transects established in Year 1 was not revisited in Year 2 because local personnel were anxious about going so near to the cliff edge, and this transect may therefore be cancelled or surveyed less frequently than the others. The indicators for Outputs 1 and 2 also form the basis of the three main indicators for the overall Outcome, because the removal of invasive alien mammals (indicator 0.1) was recognised as key to the recovery of the native wildlife and their habitat (indicators 0.2 and 0.3). Routine biosecurity monitoring and monitoring

of native wildlife and the wider ecosystem are expected to continue through Year 3 and thereafter by trained local personnel as part of the island's ongoing management as a protected area (Output 3).

Progress against Output 4 is being measured mainly in terms of the numbers of people trained or taught, according to the indicators on the log frame, but the project team also solicits and listens to feedback from the people involved, including comments received after training workshops and public events, and in response to media articles. The success and usefulness of the outreach programme, training exercises and exchange of knowledge are to be re-evaluated more formally in Year 3 through repeating the Year 1 public questionnaire survey and competence self-assessment questionnaires.

In Year 2, at least 9.6% of grant expenditure was spent on Monitoring and Evaluation (Section 14)— up from 4.4% in Year 1— chiefly on travel, food for fieldworkers, and monitoring supplies (e.g. rodent lures, collection tubes and malaise traps). Note that these figures do not include personnel costs.

9. Lessons learnt

Overall the project has gone very well to date, and has already accomplished some highly ambitious targets, including the major operations to eradicate rats from Redonda and relocate the feral goats (completed by the start of Year 2). These were considerable feats given that the project site is remote, extremely arid, and much of it is very steep and prone to rock falls. Technical details of the work carried out have been presented in technical reports and manuals, partly because they may be of value to other conservation practitioners working on other islands.

Aspects that went particularly well this year, and some lessons learned, are:

- The main bait used in this operation, Klerat®, has again proved excellent for use as a biosecurity tool on Caribbean islands. This waxy bait is completely ignored by non-target vertebrates, it is easy to handle and copes well with both rain and very high temperatures.
- The permanent bait stations installed by the project team to detect and prevent incursions by rodents proved to be so robust that they survived the very powerful hurricanes in September 2017 almost entirely intact: only one station lost its lid, but was otherwise fine. To achieve this strength, the project team use a commercially available bait box bolted onto a pedestal that is in turn fixed into the bedrock with the aid of a rock drill and steel rod.
- Even wild-born, adult feral goats can successfully adjust to life in captivity, but they settle down more readily when housed with other goats.
- Most invasive species projects in Small Island States depend heavily on international volunteers, due to limited availability of people who can spend long periods in the field. However, encouraging and enabling locals to take part, if only for a weekend, is crucial for building ownership as well as the necessary local know-how for future projects. On Redonda, we deliberately established a 'visitor trail' along the easiest route across the island to enable novices to safely take part in deploying bait and monitoring rat activity. The same trail is also now being used for wildlife monitoring.
- It is possible for even a relatively large team (up to 14 in this case) to spend extensive periods in the field using portable solar power units to run all their electronic equipment, including laptops, walkie-talkies, phones, head torches and VHF radios. This is thanks to recent improvements in solar technology and the rising availability of equipment that can be charged via a USB cable. The same equipment furthermore helped our Antiguan partners on the mainland and Barbuda, when Hurricanes Irma and Maria disrupted power supplies.
- The recovery of Caribbean wildlife on islands cleared of rats and goats can be remarkably rapid. To see hundreds of trees appearing within 12 months of removing the mammals, a steady influx of new land birds, and a significant increase in the endemic reptile populations is thrilling. This project shows the value of gathering ample baseline data *before* eradicating invasive alien species, and then aim to monitor the island regularly (at least every two

years, and preferably annually) after the aliens have been eradicated.

Importantly, this project was genuinely wanted by both government and non-government agencies in the host country from the start. Indeed, this has never been 'an FFI project', but rather an Antiguan initiative that FFI is assisting. Having strong national ownership has enabled the project team to secure permits and overcome challenges, such as the import of over 2.5 tonnes of rodenticide. For future projects that aim to tackle invasive alien species, it may be advisable to delay the actual eradication operation to the second or even third year until and unless the team is confident that sufficient support is already in place.

Despite careful planning, however, not everything worked perfectly in Year 2. For example:-

- All but one of the eight data-loggers placed on Redonda in April 2017 filled with water and malfunctioned. This is believed to have happened during the September hurricanes (they looked fine when seen in August). To continue monitoring ambient temperature and humidity, a more robust model should be sought.
- The time and intense effort it took to plan and implement the removal of rats and goats in Year 1 meant that by Year 2, the core project team was exhausted. We found it hard to embark immediately on delivering more training workshops, planning the protected area and other project activities. In hindsight we should have factored in a proper break afterwards.
- Although all project technical reports were written to the required deadlines, we underestimated the time needed to complete reviewing and copy-editing, especially given the large number of partners involved in this project. Consequently not all of the project technical reports have been finalised and put online yet. They will be posted as soon as possible in Year 3.

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

The review of our Year 1 report was very complimentary about the project design and progress to date, and did not appear to require any changes. Our team was delighted by the very positive remarks and encouraged to continue.

When the grant was funded, the cover letter pointed out that "*currently few of the indicators have baselines - these will need to be added to allow verification of evidence presented in the first Annual Report*". We duly included the baseline information (chiefly sourced from the ecological survey by Bell & Daltry, 2012) as footnotes to the log frame in Annex 2 of our Year 1 Annual Report, and have repeated these in Annex 2 of the present report. If you would prefer to see this information presented in any other way, however, please do not hesitate to let us know.

11. Other comments on progress not covered elsewhere

Repercussions of Hurricanes Irma and Maria, including possible impacts on Output 3:

As reported in our half-year report, two Category 5 hurricanes made headlines around the world when they struck the Caribbean region in September 2017, only three weeks apart. Irma and Maria were among the strongest Atlantic hurricanes on record, with maximum sustained windspeeds of 295 kph (185 mph) and 280 kph (175 mph) respectively. Inevitably this had some impact on the Darwin project because our team members—most of whom live on Antigua—were occupied for many weeks with ensuring the welfare of their families and compatriots, and with assisting national efforts to assess the storms' impacts and make repairs. Fortunately, we had correctly foreseen hurricanes as a risk on our log frame and deliberately avoided conducting any work on Redonda during the hurricane season that could not be interrupted. Consequently, no personnel were on Redonda when the hurricanes struck or put at any risk in any other way through working on this project. An update on the hurricanes and their impacts on FFI's personnel and projects was prepared by the Project Leader and shared with LTS at the end of Q2.

Following the storms, the Darwin project team recognised the more pressing need to apply our skills and resources to assist Barbuda and other severely affected islands. Project Coordinator Shanna Challenger was enlisted as part of the national DoE-led team to evaluate the storm's environmental impacts on the main islands of Antigua and Barbuda in October 2017. She and other members of the national team made good use of their Redonda survey experience and borrowed camping and survey equipment from the Darwin project. They also learned how to set up emergency shelters for homeless families. Although damage to infrastructure was catastrophic, with reportedly as many as 95% of houses "destroyed", the native wildlife were relatively unscathed. The seabirds that had been nesting on Barbuda returned within a matter of weeks to attempt to nest again (as did the seabirds on Redonda) and the endemic Barbuda warbler was recorded in greater numbers than expected (albeit 30% fewer than pre-hurricane levels).

Also in Q2, the Project Leader liaised with partners in Anguilla and other affected states and helped two local NGOs to secure US$100,000 to help meet some of their immediate needs. FFI also collaborated with RSPB and other UK-based organisations on a joint approach to the UK Minister of Environment, highlighting the needs of environmental organisations on the worst affected UKOTs.

Although the powerful hurricanes in Q2 did not cause significant damage to Redonda (despite it receiving a direct strike from Hurricane Maria), they made it more difficult for our Antigua-based team to engage with neighbouring islands in the second half of Year 2 with regard to establishing the proposed protected area around Redonda. Of particular concern is Barbuda, which was evacuated for several months. The Barbudans still have very pressing needs to rebuild their homes and infrastructure. While we will do our best to keep them informed of the work on Redonda, it may be necessary to decide soon whether that is enough or whether the protected area planning ought to be extended beyond the end of Year 3 to allow the Barbudans more time to recover and become more involved in the process. The people of Barbuda do not visit or make any use of Redonda, being nearly 90 km away, but it is their island too.

12. Sustainability and legacy

The project is now widely known in Antigua and everyone we spoke to in Montserrat and Nevis in Year 2 had also heard that Redonda was being restored. This is largely thanks to the media release in Year 1, the large number of local and regional media interviews and articles, social media updates, and word-of-mouth. Because the public survey in Year 1 had revealed many misconceptions about Redonda, more concerted work took place under Output 4 in Year 2 to raise awareness of the true nature of Redonda and this project. We found that local journalists and broadcasters tended to focus on the rat eradication and, especially, the goat relocation under Output 1, but our team is making a concerted effort to raise awareness of the island's unique and remarkable native wildlife and history, to pave the way for the island to become a protected area and potential World Heritage Site.

The extensive media coverage, as well as individual and group meetings, is crucial for communicating with the project's main target audiences: the public and decision makers in Antigua and neighbouring islands. However, we recognise the need to share our technical methods and results with ecologists and conservation practitioners more widely, and aim to post all of our technical reports online in Year 3 once they have been copy-edited. Several peer-reviewed publications are already in the public domain, including our contributions to the *IUCN Red List of Threatened Species* (i.e. the species accounts for the endemic lizards *Pholidoscelis atratus* and *Copeoglossum redondae*, with the revised account for *Anolis nubilus* ready to be uploaded).

The project's exit strategy is still valid. The permanent removal of destructive alien mammals (Output 1) will surely stand as the greatest legacy from this project funded by the Darwin Initiative, having been the biggest threat to the biodiversity of a unique ecosystem. The removal of both goats and rats has already triggered significant increases in native wildlife populations and improvements in habitat quality on this degraded and unique site within less than 12 months (see section 3.3). To see such swift results from conservation activities within such a short time is tremendously rewarding for everyone involved, and our local partners are both

proud of their roles in this and determined to continue building on this success by protecting Redonda and restoring additional islands around Antigua. This determination is demonstrated by the efforts of the EAG and DoE in Year 2 to champion the island in national and regional forums and to secure more funding from USFWS NMBCA, GEF, and other sources to continue.

Thanks to Redonda being very remote, uninhabited and difficult to access, the risk of re-invasions by these or other alien species is very low and ought to be relatively easy to manage through the biosecurity systems established under Activity 1.4. However, we do not envisage this project and its partnerships coming to an abrupt halt at the end of Year 3, but rather entering a new phase when the Antiguan partners may develop further, exciting conservation activities with technical assistance from FFI, such as the reintroduction of burrowing owls, iguanas and other keystone species to Redonda, and even designate the island a World Heritage Site. Such needs and opportunities will be explored during the development of the management plan in Year 3 (Activity 3.4).

13. Darwin identity

The Darwin Initiative name and, where appropriate, logo have been used extensively to date, including on the widely disseminated media interviews and articles, on all project reports, PowerPoints, and other project documents such as agendas and minutes of Steering Committee meetings. Wherever possible, we have included the full clause "with support from Darwin Initiative through UK Government funding". Indeed, the 'standard acknowledgements clause' FFI and our partners have agreed to insert in all materials associated with this project reads as follows "*The Redonda Restoration Programme is a collaborative programme of the Government of Antigua & Barbuda, Environmental Awareness Group (EAG), Fauna & Flora International (FFI), British Mountaineering Council (BMC), Wildlife Management International Ltd (WMIL) and Island Conservation, with support from Darwin Initiative through UK Government funding, National Fish & Wildlife Foundation, Global Wildlife Conservation, Betty Liebert Trust, Taurus Foundation, Caribbean Helicopters Ltd and Syngenta Crop Protection AG*." While some editors unfortunately refuse to include the complete list of sponsors, we have been persistent and for the most part successful at ensuring that the Darwin Initiative is named in the most prominent outputs, including the forthcoming article in BBC Wildlife.

To further reinforce this relationship and ensure our partners are aware, stickers with the Darwin logo have been fixed to all equipment purchased using grant funds, including the project laptop, GPSs, walkie-talkies, etc. May we suggest Darwin Initiative considers offering such stickers to all grantees? This project is now well understood by the host organisations (including the Department of Environment), other departments of the Government of Antigua & Barbuda and other participating organisations to be a UK Government-funded project, and that the Darwin Initiative is the single largest funding source. However, we are aware that more can be done to continue increase the project's presence on social media and to link this to the Darwin Initiative's social media channels.

14. Project expenditure

Table 1: Project expenditure <u>during the reporting period</u> (1 April 2017 – 31 March 2018)

Project spend (indicative) since last annual report	2017/18 Grant (£)	2017/18 Total Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)			3.8	
Project Leader: Dr Jenny Daltry			-0.6	
Project Coordinator: Ms Shanna Challenger			9.8	
Finance Administrator: Ms Isabel Vique			-9.9	

Project spend (indicative) since last annual report	2017/18 Grant (£)	2017/18 Total Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Community Liaison: Ms Natalya Lawrence			-0.4	
Wildlife Officer: Ms Andrea Otto			-9.3	
Biosecurity Officer: Mr Tahambay Smith			4.3	
Biosecurity Officer: Mr Sean Lee			4.3	
Rat Eradication Team Leader: Ms Elizabeth Bell			0.0	
Consultancy costs			-6.3	
Overhead Costs			1.9	
Travel and subsistence			-9.5	
Operating Costs			-6.5	
Capital items (see below)			-0.6	
Camping gear			-3.9	
First aid kits			21.2	More than 10% shortfall (but this is a difference of only £6.37)
Others (see below)			-1.0	
Monitoring and Evaluation			-0.6	
Other consumables			-6.2	
TOTAL	**£88,850**	**£88,850**		

Please note, all the agreements and activities were completed by the endo of Year 2. However, some of the transactions were processed in April 2018.

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2017-2018

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
Impact **Significant recovery and regeneration of threatened species and habitats on Redonda is a source of national pride and directly informs and inspires other Caribbean nations to eliminate harmful invasive species.**		Strong early signs of recovery, as of the end of Year 2, include • Doubling in the number of Redonda ground lizards (compared to Year 1 baseline), • Tripling in the number of Redonda tree lizards (compared to Year 1 baseline). • Conspicuous major increase in butterflies and other invertebrates since Year 1 (data analysis in progress). • Conspicuous major increase in vegetation cover and biomass, including many hundreds of new tree seedlings. • First record of bats, Audubon's shearwaters and nine more bird species. The rat eradication and biodiversity monitoring methods from this project are being emulated by other projects; notably including the Darwin Plus project DPLUS060 in Anguilla.	[redacted]
Outcome **The permanent removal of harmful invasive species triggers the recovery of endemic species, habitats and ecological processes on Redonda, and enhances Antigua & Barbuda's natural capital and conservation capacity.**	0.1 No invasive mammals remain on Redonda by project end. 0.2 Net increase by at least 10% in abundance of fast-breeding native species by Year 3. 0.3 Net increase by at least 10% in vegetation cover by Year 3.	0.1 The last known rat died in early March 2017, and the last known goats were removed in April 2017. No invasive mammals have been detected on the island since then, despite frequent surveys using a range of detection tools. 0.2 Monitoring using point count methods, validated by more detailed mark-recapture studies, has shown that the density of the	Another round of very intensive, island-wide surveys to be conducted in Year 3 Q1 to verify no rats and goats remain before formally declaring the island to be free from invasive mammals. Analysis of biodiversity monitoring data obtained in Year 2 Q4 to be completed in Year 3 Q1. Monitoring of biodiversity will continue through Year 3 (and post-project) under

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
		endemic Redonda ground lizard *Pholidoscelis atratus* and Redonda tree lizard *Anolis nubilus* (both Critically Endangered) has doubled and tripled respectively since rats and goats were removed. Invertebrate monitoring data from Year 2 Q4 await analysis but preliminary observations are that many species have increased very significantly (certainly more than doubled) in the same period. 0.3 Analysis of monitoring data in March 2018 is yet to be completed, but it is evident from site visits and photographs that the vegetation cover has increased by more than this. Many areas that were bare at the start of the project are now covered in grasses and herbaceous plants, even in Q4, at the height of the dry season. One of the most remarkable changes has been in the appearance of hundreds of new young native trees in many parts of the island, which we believe to be the first new trees to have successfully grown here in many decades.	Output 2. Changes to be measured against baseline data from Year 1 (or pre-project data, where available).
Output 1. Alien invasive vertebrates (rats and goats) successfully removed from Redonda, with systems in place to prevent (re)invasions.	1.1 No goats on Redonda by end of Year 2. 1.2 Rare breed goats from Redonda housed on enclosed government farmland on Antigua by end Year 1. 1.3 No rodents on Redonda by end of Year 2.	The indicators still appear valid and useful. The following progress was made in Year 2: 1.1 The last known goats were removed from Redonda in Q1 (specifically April 2017). 1.2 The goats from Redonda are currently housed at the fully enclosed Veterinary & Livestock Division facility on Antigua (see Section 3.1, Activity 1.2), apart from a few orphaned kids and other individuals that needed more specialist care. These are temporarily house at Animal Ark in Antigua but remain the property of the Government of Antigua and Barbuda.	

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
		1.3 The rat eradication operation in Year 1 appears to have been fully successful, with no evidence of rats found during surveys in Year 2 (see Section 3.1, Activity 1.3). This indicator will be verified with another island-wide survey in Year 3.	
Activity 1.1 Complete Operational Plan and SOPs to remove goats and eradicate rats.		Completed in Year 1.	
Activity 1.2 Capture and transfer goats from Redonda to enclosed government farmland on Antigua.		Completed. The last goats were removed in April 2017. See section 3.1.	
Activity 1.3 Establish baiting grid on Redonda and eradicate rats.		Completed in Year 1.	
Activity 1.4 Establish biosecurity surveillance system to prevent incursions, and monitor Redonda every 2 months to verify no invasive mammals remain.		Underway. Biosecurity plan and protocols were developed and adopted in Year 2 Q1 (incorporating the use and maintenance of 39 permanent bait stations that were installed on Redonda at the end of Year 1). Biosecurity monitoring visits were conducted every 3 months to search the island for invasive mammals, plus additional checks were conducted by team members whenever visiting Redonda for wildlife surveys or other purposes. See section 3.1.	
Activity 1.5 Publish technical report(s) detailing the methods, results and any lessons learned from Output 1.		Underway. The project has produced a suite of illustrated technical progress reports, including the final technical reports on both the goat removal and the rat eradication operations, which contain detailed methods, results and lessons learnt. However these need to be copy-edited before being posted online. See section 3.1.	
Activity 1.6 Incorporate biosecurity system into the costed management plan for Redonda (re: 3.4).		To be conducted in Year 3 (along with activity 3.4).	
Output 2. Monitoring system established to measure the responses of fauna, flora and ecological processes to the removal of alien invasive vertebrates.	2.1 Rapid methods devised and established for monitoring short- and long-term changes in major taxa and abiotic characters (in Year 1, tested and refine by Year 3). 2.2 Status of major taxa and abiotic characters monitored as per 2.1 before and after removing the goats and rats (every year).	The original indicators still appear valid and useful. The following progress was made in Year 1: 2.1 Rapid monitoring methods developed in Year 1 were re-evaluated and refined during Year 2. These cover a wide range of taxa, both terrestrial and marine, as well as their habitat. See section 3.1. 2.2 The second round of surveys was conducted in Year 4. These data are being compared to the baselines in Year 1 (and pre-project records where available) to measure changes. See section 3.1. Some of the data collected at the very end of Year 2 Q4 are awaiting analysis.	
Activity 2.1 Project scientists design and agree standardised methods to monitor birds, reptiles, bats, invertebrates, plants, soil and microclimate.		Completed. Methods were developed in consultation with local scientists, and are being refined under Activities 2.2 and 2.3. A manual of methods has been prepared and updated, following fieldwork in Year 2. See section 3.1.	
Activity 2.2 Conduct monitoring as per 2.1 during the grant period (before and		Underway. Using the agreed standardised methods (2.1), data were collected on the diversity and abundance of birds, reptiles, invertebrates (terrestrial and marine),	

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
after removing the goats and rats).		plants and reef fish. Soil properties were also re-surveyed and analysed. Unfortunately most of the data loggers installed to monitor microclimate malfunctioned. Monitoring will continue through Year 3 and thereafter.	
Activity 2.3 Finalise manual detailing the monitoring methods, incorporating lessons learned from 2.2.		Ongoing. Some changes were made following the experiences in Year 2 (e.g. lizard monitoring methods needed to be adjusted slightly to accommodate the fall in visibility due to the rapid growth of vegetation). The manual is expected to be finalised in Year 3, as planned.	
Activity 2.4 Publish technical reports detailing the results and lessons learned from Output 2.		Ongoing. Peer-reviewed publications from Redonda in Year 1 were listed in the first annual report, and new ones are in Annex 3, Table 2. The technical reports produced under Activity 1.1 will also be copy-edited and shared online shortly, with others to follow in Year 3.	
Activity 2.5 Incorporate ecological monitoring plan into the costed management plan for Redonda (re: 3.4).		To be conducted in Year 3 (with activity 3.4).	
Output 3. Redonda becomes a protected area in accordance with the Sustainable Island Resource Management Zoning Plan for Antigua & Barbuda, with an effective structure to manage its ongoing ecological recovery and sustainable use.	3.1 Management committee established and operational by end Year 2. 3.2 Redonda designated as an Environmental Protected Area, encompassing the land and surrounding sea by end Year 3. 3.3 Management plan prepared (Year 3).	The indicators still appear valid and useful: 3.1 The Project Steering Committee, established in Year 1, is working well, and, as predicted, is functionally serving as the management committee for Redonda, with the Department of Environment acting as the lead Government agency. 3.2 Redonda has not been designated as a protected area yet, but is in practice being treated by the government and stakeholders as a strict nature reserve. The project made steady progress in Year 2 to clarify the steps for protection, and is benefitting from data and awareness generated in Years 1 and 2 to excite public support for protecting the island. While we will strive to submit the protected area proposal and supporting documents in Year 3, however, we do not have control over how long it will take Cabinet to decide on this case. 3.3 Data and consultations in Year 1 and Year 2 have gone a long way to clarify the area's management issues and objectives, which will be explored further in Year 3 as the management plan takes shape.	
Activity 3.1 Complete stakeholder consultations in Antigua and Montserrat.		Completed/ Ongoing. The project team has conducted three visits to Montserrat (plus two to Nevis) to date and held numerous small and large meetings with stakeholders on Antigua. The consultations have been very informative and positive. See section 3.1. The work plan in the proposal was misleading in that it indicated consultations would cease after Year 1 but this is necessarily an ongoing activity to cooperate on the biosecurity measures (Activity 1.6), help foster support for protecting Redonda (Activity 3.2), and to engage stakeholders in the management planning process (Activity 3.4).	

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
Activity 3.2 Prepare and submit technical proposal to Cabinet to designate the Redonda Environmental Protected Area (EPA).		Underway. The Project Steering Committee still anticipates the island will be designated an EPA, but there is a slim possibility it may be designated under a Protection Order or other mechanism if the EPA process is slow.	
Activity 3.3 Quarterly management meetings of the Redonda EPA Management Committee.		As hoped, the Project Steering Committee has essentially become the site Management Committee and is directing day to day operations on the island and developing its management objectives for when Redonda becomes a protected area. The committee met every quarter in Year 2 and includes senior representatives from all of the government agencies and NGOs, with the Department of Environment recognised as the Chair.	
Activity 3.4 Develop a costed 10-year management plan for the protected area using a participatory process.		To be conducted in Year 3 (with activity 1.6). In the meantime, data gathered under other project activities (e.g. 2.3, 3.1) will help to inform the plan. The new biodiversity monitoring plan and biosecurity plan will be incorporated into the overall management plan.	
Output 4. National capability to plan, manage and implement and monitor invasive species projects is raised, supported by enhanced technical skills and greater public awareness and cooperation.	4.1 At least 20 persons from Antigua trained on invasive species control and apply their skills towards Output 1 (by Year 2) 4.2 At least 20 persons from Antigua trained on ecological monitoring and apply their skills towards Output 2 (by end Year 2). 4.3 At least 1 local student studies Redonda for postgraduate degree (Years 2 and 3). 4.4 At least 5 persons from Antigua gain increased skills and experience in managing projects and conservation sites (by Year 3). 4.5 At least 75% of Antiguans, Barbudans and Montserratians know about the project and are able to explain why Redonda merits conservation (end Year 2).	The original indicators still appear valid and useful, with further work carried out in Year 1: 4.1 20 Antiguans government and NGO technicians learned and participated directly in the removal of goats and/or rats in Year 1 (see names in Year 1 Annual Report). Further meetings and workshops led by the project team throughout Year 2 introduced more than 30 Antiguan government and NGO technical staff to practical methods for preventing, detecting and eradicating invasive alien species. These were reinforced with hands-on work to monitor and maintain the permanent bait stations on Redonda (Activity 1.4) and other islands around Antigua. 4.2 More than 30 Antiguans (many of them the same individuals as in 4.1) have gained increased knowledge and skills through being involved in designing and implementing the monitoring programme in Years 1 and 2, with technical support from FFI. While many of them practised wildlife monitoring on offshore islands closer to Antigua, a dozen staff and volunteers from the DoE and EAG actively participated in data collection on Redonda in Year 2. 4.3 Antiguan Shanna Challenger was offered an MPhil scholarship from the Caribaea Initiative in Year 2 and began developing her thesis topic on the behavioural ecology of boobies on Redonda. Although she has deferred enrolment to the next academic year, she has already begun practising methods and collecting preliminary data with support from seabird specialists at the University of Roehampton. 4.4 From the start of this project, FFI staff have worked alongside more than 30 Antiguans from government agencies, NGOs and the private sector, 16 of whom	

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
		are members of the Project Steering Committee and most are colleagues from government agencies and NGOs. In Year 2, more than 20 Antiguans regularly participated in key technical workshops and fieldwork, and gained more expertise in project management and the management of conservation sites: Redonda being very different to any other site in Antigua and Barbuda. The Project Coordinator in particular has gained vastly increased skills and experience in project management including budget management and facilitating workshops, including a one-week training course in Cambridge. 4.5 Based on the questionnaire survey conducted in Year 1, most persons know very little about Redonda. By the end of Year 2, it has become difficult to meet anyone in Antigua who has not heard of the project to restore Redonda. The extent of the increase in knowledge and attitudes will be evaluated in Year 3 by repeating the questionnaire survey.	
Activity 4.1 Plan multi-media campaign to communicate project to the public on Antigua and Barbuda and neighbouring states.		Completed in Year 1.	
Activity 4.2 Implement campaign, including media releases, signage and phone-in radio shows, and evaluate impact on public.		Ongoing. Actions in Year 2 included multiple articles in the local and international press, regional airline in-flight magazines, national television interviews, signage on Redonda, a new social media site and public presentations. To date the feedback received has been overwhelmingly positive and supportive (See Section 3.1).	
Activity 4.3 Analyse training needs of field personnel.		Ongoing. Training needs have been informally assessed by the team leaders working alongside less experienced personnel (See Section 3.1).	
Activity 4.4 Conduct training classes and on-the-job mentoring for local personnel participating in eradication and biosecurity activities (re Output 1).		Completed/ Ongoing. Over 20 Antiguans government and NGO technicians participated in the removal of invasive mammals in Years 1 and 2 and participating in the biosecurity workshops. Two Antiguans also participated in the Darwin Plus project DPLUS060 in Anguilla at the end of Q4 to help acquire and exchange more skills with regard to eradicating rats and island biosecurity.Further training is planned in Year 3, focusing on biosecurity to prevent incursions. (See Section 3.1).	
Activity 4.5 Conduct training classes and on-the-job mentoring for local personnel participating in biodiversity monitoring (re Output 2).		Completed/ Ongoing. More than a dozen Antiguans were involved in designing and implementing the monitoring programme, with training and support from FFI, in Years 1 and 2. Further training and fieldwork is planned in Year 3 (see Section 3.1).	
Activity 4.6 Local technicians participate in project meetings and key field activities with FFI training and mentoring where needed.		Ongoing. Well over 30 local persons participated in project management and implementation in Years 1 and 2, including 16 Antiguans on the Project Steering Committee (closely involved in most aspects of project planning and evaluation) plus others invited to take part in key workshops. The Project Coordinator in particular has gained vastly increased skills and experience in project management. More management training and opportunities for fieldwork will be provided for local	

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
		technicians in Year 3. (See Section 3.1).	
Activity 4.7 Evaluate impact of 4.4–4.6 on the competences of local personnel in government and NGO sectors.		To be conducted in Year 3.	
Activity 4.8 Student research on Redonda's biodiversity and management for postgraduate degree(s).		Underway. One Antiguan ecologist has been offered Masters scholarship from the Caribaea Initiative and, as of Year 2, Q4, has begun gathering preliminary data and developing her thesis topic. She is planning to study the ecology of seabirds that nest on Redonda.	

Annex 2: Project's full current logframe as presented in the application form (unless changes have been agreed)

Project summary	Measurable Indicators[1]	Means of verification	Important Assumptions
Impact: Significant recovery and regeneration of threatened species and habitats on Redonda is a source of national pride and directly informs and inspires other Caribbean nations to eliminate harmful invasive species.			
Outcome: The permanent removal of harmful invasive species triggers the recovery of endemic species, habitats and ecological processes on Redonda, and enhances Antigua & Barbuda's natural capital and conservation capacity.	0.1 No invasive mammals remain on Redonda by project end. 0.2 Net increase by at least 10% in abundance of fast-breeding native species by Year 3.[2] 0.3 Net increase by at least 10% in vegetation cover by Year 3.[3]	0.1 Biosecurity monitoring datasheets and quarterly reports. 0.2 Biodiversity monitoring data and reports. 0.3 Fixed point photographs and vegetation plots.	Recent scientific research is correct in identifying rats and goats as the primary drivers of biodiversity loss on Redonda, and that at least some of these changes are reversible if the aliens are removed.

[1] The following notes have been inserted in response to the reviewer requesting more details of the pre-project baselines for the project indicators (see section 10) when the grant was approved. We recognise the importance of this request, but fear most of the following details are too cumbersome to insert into the log frame cells above. We hope presenting more detailed information in footnotes is an acceptable solution:

[2] Comparisons will be made to the pre-project baseline data in Bell & Daltry (2012) which included: (i) Density estimates of the endemic Redonda ground lizard *Pholidoscelis atrata* (146.9 per hectare) and Redonda tree lizard *Anolis nubilus* (770.9 per hectare) obtained from point counts in the 'safe zone' at the top of the island; (ii) Total numbers of nesting seabirds (West Indian red-billed tropic bird: 30 pairs; bridled tern: 41 pairs; brown noddy: 31 pairs; brown booby: 774 pairs; masked booby: 164 pairs; red-footed booby: 150 pairs; magnificent frigatebird: 119 pairs); (iii) Total number of land bird species (2 species only) and pairs (peregrine falcon: 1 non-resident pair; and zenaida doves: 2 pairs). For invertebrates and other taxa that haven't been surveyed before, net changes in abundance and diversity will be measured by comparing samples from Years 1 and 3 (Activity 2.2).

[3] Pre-project satellite images and photographs show not more than 1% of the island has permanent vegetation cover (mainly trees *Ficus citrifolia* and small patches of cacti *Opuntia* spp. and *Aloe vera*), while ephemeral weedy herbs and grasses form a thin layer across 20% of the island after rain. Changes are to be measured by comparing fixed point photographs in Years 1 and 3 (Activity 2.2) and, if available, satellite images.

Outputs: 1. Alien invasive vertebrates (rats and goats) successfully removed from Redonda, with systems in place to prevent (re)invasions.	1.1 No goats on Redonda by end of Year 2.[4] 1.2 Rare breed goats from Redonda housed on enclosed government farmland on Antigua by end Year 1.[5] 1.3 No rodents on Redonda by end of Year 2.[6]	1.1 Monitoring reports and site visits by project biologists and biosecurity personnel. 1.2 Photographs and stock books. 1.3 Monitoring reports and site visits by project biologists and biosecurity personnel.	Rats on Redonda are susceptible to the same bait and baiting methods that have been successfully used on other Caribbean islands. No unusual and severe weather events during critical stages (this project will avoid conducting important activities during the hurricane season, especially August through October).
2. Monitoring system established to measure the responses of fauna, flora and ecological processes to the removal of alien invasive vertebrates.	2.1 Rapid methods devised and established for monitoring short- and long-term changes in major taxa and abiotic characters (in Year 1, tested and refined by Year 3).[7] 2.2 Status of major taxa and abiotic characters monitored as per 2.1 before and after removing the goats and rats (every year).	2.1 Biodiversity monitoring manual. 2.2 Data and annual monitoring reports.	Long term monitoring strategy accurately predicts the future human and other resources available to implement it.
3. Redonda becomes a protected area in accordance with the Sustainable Island Resource Management Zoning Plan for Antigua & Barbuda, with an effective structure to manage its ongoing ecological recovery and sustainable use.	3.1 Management committee established and operational by end Year 2. 3.2 Redonda designated as an Environmental Protected Area, encompassing the land and surrounding sea by end Year 3. 3.3 Management plan prepared (Year 3).	3.1 Redonda Management Committee ToR and meeting minutes. 3.2 Official designation of the protected area. 3.3 Redonda Management Plan (to at least final draft form).	Continued cooperation among stakeholders. Government willingness to protect Redonda, in accordance with its own national land use plan and legislation.
4. National capability to plan, manage and implement and monitor invasive species projects is raised, supported by enhanced technical skills and	4.1 At least 20 persons from Antigua trained on invasive species control and apply their skills towards Output 1 (by Year 2).[8]	4.1 Training workshop and field reports. Names of trainees participating in fieldwork. Self-assessment competence questionnaires by the	Trained expertise remains in Antigua & Barbuda and Montserrat.

[4] Pre-project baseline of an estimated 62–65 feral goats present on Redonda (Bell & Daltry, 2012).

[5] Pre-project baseline of zero goats of this breed being kept on government land at the project start.

[6] Pre-project baseline of an estimated 5,500 black rats present on Redonda at the project start (Bell & Daltry, 2012, 2016).

[7] No previous monitoring programme was prescribed or implemented for any aspect of Redonda's biodiversity.

[8] At the project start, only five local persons (all affiliated to the EAG) were known to have had previous advanced skills and experience of conducting rat eradications

greater public awareness and cooperation.	4.2 At least 20 persons from Antigua trained on ecological monitoring and apply their skills towards Output 2 (by end Year 2).[9] 4.3 At least 1 local student studies Redonda for postgraduate degree (Years 2 and 3). 4.4 At least 5 persons from Antigua gain increased skills and experience in managing projects and conservation sites (by Year 3). 4.5 At least 75% of Antiguans, Barbudans and Montserratians know about the project and are able to explain why Redonda merits conservation (end Year 2).[10]	trainees, and appraisals by trainers and field team leaders. 4.2 As 4.1. 4.3 Student research thesis/ theses. 4.4 Before and after self-appraisals by participating government and NGO staff. 4.5 Interviews of representative samples of general public (out of the total of approximately 90,000 on Antigua, Barbuda and Montserrat).	Increased knowledge results in positive attitudes and behaviours.

Activities (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)

1.1 Complete Operational Plan and SOPs to remove goats and eradicate rats
1.2 Capture and transfer goats from Redonda to enclosed government farmland on Antigua.
1.3 Establish baiting grid on Redonda and eradicate rats.
1.4 Establish biosecurity surveillance system to prevent incursions, and monitor Redonda every 2 months to verify no invasive vertebrates remain
1.5 Publish technical report(s) detailing the methods, results and any lessons learned from Output 1.
1.6 Incorporate biosecurity system into the costed management plan for Redonda (re: 3.4)

2.1 Project scientists design and agree standardised methods to monitor birds, reptiles, bats, invertebrates, plants, soil and microclimate.
2.2 Conduct monitoring as per 2.1 during the grant period (before and after removing the goats and rats).
2.3 Finalise manual detailing the monitoring methods, incorporating lessons learned from 2.2.
2.4 Publish technical reports detailing the results and lessons learned from Output 2
2.5 Incorporate ecological monitoring plan into the costed management plan for Redonda (re: 3.4)

and/or rodent biosecurity in natural landscapes.

[9] At the project start, around 8 persons (most of them EAG staff or volunteers) were known to have had previous advanced skills and experience of surveying and monitoring wildlife on offshore islands.

[10] Based on the questionnaire survey conducted in Year 1, most persons knew little about Redonda at the start of this project (e.g. far fewer than half were aware it has endemic reptiles, or supports breeding colonies of the national bird, the magnificent frigatebird). We can safely assume 0% of the population knew of this project prior to 2016.

3.1 Complete stakeholder consultations in Antigua and Montserrat.
3.2 Prepare and submit technical proposal to Cabinet to designate the Redonda Environmental Protected Area (EPA)
3.3 Quarterly management meetings of the Redonda EPA Management Committee.
3.4 Develop a costed 10-year management plan for the protected area using a participatory process.

4.1 Plan multi-media campaign to communicate project to the public on Antigua and Barbuda and neighbouring states
4.2 Implement campaign, including media releases, signage and phone-in radio shows, and evaluate impact on public
4.3 Analyse training needs of field personnel.
4.4 Conduct training classes and on-the-job mentoring for local personnel participating in eradication and biosecurity activities (re Output 1)
4.5 Conduct training classes and on-the-job mentoring for local personnel participating in biodiversity monitoring (re Output 2)
4.6 Local technicians participate in project meetings and key field activities with FFI training and mentoring where needed.
4.7 Evaluate impact of 4.4–4.6 on the competences of local personnel in government and NGO sectors.
4.8 Student research on Redonda's biodiversity and management for postgraduate degree(s).

Other Project Management activities:-
X.1 Project inception meeting
X.2 Project Steering Committee established and meets regularly to oversee project activities
X.3 Project biannual reports/ donor technical and financial reports
X.4 Monthly financial accounts
X.5 End of project Audit