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Darwin Project Information

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Project title	Assessment and protection for Cayman Islands' Seabird Populations
Territory(ies)	Cayman Islands
Contract holder Institution	Department of Environment
Partner institutions	University of Liverpool, UK National Trust of the Cayman Islands University of Exeter, UK
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Project leader name	Gina Ebanks-Petrie
Project website/Twitter/blog etc.	www.caymanseabirds.weebly.com, @CaymanSeabirds
Report author(s) and date	Rhiannon E. Austin, Jonathan Green, Gina Ebanks-Petrie, Timothy Austin, Jane Haakonsson, Frederic Burton and Sophie O'Hehir. 30th June 2018

1 Project Overview

The Cayman Islands

The Cayman Islands (Grand Cayman, Little Cayman and Cayman Brac) are a UK Overseas Territory located in the western Caribbean Sea, to the south of Cuba and northwest of Jamaica (19°N, 79-82°W, Fig. 1). The marine environment around the Cayman Islands supports a diverse range of fauna including invertebrates, fish, turtles and seabirds, and this diversity of marine life itself provides strong economic draws through tourism and recreational fisheries. The Islands have benefitted from over 25 years of marine conservation action, focused through a network of Marine Protected Areas (MPAs) that is actively managed and enforced by the Cayman Islands Government's Department of Environment (DoE). Nevertheless, these efforts at site protection currently extend purely to near-shore marine habitats and associated reef organisms, while many large mobile marine vertebrates remain insufficiently protected throughout offshore Caymanian waters.

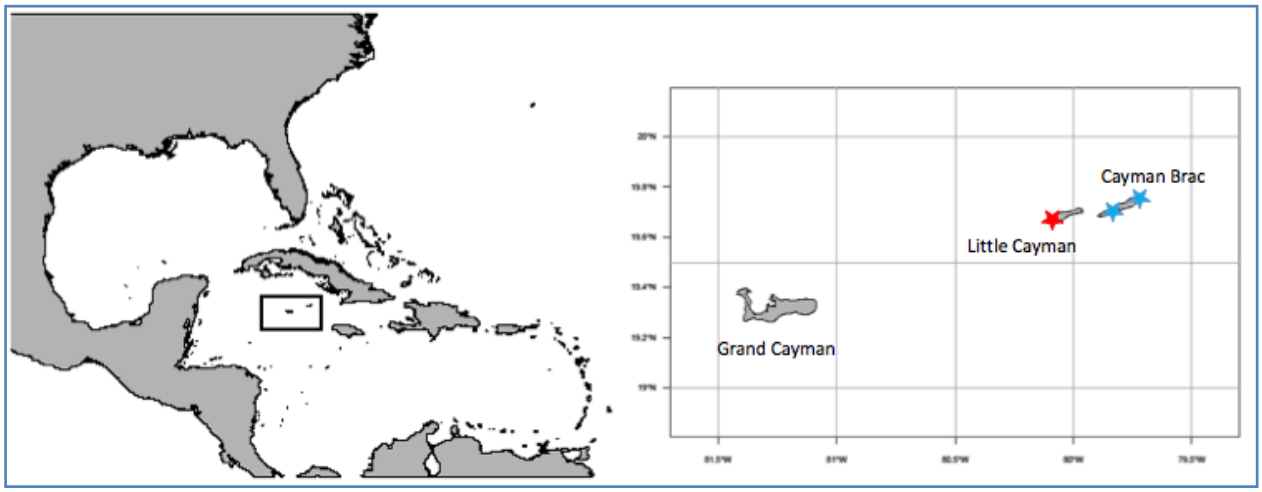

Fig. 1. Map of the Cayman Islands in the western Caribbean Sea. Colony locations of red-footed boobies on Little Cayman (red star) and brown boobies on Cayman Brac (blue stars) are shown.

Project background & key issues addressed

Seabirds are among the large mobile marine vertebrates that inhabit waters around this UKOT. The Cayman Islands support multiple resident seabird species, including globally and regionally important populations of red-footed boobies (*Sula sula*; RFBs), brown boobies (*S. leucogaster*; BBs) and magnificent frigatebirds (*Fregata magnificens*; FBs). Despite some previous efforts to establish the status and trends of RFB, BB and FB populations in the Cayman Islands, knowledge of resident seabird colonies was insufficient before this project. Routine monitoring of colonies was non-existent, and little was known about existing population sizes and trends, breeding behaviour, productivity and key threats. The at-sea movements and ecology of resident seabird populations were also largely unknown and this group, as with other large mobile marine vertebrates, was not considered an active part of marine spatial planning and/or MPA designation.

Seabirds, one of the most threatened groups of marine vertebrates, are vulnerable to a range of threats both at sea and on land, owing to their highly mobile life styles and life history strategies (they are long-lived, slow to mature, raise small broods and experience slow rates of population growth). Their lifestyle and traits also qualify them as tractable indicators of the status of the marine environments in which they forage. In order to promote their role as marine indicators, and establish effective conservation strategies for these highly mobile vertebrates, a thorough understanding of how and when they use the marine environment, their population status and key threats to survival is thus required. As the Cayman Islands continue to experience rapid, unsustainable in-land and coastal development, there remains an urgent need for robust monitoring approaches and effective conservation strategies for key species and habitats.

Project aims

This project aimed to address knowledge gaps and provide essential information on the status, movement behaviour, and ecology of globally and regionally significant seabird populations that breed on the Cayman Islands (RFBs and BBs), to feed into conservation action. After the first field season FBs were added to the list of focal species as the breeding population was assessed as data deficient. The main objective was to generate new knowledge that would inform decisions made by local stakeholders about marine spatial planning around the Cayman

Islands, and allow the Cayman Islands Government to implement appropriate management actions for important resident seabird populations.

Specific project objectives were to:

1. Identify key at-sea habitats of globally and regionally important seabird populations in the Cayman Islands
2. Identify over-land commuting routes and trip departure/arrival time of RFBs on Little Cayman, and relate this information to site plans for proposed airport developments
3. Improve knowledge on the population size, breeding biology, phenology, diet and predation of globally and regionally important seabird populations, to allow identification of the main threats to colonies on the Cayman Islands
4. Establish sustainable seabird census and monitoring programmes that local Government staff, NGOs and community partners can operate

The project ran successfully over three seabird breeding seasons (2 project years), met all of the above objectives and generated a wealth of data, which provide a strong evidence base for the development of robust management approaches and associated conservation actions in this UKOT.

2 Project Stakeholders/Partners

This project was conducted as a collaborative effort between the DoE, University of Liverpool, UK (UoL), National Trust for the Cayman Islands (NTCI) and University of Exeter, UK (EXE). The project application stemmed from initial conversations between postdoctoral researcher Dr Rhiannon Austin (née Meier) and the DoE during 2014, prior to lengthy discussions between all partners to identify research and conservation needs in the Cayman Islands. The project also benefitted from lessons learned during DPUS007, led by UoL. As such, all partners were involved in project development and application processes from an early stage. The project was therefore highly timely, identified relevant management needs in this UKOT, and benefitted from high levels of local support.

The project started with a meeting between all project partners present in the Cayman Islands (April 2016), which helped to plan work in the short and long term, and to establish and build inter-partner relationships. During project implementation, representatives from DoE have been involved in project planning, have been heavily involved in fieldwork and have been trained in field skills and data collection. NTCI staff have been consulted and involved in operational matters in the field, and members of the NTCI have been consulted on fieldwork and project progress through town-hall meetings in both communities where the work was conducted. Other interested parties and local residents have also attended these meetings and have been trained in and involved with fieldwork on both Cayman Brac and Little Cayman. The Royal Society for the Protection of Birds (RSPB) has also provided guidance for this work through a site visit in 2016, and participation in regular Steering Group Meetings during project monitoring and evaluation processes. Furthermore, an RSPB staff member undertook a voluntary sabbatical in March 2017, to conduct population surveys on white-tailed tropicbirds on Cayman Brac.

Our initial application provided for Dr Austin to be based continuously in the Cayman Islands, with a large portion of time spent at DoE HQ on Grand Cayman, which has continued to be a great benefit to the project. Field periods in all project years were longer than initially anticipated during the development of the project, although this allowed the project team (both Dr Austin and DoE staff) to embed closely within the local communities most directly impacted by this work. Furthermore, due to flexibility in timing and the budget, Dr Austin was able to spend periods in the UK working with project partners from the Universities of Liverpool and Exeter, and thus the project benefitted from additional expertise held in these centres of learning.

3 Project Achievements

3.1 Outputs

Output 1. At-sea Habitat Use

We aimed to identify key at-sea habitats of globally and regionally important seabird populations. Prior to the project, nothing was known about the at-sea habitat use of seabird populations in the Cayman Islands. Through this project, we identified the key at-sea habitats of red-footed booby and brown booby populations using standardised tracking and analytical approaches accepted by the international community (see Annex 6.1). Through collaboration and leveraged additional funding, we were also able to add a third important resident seabird species, the magnificent frigatebird (*Fregata magnificens*), to the project. Marine Important Bird and Biodiversity Areas (marine IBAs) were identified for the three species using Birdlife International criteria, and species distribution maps were produced, highlighting priority marine areas for protection (see Annexes 6.1 and 6.2). A comparison of the at-sea distributions of the two booby species, and different classes of populations (i.e. males and females), was also undertaken and will form part of a peer-reviewed scientific paper that is currently in preparation (Annex 6.2). A peer-reviewed scientific manuscript focused on the FB data has also been produced and is currently in review in a scientific journal (see Annex 6.3). Tracking data can be accessed via links on the Movebank online database (www.movebank.org).

Work on this output for brown boobies proceeded as planned, with the exception of the late breeding season in 2016 at the start of the project, which resulted in a limited number of available birds for tracking. For red-footed boobies, the long-life GPS-GSM tags did not perform well or yield the desired sample sizes. We addressed this issue by up-scaling our archival tracking work, but the species also proved difficult to recapture. The breeding season in 2017 was poor, with low rates of reproductive success across both experimental and control nests (see Annex 6.4), and therefore our tag recovery rates for red-footed boobies were smaller than hoped. Despite these challenges, our planned mitigation of multiple device types and multiple flexible fieldwork seasons allowed us to collect sufficient data to achieve the output. (See Annexes 6.1 and 6.2).

Output 2. Commuting Routes and Times

We aimed to identify commuting routes and times of seabirds on Little Cayman, due to potential disturbance and risks imposed by proposed development of a nearby airport runway and infrastructure on this island. Prior to this project no quantitative information on commute pathways and activity patterns for seabirds was available, preventing an assessment of the potential risk posed by different coastal development scenarios. Tracking data from RFBs and FBs (see Output 1) were used to identify commuting routes, the density of flying birds over land-areas, and departure and arrival bearings during foraging trips, which has allowed an assessment of potential conflict between different airport development scenarios and the breeding population (evidence in Annex 6.2). Species-specific maps of flyways (overlaid on map layers of airport scenarios), and figures showing flight activity patterns and commute bearings, were produced (see Annex 6.2). These data are contributing to the peer-reviewed article that will be submitted shortly to a scientific journal for publication.

Output 3. Population Biology

We aimed to greatly improve understanding of population size, breeding biology, phenology, diet and predation of globally and regionally important seabird populations, to allow identification of threats and production of conservation strategies. Prior to the start of this project, no routine standardised monitoring activities at seabird colonies were undertaken on the Cayman Islands (despite some efforts at population surveys in the past), and thus there was no baseline information on current population sizes, breeding biology and phenology, diet or the threat of predation at colonies. Through this project we have produced a step-wise change in these areas as outlined below:

***Productivity*:** Levels of breeding success were determined for the three seabird species, by the project team, in at least one study year (Years of data: BBs = 3, RFBs = 2, FBs = 1; Annex 6.4), and continue to be collected during the current season. Furthermore, to assess the impact of handling and tag attachment on productivity, the breeding success of sets of tracked and control nests were compared during the study (see Annex 6.4). On Cayman Brac, work by a network of volunteers (trained during the project – see Output 4) has accumulated a wealth of data on productivity, not only during the lifetime of the project but since 2012. This dataset has been compiled into a database on the brown booby population that will be used by the DoE in subsequent years (see Annex 6.4 for measures of productivity). This active and growing dataset will allow the DoE to assess the on-going health of the populations in the Cayman Islands

***Phenology*:** An assessment of phenology through regular colony visits throughout the year was not feasible due to colony accessibility and staffing constraints. However, we were able to remotely assess phenology of red-footed boobies using the camera traps purchased originally for predation work. These generated an extensive amount of data, which are still being processed by students at the UoL, and staff and interns at the DoE. Nevertheless, we have identified the main timings of nest building, incubation, chick-rearing and post-fledging periods from analysed images (see Annex 6.4). A basic summary of the annual phenology of focal seabird species as assessed broadly through regular colony visits can also be found in the 'Seabird Monitoring Guide' that was produced during the project (Annex 6.7) and can be found on the project website. This information will guide future monitoring and research work on seabird populations in the Cayman Islands.

***Population estimates*:** We greatly improved our understanding of current population sizes of RFBs, BBs and FBs on Little Cayman through survey work at the colonies. Population survey methods were trialled and refined during the project, and full colony surveys were undertaken in 2017 on Cayman Brac, and 2017 and 2018 on Little Cayman (see Annex 6.1 for methods). Flexible breeding periods and unpredictable environmental conditions did cause some delays to survey work during the project, but we utilised our planned extended flexible field seasons and local knowledge to overcome these issues and have successfully developed, tried and tested the population monitoring programmes. The data generated during these surveys is extensive and still being processed, however, we have obtained preliminary population estimates for the three species to add to compiled historic estimates (see Annex 6.4 and 6.5; new estimates available in the eBird online database at www.eBird.org). A population database has been produced that will be used during routine population surveys planned by the DoE using our repeatable double sampling methods (see screenshot in Annex 6.4). Due to the simplicity of the database's format, and existing DoE in-house capacity built during the project, a guide on how to use the database (as outlined in the original application) is not appropriate or required. The DoE's capacity to routinely monitor populations with repeatable colony-tailored methodology, and assess population trends over the long-term has thus been notably improved.

***Diet*:** We identified dietary habits of RFBs, BBs and FBs directly (through opportunistically collected regurgitates over three field seasons) and indirectly (through stable isotope data collected from blood samples during two field seasons). Plots showing the relative composition of different prey items to the diet of the three seabird species were produced, as were stable isotope biplots of booby and prey species, to help interpret the contribution of different prey groups to the diet. An improved understanding of the prey groups that these predators rely on, and their ecology, will help the DoE to identify prey-related impacts on populations, and assess their likely resilience to future environmental change. Our field team also found evidence in frigatebirds of scavenging behaviour and interactions with fisheries, as two carcasses were found having swallowed hooks and entangled in fishing line. This has thus identified a need for future investigation of this at-sea threat (see recommendations in SCAP – Output 5).

***Predation*:** We used a network of camera traps deployed at the colony on Little Cayman to assess the presence of introduced predators and accumulate direct evidence of predation. The field team also opportunistically assessed predation on both Little Cayman and Cayman Brac while working at the field site. Evidence of cat predation on brown boobies was gained during

tracking work at the colony in 2018 (Annex 6.4). We also recorded direct video and photographic evidence of cat predation on RFBs and FBs (both adults and chicks), which has been used by the DoE to justify initiation of a cat eradication programme on Little Cayman (focused on the Booby Pond and surrounding area) to address this threat (see Annex 6.4 and 6.6). This programme has since ceased owing to a legal case mounted by two animal welfare groups in the Cayman Islands. However, it is hoped that management actions to target this identified threat to the breeding populations will be reinitiated once court proceedings have ended.

Output 4. Training

By the end of the project, we aimed to have built enough capacity to allow local government staff, NGOs and community partners to operate self-sustaining seabird census and monitoring programmes. Prior to the project, no routine population monitoring work was undertaken and staff did not have specific skill sets to undertake this task effectively. During the project, six staff members from DoE have been involved in and/or trained (by seabird experts form the UoL and EXE) in seabird monitoring and research techniques on both islands, and have gained considerable new skills in this area. Two staff at DoE were also trained in tag scheduling and downloads, and in basic data handling skills, including in the maintenance of the population database. New (x5) and existing (x2) volunteers received training in and were involved in population surveys and productivity monitoring work on BBs on Cayman Brac. This training was in the form of small group sessions to run through training materials (see Annex 6.7) and PowerPoint presentations available on the project website, as well as practical sessions in the field to train volunteers in seabird identification, use of monitoring equipment and data collection. A summary of information provided to staff and volunteers in seabird monitoring can be found in the 'Seabird Monitoring Field Guide' that was produced during the project (Annex 6.7; with a full electronic version available on the project website). These guides were disseminated to volunteers and relevant local community members / conservation organisations in the Cayman Islands to streamline and enhance the efforts and involvement of volunteers. While we initially aimed to train NTCI staff members in seabird tracking and monitoring methods, this was not possible during the project owing the other NTCI commitments and staffing issues. We did however continue to engage and involve NTCI staff in the project through regular internal and community update meetings, and it is hoped that trained staff of the DoE will be able to pass on the newly acquired skills to relevant field staff on the NTCI in the future as staffing levels change. Eight high-school students interning at the DoE also received short-term training in data processing techniques for camera trap and population survey data, and were involved in data input tasks. In addition to the training of Caymanian residents, six undergraduate students at the UoL received training and were involved in data processing of camera trap or bird-borne video logger imagery, and one MSc student was trained in GIS and population data processing methods (Annex 6.5).

During the project, a number of TV, radio and other news outlet interviews have been given through local media channels, and the project had a dedicated website and Twitter feed (258 followers) on which regular updates were provided (see Annex 6.7 for further details of media and engagement activities).

Output 5. Species Conservation Plans

Guided by newly acquired information resulting from project activities, we aimed to produce Species Action Plans (SAPs) for important seabird populations, as a key step towards formalizing enabling Species Conservation Plans (SCPs) under the National Conservation Law 2013 (NCL).

Prior to the project, the most recent management plans for seabirds were embedded in the Cayman Islands National Biodiversity Action Plan, 2009 (NBAP). However, these plans were out-dated, and suffered from a lack of knowledge on species' population status and ecology, and no up-to-date SAPs had been drafted. During the project, using information gained during tracking and colony work, we drafted a combined Species Action Plan for RFBs, BBs and FBs (See Annex 6.8). This document includes a summary of the conservation status, ecology and

threats of species, and a detailed framework for action with objectives, proposed actions and timescale, and thus represents moves towards a step-change for conservation action of important seabird populations.

Rounds of public consultation were also initiated during end of project community meetings on both Little Cayman and Cayman Brac (See Annex 6.7), during which the outputs of the project, and plans for management action were discussed with local communities. A further formal round of consultation with DoE managers will be undertaken in 2018-2019, after which corresponding Species Conservation Plans will be drafted by DoE for approval by the National Conservation Council and Cabinet, and placed out for public consultation before submission for Cabinet approval. The SCPs will provide a legal framework for implementation of the SAP's and for enforcing protective measures under the NCL.

3.2 Outcome

The overall project outcome was to determine the at-sea movements and status of important seabird populations, allowing identification of Important Bird Areas, establishment of sustainable monitoring programmes and development of informed marine and coastal conservation strategies.

The outcome of the project was achieved. Over 210 seabirds including the original target species and a third species, the magnificent frigatebird, were tracked from the Cayman Islands over three breeding seasons (2016-2018). These data were used to define new marine Important Bird and Biodiversity Areas using Birdlife International protocols and criteria (Annex 6.1 and 6.2). We assessed that the proposed airport development scenarios on Little Cayman will pose low risk to the resident RFB and FB colonies, and that airport scenario 3 represents the lowest risk as is both furthest from the colony and an area over which fewest seabirds commute (Annexe 6.2). We have designed and established baseline colony-specific population monitoring programmes that can be run by trained local stakeholders (Annex 6.4). Finally, Species Action Plans have been drafted for globally and regionally important seabird populations, identifying threats to seabirds, objectives and a framework for action (Annex 6.8).

The extended presence of a postdoctoral researcher in the Cayman Islands who could liaise and interact with the Department of Environment team had several benefits to the project. DoE staff benefitted from informal mentoring and in-field training while local expertise from DoE staff meant that many activities of the project were undertaken at a more advanced level than originally planned (Annexes 6.2 – 6.5). A continuous presence during field seasons aided in communications and planning, especially where problems were encountered. A further outcome is an identified need for DoE to receive further training on the skills needed to analyse and process the data outputs from projects such as ours. This is now the subject of an application by Dr Austin for a NERC Innovation Fellowship as a further collaboration between the University of Liverpool and the Cayman Islands DoE.

3.3 Long-term strategic outcome(s)

The project was ultimately successful in achieving the intended project outcomes. There is no doubt that there has been a step-change in the status, importance and understanding of the role of seabirds in the Cayman Islands and that the DOE is now well placed to maintain monitoring of the Cayman Islands' major seabird colonies. Data from this project and subsequent monitoring will be key to ongoing adaptive management of the Booby Pond Nature Reserve and RAMSAR site on Little Cayman, and the cliffs and south coast nesting zone of Cayman Brac.

The identification and mapping of marine IBAs by this project contributes to nascent thinking within the Cayman Islands Government about the legal extent of territorial waters, the need for protection and management of shallow offshore banks, and what role Protected Areas under

the NCL should play in the protection and management of offshore marine resources, given limited capacity for patrolling so far offshore.

Tracking data from this project also places the Cayman Islands Government in a more informed position to participate in regional and international initiatives to protect species and biodiversity at a multiple island scale recognizing that Little Cayman's BB's routinely forage in Jamaican waters and Cayman's FB's spend a significant amount of time in both Jamaica and Cuba.

As described in section 7, the project has delivered good value for money. We were able to make use of existing assets and for DoE staff to work alongside the project team while also working on other tasks. We were also able to use the existence of the project to leverage further funding towards the work from bodies such as the Cayman Islands Turtle Farm, through their Conservation Fund.

Importantly, we have transferred the work undertaken by committed and enthusiastic local residents into useful data that will help in our understanding of these birds.

Working with the Universities of Exeter and, in particular, Liverpool has brought huge value to the project. In particular, their support of and training provided to the project officer has enabled her to perform at a very high level. She has not only generated a mass of data, but has worked very hard to analyse and interpret the data, which are now incorporated into the project outputs.

4 Sustainability and Legacy

Training local Government staff and other project partners in seabird tagging and monitoring techniques was one of the major project objectives. This ensured that capacity was built and that monitoring and data management can be sustained in the long-term. All DoE staff listed on the project have either received training in field techniques from seabird scientists at partner organisations, or been involved in data processing and project management processes. This will ensure that staff are equipped with the required skills to use collected data for management purposes, and tag and monitor seabirds to generate population and tracking data in subsequent years. A number of volunteers have also involved in field activities over the span of the project (Cayman Brac = 5, Little Cayman = 2). Volunteers assisted in tag deployment/recovery trips and population survey work on both islands, and have been trained in seabird monitoring skills to promote the long-term continuation of routine population monitoring.

The data collected during this project are now being used as an evidence base for the creation of Species Conservation Plans under the National Conservation Law of Cayman Islands (2013). Species Action Plans have been drafted (internal Government documents; see Annex 6.8), which will lead to the production of Species Conservation Plans (public documents enforceable under the NCL) following a round of public consultation in 2018-2019. The outputs of this project will thus ensure a step change in the management of seabird populations on the Cayman Islands, and a sustained benefit to conservation practices. The project is therefore leaving a long-term legacy.

The project gained considerable interest within the Cayman Islands, as evidenced through numerous television features, radio interviews and news reports (see Annex 6.7). Local communities were also engaged through public meetings, school talks and magazine articles, and results dissemination will continue as the University of Liverpool produces further outputs with the wealth of additional data collected over the last three field seasons, Project outputs have also been more widely disseminated to scientific communities at international conferences and through a number of peer-reviewed scientific publications that are either currently in review with scientific journals or in preparation, thus ensuring maximum impact (Annex 6.3 and 6.7).

Dr Rhiannon Austin plans to continue working in applied seabird conservation science, either within the Caribbean region or further afield and is seeking further funding and postdoctoral positions. With support from the UoL through ongoing collaborations, staff of DoE will continue to use resources and skills gained during the project to ensure that project outputs are fully

utilized for conservation management. While this project has been highly successful, it did not attempt to allow for high levels of skills exchange with respect to the handling, analysis and scientific interpretation of collected data. In conducting the work we identified dependence within the DoE on external organisations, and an associated in-house skills deficit with respect to data handling that we would like to address. As a result, the DoE and partners at the UoL are currently applying for a NERC innovation placement grant to allow Dr Austin to be embedded at the DoE for another year to build on the work started during this project.

5 Lessons learned

While the project was ultimately successful, several important lessons have been learned that would be valuable for future projects, both for similar projects to ours and more widely across the UKOTs.

1. The financial elements of the project were complex, in part due to the initial setup of the project where funding was awarded to DoE Cayman Islands but with large elements subcontracted back to UoL. This involved two sets of international financial transactions, with inevitable losses of conversion. It also put the burden of financial management onto DoE. This was challenging because the task of managing a project with multiple elements and considerable expenditure, in some cases involving large transactions with UK institutions (e.g. for data logger purchase) was complex, especially when considering the geographical and temporal constraints of working between the UK and Caribbean. We underestimated the demands of this, which meant that the finance team in the DoE found it difficult to incorporate into their existing workloads. One consequence of this was that the Project Officer Dr Austin spent considerable time working on this side of the project, which took her away from her core work on in the project itself. For future similar projects, we would have budgeted in a specific contribution towards the costs of a financial officer in the Cayman Islands. Alternatively or even in addition, we would have the UK institution as the lead organisation (as UoL did in DPLUS007) with contracts to the Cayman Islands for local expenditure for fieldwork. UoL are a much larger organisation than those typically found in the UKOTs with multiple finance specialists across various teams (central, departmental) who might better have been able to absorb the work involved. There would also have been fewer large financial transactions back and forth across the Atlantic.
2. Meetings between multiple members of the project team were hard to organise. This was complicated by distance and time differences. While the project officer Dr Austin did a fantastic job of communicating between the parties, it may have been more efficient if there were some more meetings by video conference. The project leader and major partners were all busy people and so a schedule of regular but infrequent meetings would have been good. This is something we would recommend for the wider Darwin community.
3. Dr Austin worked tirelessly in the field, but she also benefitted from having a full-time fieldworker dedicated to the project at key periods. On some occasions this support came from volunteers but at other times we paid a casual project assistant. Funding for this came from contingency funds in the project budget. The project was successful in exposing DoE staff to the techniques used in this work and extensive training was provided such that future work could be conducted independently. However, active participation and training is not the same as having a dedicated assistant and in future we would incorporate this into the project plan and budget, on top of the time allocated for DoE core staff. We recommend that other applicants seriously consider the roles of team members during practical work and ensure that sufficient support is provided so that trainees can train, without needing to simultaneously provide support and assistance.
4. Seabird conservation in the Cayman Islands benefits from the considerable efforts of a small number of dedicated and enthusiastic volunteers. Our project has provided further guidance and training to these volunteers so that the maximum possible value can be extracted from their inputs. However, while the National Trust of the Cayman Islands were partners to the project, the volunteers had been working largely independently.

Prior to the application and in the development of the project it would have been good to have closer and/or more direct contact with the volunteers. Both the project team and the local volunteers would have benefited from this. The volunteers could have had an input into the process to clarify what they have been doing, what they need and what is feasible. The project partners would have benefitted from having a clearer idea about conditions on the ground and the capacity of the volunteers, such that activities could have been planned that were realistic and more specific to the local conditions.

5. Contrary to our original plan the project officer split their time between the Cayman Islands and the UK which was a very effective approach for a project of this nature. Spending time in the field and being embedded with the lead organisation in the Caymans meant that Dr Austin gained a very good understanding of the study environment and could build effective relationships with all relevant stakeholders. She was able to work with and directly train local staff, volunteers and students who provided extensive support to the project. This was interspersed with periods spent in the UK where Dr Austin could engage with a relevant academic environment, which helped her to bring the latest techniques, technology and thinking to the work. In doing so, Dr Austin was able to co-supervise a Masters student who aided in interpreting the data from the red-footed booby aerial census. Time in the UK also enabled her to explore further funding opportunities to build on the work started in the current project. An important consideration however is the personal cost of regularly moving between homes and countries. There are inevitable personal expenses and difficulties associated with moving accommodation that should be made clear to future individuals working under this model. In particular, we underestimated the living costs for the Cayman Islands that had to be borne from a salary costed at UK rates, without additional living allowance from the project budget. While for most Darwin projects this is perhaps less of a consideration, for territories and countries with high living costs such as the Cayman Islands, this should be included in the project budget.
6. Our project plan incorporated several mitigation measures that we had to deploy during the project. For example, the performance of the GPS-GSM data loggers was not as effective as we had hoped, but extra deployments of archival loggers meant that sufficient data were obtained on red-footed booby movements. Similarly, later than expected breeding seasons did not complicate or negatively affect our fieldwork schedule due to provision for multiple flexible fieldwork schedules. These plans in turn had been developed following a previous project (DPLUS007). We urge all investigators to exhaustively consider what practical elements of their project might not go wholly according to plan and to think of multiple alternatives and mitigation measures where possible. Having these in place ensured the successful outcomes of our project.

5.1 Monitoring and evaluation

The project ran as planned with respect to achieving the project goal of determining the at-sea movements and status of important seabird populations. However, we developed project data collection activities beyond those listed in the initial application and generated a wealth of additional data that will support conservation management of seabirds in our UKOT. These activities included undertaking a third field season in Jan-March 2018, which i) delivered an additional year of movement data for brown boobies, and preliminary data on immature frigatebirds, and ii) allowed for a full population survey of the red-footed booby and magnificent frigatebird colonies on Little Cayman (using our tried and tested double-sampling methodology that was developed during the project). We also collected additional streams of movement data from birds that were not originally planned including data from time-depth recorders, immersion loggers, accelerometers and video loggers, and these high-resolution data are currently being analysed and used to support advanced analyses on seabird movements by staff at the UoL.

To assess project progress against measurable objectives, four steering group meetings were held during the project, with representatives from project partner organisations, as well as external independent advisors from the RSPB and the University of Roehampton (See Annex 6.9). This approach worked well, allowing us to identify any project issues, draw on the wealth of experience held by our interdisciplinary project committee, and maximise on data collection and project outputs. In addition to steering group meetings, the Department of Environment and

Dr Austin met regularly in-house to discuss project progress, and ensure that the work undertaken contributed to meeting desired project outcomes with maximum impact. Briefing documents were circulated amongst the steering group committee (steering group meetings) or project partners (in-house meetings) prior the each meeting. Indicators of achievements such as species distribution maps were presented at these meetings to allow project partners to measure success and adopt flexible approaches to project activities where needed.

5.2 Actions taken in response to annual report reviews

We were pleased with the positive reviewer feedback received in response to our first annual report, with only one comment that required addressing during the following report. This issue related to the absence of NTCI staff from the training programme, and reduction in the number of islander volunteers trained in comparison to those estimated in the initial application form. Both comments were addressed and explanations provided in the Y2 half-year report, and there are no outstanding issues. Past reviews have been disseminate to, and discussed with, all project partners.

6 Darwin Identity

The project received notable media attention during its lifetime. Project outputs were publicized through a number of TV and radio interviews, and news articles released in the Cayman Islands (see Annex 6.7 for links to media outputs). All media releases associated with this project acknowledged the Darwin Initiative as the major funding source, and the Darwin logo was also used in public presentations given during the project, and educational materials produced (see links to presentations on project website and Annex 6.7). Project activities and outputs were also regularly publicized through a dedicated twitter feed (@CaymanSeabirds), project website, and other partner websites (www.caribbeanseabirds.org.uk, www.segul.org.uk), and the Darwin Initiative were acknowledged through all of these channels. Throughout the project it has been made clear in all publicity that this work stemmed from Darwin Initiative funding and that this was a discrete project made possible by support from this funding body.

As the Cayman Islands have benefitted from a number of other high-profile projects that the Darwin Initiative have funded (i.e. DPLUS019, 18-016, EIDPO045), the host country and members of its general public are familiar with this grant scheme. The local support and awareness of seabirds that has been generated thorough these avenues of publicity should encourage the continuation of seabird monitoring and conservation activities in this UKOT over the long term, thus leaving a project legacy.

7 Finance and administration

7.1 Project expenditure

Project spend (indicative) since last annual report	2017/18 Grant (£)	2017/18 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs				-
Consultancy costs				-
Overhead Costs				-
Travel and subsistence				-
Operating Costs				-
Capital items				-

Project spend (indicative) since last annual report	2017/18 Grant (£)	2017/18 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Other				
TOTAL				

Staff employed (Name and position)	Cost (£)
Dr Rhiannon Meier (Postdoctoral research associate) – Y2	
Dr Jonathan Green (Senior lecturer) – Y2	
TOTAL	

Consultancy – description of breakdown of costs	Other items – cost (£)
TOTAL	-

Capital items – description	Capital items – cost (£)
TOTAL	-

Other items – description	Other items – cost (£)
Birds Caribbean and Seabird Conference Registration Bio-logging Science Symposium Registration Printing of Seabird Guides	
TOTAL	

7.2 Additional funds or in-kind contributions secured

Source of funding for project lifetime	Total (£)
ECR Career Development Bursary - R.Meier (2016)	
Research grant, British Trust for Ornithology (2016)	
Cayman Islands Turtle Farm Conservation Fund (2017)	
Department of Environment funds for frigatebird tracking (2017)	
Department of Environment salaries in-kind (2016-2018)	
Department of Environment additional in-kind contributions (2016-2018)	
University of Liverpool salary overheads for Drs Austin & Green (2016-2018)	
University of Exeter salary overheads for Dr Votier (2016-2018)	
TOTAL	

Source of funding for additional work after project lifetime	Total (£)
-	-
TOTAL	**-**

7.3 Value for Money

This project demonstrated excellent value for money owing to the existing local capacity that was utilized during project activities to meet the objectives. The DoE have a staff presence on both Little Cayman and Cayman Brac, and we were able to use established cost-effective methods of working at field sites and within local communities. The project benefitted from the use of local volunteers, and existing DoE infrastructure, which allowed us to make best use of staff time and minimize T&S costs. The project also demonstrated excellent value for money due to the sizable in-kind contributions (in the form of staff time, overheads, subsidized accommodation and vehicle access) that were provided by project partners (representing well over 50% of total project costs). Dr Austin, who was based in the Cayman Islands for the majority of the project, undertook the day-to-day running and management of the project, thereby providing value for money.

Healthy and sustainably managed marine ecosystems, including populations of large mobile marine vertebrates such as seabirds, underpin a range of economic activities in the Caribbean UKOTs, as well as contribute to wellbeing. Furthermore seabirds as marine top predators represent useful tools for monitoring marine ecosystem health and detecting change within the marine environment. The contribution that this project therefore makes to ensuring the long-term health of seabird populations represents excellent value for money, both in terms of wider ecosystem health and the economy.

Annex 1

Project's original (or most recently approved) logframe, including indicators, means of verification and assumptions.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: This project will improve the ability of local stakeholders to manage marine ecosystems and implement sustainable long-term monitoring that will allow detection of population responses to anthropogenic- and environmental-driven change.			
Outcome: Determine the at-sea movements and status of important seabird populations, allowing identification of Important Bird Areas, establishment of sustainable monitoring programmes and development of informed marine and coastal conservation strategies.	0.1. New Marine Important Bird Areas identified using Birdlife International criteria protocols and criteria 0.2. Impact of proposed airport development on RFB colony assessed 0.3. Locally-run self-sustaining seabird monitoring programme established 0.4. Conservation plans developed for globally and regionally important seabird populations identifying threats to seabirds, objectives and framework for action	0.1 Marine IBAs listed on Birdlife International online database 0.2 Impact assessment report produced and uploaded to government and project websites 0.3 Reports on stakeholder activity, documentation of techniques, databases and results 0.4 Species Action Plans produced, held in government records and uploaded to project website	Sufficient data collected to run Birdlife International procedures. Local organisations and volunteers retain capacity and enthusiasm to operate continuing programmes.
Outputs: **1**. Key at-sea habitats of globally and regionally important seabird populations identified	1.1. Species distribution maps and GIS layers highlighting core foraging and rafting areas created 1.2. Peer-reviewed scientific publications produced	1.1 Link to data uploaded to Birdlife seabird tracking database and / or www.movebank.org 1.2 Link to project website 1.3 Peer-reviewed scientific publications	Breeding seabirds will be present at colonies during scheduled tracking work (mitigation: Flexible fieldwork periods incorporated into project work plan). Environmental conditions will be favourable for observation and tracking work (mitigation: flexible fieldwork periods incorporated into project work plan).
2. Commuting routes and times of seabirds identified in light of proposed airport development on Little Cayman	2.1. Species-specific maps and GIS layers of flyways produced 2.2. Species-specific time-activity	2.1 Link to data uploaded to Birdlife seabird tracking database and / or www.movebank.org 2.2 Link to project website	Breeding seabirds will be present at colonies during scheduled tracking work (mitigation: Flexible fieldwork periods incorporated into project work plan).

	budgets produced	2.3 Peer-reviewed scientific publications	Environmental conditions will be favourable for observation and tracking work (mitigation: flexible fieldwork periods incorporated into project work plan). Tracking devices will operate effectively to collect intended data (mitigation: use of tried and tested devices and built-in allowance for some device losses).
3. Understanding of population size, breeding biology, phenology, diet and predation of globally and regionally important seabird populations is greatly improved, allowing identification of threats and production of conservation strategies	3.1. Production of annual reports containing colony monitoring data 3.2. Establish a population database for key resident seabirds 3.3. Report on predation rates at colonies produced 3.4 Production of conservation plans for RFBs and BBs	3.1 Link to birds Caribbean database 3.2 Peer-reviewed scientific publications 3.3 Guide to use and maintenance of database 3.4 Copy of predation report	Suitable sub-sections of colonies amenable to regular monitoring. Techniques for census not affected by variability in environmental conditions (mitigation: flexible fieldwork periods incorporated into project plan; project research officer stationed continuously in-territory).
4. Local Government staff, NGOs and community partners operate self-sustaining seabird census and monitoring programmes	4.1. Training of two members of staff from DoE and one-two from NTCI in census and monitoring methods 4.2. Two DoE staff trained in maintenance of the population database for key resident seabirds 4.3. 10-20 Islander volunteers recruited and trained in seabird census techniques 4.4. Seabird monitoring field guide produced	4.1 Notes and presentations from training sessions 4.2 Copy of field guide	Funds and staffing are available for sustained seabird monitoring. Islander volunteers will show interest in project and workshops (mitigation: hold talks to actively engage islanders in project and gain support for conservation efforts).
5. Development of species conservation plans	5.1. Production of conservation plans for RFBs and BBs for approval by National Conservation Council and Cabinet	5.1 Copies of conservation plans uploaded to government and project websites	Sufficient data collected to inform species conservation plans. Conservation plans will be adopted by the National Conservation Council and

			approved by Cabinet after positive public consultation.

Activities

Output 1. **At-sea habitat use**

1.1 GPS track red-footed boobies from the globally important colony in the Booby Pond Important Bird Area on Little Cayman

1.2 GPS track brown boobies from the regionally important colony on Cayman Brac

1.3 Identify key at-sea habitats that are important for the two booby populations. Produce GIS layers and assess presence of marine IBAs

Output 2. **Commuting routes and times**

2.1 Produce fine-scale maps of commuting routes and time-activity budgets based on GPS tracking data from red-footed boobies

2.2 Visually identify arrival and departure routes and timings of commuting birds

Output 3. **Population biology**

3.1 Monitor productivity (breeding success) and phenology of both booby populations via regular colony visits

3.2 Assess census methods (aerial photography, ground surveys; year 1:) and conduct census of red-footed booby population (year 2)

3.3 Conduct census of brown booby population

3.4 Create population monitoring database and associated guide

3.5 Undertake baseline assessment of booby diet from spontaneous and opportunistic regurgitate samples, focusing on tracked individuals

3.6 Assess predation rates at booby colonies using camera traps. Observations of kleptoparasitism by magnificent frigatebirds at red-footed booby colony

Output 4. **Training**

4.1 Train local NGO, government and volunteer staff to conduct and implement seabird monitoring and research techniques

4.2 Produce seabird monitoring field guide to aid staff and volunteers in the field

4.3 Workshops, school visits and publicity to engage and train local volunteers in seabird identification, monitoring and protection

Output 5. **Species Conservation Plans**

5.1 Produce conservation plans for RFB and BB in accordance with the NCL Section 17

5.2 Carry out public consultation in accordance with Section 17(4) of the NCL

Annex 2 Report of progress and achievements against final project logframe for the life of the project

Project summary	Measurable Indicators	Progress and Achievements for the life of the project
Impact: This project will improve the ability of local stakeholders to manage marine ecosystems and implement sustainable long-term monitoring that will allow detection of population responses to anthropogenic- and environmental-driven change.		Notable capacity has been built amongst local partners, will contribute to effective monitoring and research of resident seabirds, and result in appropriate and sustainable conservation management for this group, thus ensuring healthy marine ecosystems, which underpin a range of economic activities in the Cayman Islands
Outcome Determine the at-sea movements and status of important seabird populations, allowing identification of Important Bird Areas, establishment of sustainable monitoring programmes and development of informed marine and coastal conservation strategies.	0.1. New Marine Important Bird Areas identified using Birdlife International criteria protocols and criteria 0.2. Impact of proposed airport development on RFB colony assessed 0.3. Locally-run self-sustaining seabird monitoring programme established 0.4. Conservation plans developed for globally and regionally important seabird populations identifying threats to seabirds, objectives and framework for action.	1. Marine IBAs were defined for important seabird species using Birdlife International protocols and criteria. 2. Maps showing the overlap between commuting routes and proposed sites of airport develop were produced, and the risk to colonies associated with different airport scenarios was assessed. 3. Population monitoring methods were developed for important seabird populations, and population surveys were undertaken to obtain data that will provide baseline population estimates. Both Government staff and volunteers were trained in population monitoring methods and maintenance of datasets, and are now able to run self-sustaining monitoring activities at colonies. 4. Species Action Plans for important seabird populations were drafted and will undergo formal rounds of public consultations in 2018-2019, before final Species Conservation Plans will be drawn up under the NCL.
Output 1. Key at-sea habitats of globally and regionally important seabird populations identified	1.1. Species distribution maps and GIS layers highlighting core foraging and rafting areas created 1.2. Peer-reviewed scientific publications produced	We have identified key at-sea habitats and marine IBAs of globally and regionally important populations of RFBs and BBs using standardised approaches accepted by the international community. Through collaboration and additional funding we also added a third important seabird species to the project, the Magnificent frigatebird (FB), and produced similar outputs for this breeding population (see Annexes 6.1 and 6.2). Results of this work have contributed to the production of draft Species Action Plans (Output 5), and are forming the basis of a number of peer-reviewed scientific articles, either currently in review (see Annex 6.3) or in preparation (see maps and figures in Annexes 6.2 and 6.4).
Activity 1.1 GPS track red-footed boobies from the globally important colony in the Booby Pond Important Bird Area on Little Cayman		Over 2x field seasons (2016 and 2017), 80 GPS loggers were deployed on adult RFBs and 43 on adult FBs. These yielded data on 32 full (11 partial) foraging trips from 44 RFBs, and 153 full (14 partial) foraging trips from 23 FBs (See Annex 6.2). In 2017, 18 RFBs were successfully tracked with simultaneously deployed time-depth recorders (TDRs) and immersion loggers, to aid advanced behavioural

		analyses being undertaken by scientists at the UoL. These analyses will contribute to a number of peer-reviewed scientific articles that are in preparation. In 2017, one FB was successfully tracked with a video logger, the data of which have been used to validate behavioural models for this species (Annex 6.2 and 6.3). A further 3 FBs were tracked with accelerometers which will be used in ongoing studies of at-sea behaviour on the species.
Activity 1.2. GPS track brown boobies from the regionally important colony on Cayman Brac		Over 3x field seasons, between 2016 and 2018, 85 archival GPS loggers were deployed on BBs from Cayman Brac, yielding data on 240 full, and 12 partial, foraging trips from 66 individuals (See Annex 6.2). During 2017, 33 BBs were successfully tracked with additional TDRs and immersion loggers. During 2018, 16 BBs were successfully tracked with video loggers and a further 12 tracked with simultaneously deployed TDRs and accelerometers. These data are being used in advanced statistical analysis of at-sea behaviour being undertaken by scientists at the UoL, and will contribute to a number of peer-reviewed scientific articles that are in preparation.
Activity 1.3. Identify key at-sea habitats that are important for the two booby populations. Produce GIS layers and assess presence of marine IBAs		Using Birdlife International methodologies, key at-sea habitats and marine IBAs have been identified for of RFBs, BBs and FBs from combined tracking data collected in S1-S3, and species distribution maps and map layers have been produced (see Annex 6.2).
Output 2. Commuting routes and times of seabirds identified in light of proposed airport development on Little Cayman	2.1. Species-specific maps and GIS layers of flyways produced 2.2. Species-specific time-activity budgets produced	Tracking data from RFBs and FBs, collected during 2016 and 2017 (see Output 1) have been analysed to determine overland commuting routes, departure and arrive times and the frequency of flights over proposed airport sites on Little Cayman, in order to assess the relative risks of different airport scenarios to the breeding populations at Booby Pond.
Activity 2.1. Produce fine-scale maps of commuting routes and time-activity budgets based on GPS tracking data from red-footed boobies		Fine-scale maps and map layers showing commuting routes of RFBs to and from the Little Cayman colony have been produced, and overlaid on maps of proposed airport development scenarios (Annex 6.4).
Activity 2.2. Visually identify arrival and departure routes and timings of commuting birds		Tracking data from RFBs and FBs were used to determine departure and arrival routes, bearings and times, to aid the assessment of potential risks caused by proposed airport developments on Little Cayman (Annex 6.4). Plots of all of these trip characteristics were also produced for BBs on Cayman Brac (Annex 6.4).
Output 3. Understanding of population size, breeding biology, phenology, diet and predation of globally and regionally important seabird populations is greatly	3.1. Production of annual reports containing colony monitoring data 3.2. Establish a population database for	Our understanding of the population size, breeding biology, phenology, diet and predation of globally and regionally important seabird populations has been greatly improved following the below achievements, which have resulted in the identification

improved, allowing identification of threats and production of conservation strategies	key resident seabirds 3.3. Report on predation rates at colonies produced 3.4 Production of conservation plans for RFBs and BBs	of key threats to populations and aided production of conservation strategies.
Activity 3.1. Monitor productivity (breeding success) and phenology of both booby populations via regular colony visits		Rates of breeding success for RFBs, BBs and FBs were recorded during 2016 and 2017, for both experimental nests tracked during the project, and a set of control nests (see Annex 6.4). Phenology of RFBs was monitored using 5x camera traps setup in front of nests in the colony and captured images are in the process of being analysed by staff and students at the DoE and UoL (see Annex 6.4 for preliminary outputs). Historic monitoring data on productivity and phenology, collected by volunteers and past population survey efforts, were also collated (see Annex 6.4 and the phenology table in the 'Seabird Monitoring Field Guide' on the project website: www.caymanseabirds.weebly.com).
Activity 3.2. Assess census methods (aerial photography, ground surveys; year 1:) and conduct census of red-footed booby population (year 2)		Population surveys on RFBs and FBs at the Booby Pond, Little Cayman were undertaken in 2017 and 2018, following trial drone surveys and ground surveys to delineate the boundaries of the colony in 2016 and 2017 (see Annex 6.1 and 6.4, as well as previous project reports). An MSc dissertation on the Little Cayman population work was produced by a student at the UoL (Joseph Hanlon; see Annex 6.5). Population estimates for RFBs and FBs have been obtained, and further processing and analysis of these data is planned.
Activity 3.3. Conduct census of brown booby population		A full-colony survey of the brown booby population on Cayman Brac was undertaken during January 2017, using ground and aerial sampling methods developed during activity 3.2, and preliminary population estimates have been obtained (Annex 6.4).
Activity 3.4. Create population monitoring database and associated guide		A population monitoring database has been produced including newly obtained data and historic population estimates (see Annex 6.4), and will be used during routine population surveys planned by the DoE using developed repeatable double-sampling methods.
Activity 3.5. Undertake baseline assessment of booby diet from spontaneous and opportunistic regurgitate samples, focusing on tracked individuals		Fifty-seven regurgitate samples were opportunistically collected and analysed from the three seabird species during the project, to identify dietary prey compositions and provide an assessment of booby and frigatebird diet (Annex 6.4). Stable isotope data from blood samples of 61 RFBs and 31 BBs, and sampled fish and squid regurgitates, were also collected to aid interpretation of dietary habits in RFBs and BBs.
Activity 3.6. Assess predation rates at booby colonies using camera traps.		Direct and indirect evidence of cat predation on RFBs, FBs and BBs at colonies on

Observations of kleptoparasitism by magnificent frigatebirds at red-footed booby colony		Little Cayman and Cayman Brac was gained through camera trap imagery and direct observations during routine colony work (Annex 6.4), and was used as evidence to initial a cat eradication programme on Little Cayman (Annex 6.6).
Output 4. Local Government staff, NGOs and community partners operate self-sustaining seabird census and monitoring programmes	4.1. Training of two members of staff from DoE and one-two from NTCI in census and monitoring methods 4.2. Two DoE staff trained in maintenance of the population database for key resident seabirds 4.3. 10-20 Islander volunteers recruited and trained in seabird census techniques 4.4. Seabird monitoring field guide produced	Training of DOE staff in seabird monitoring and research techniques was undertaken over three field seasons to build in-house capacity at the DoE to allow the running of self-sustaining seabird monitoring programmes. Considerable effort was made towards guiding efforts of an existing volunteer base, and providing additional training to new and existing community members. Seabird monitoring guides were produced and disseminated during the project to aid monitoring efforts of local stakeholders, and general knowledge of seabirds on the Cayman Islands. The project and its outputs have been well publicized through local media channels, community meetings, international social media coverage and scientific conferences.
Activity 4.1. Train local NGO, government and volunteer staff to conduct and implement seabird monitoring and research techniques		DOE staff (x3) have received field training in seabird tracking, handling and/or population monitoring techniques, and 6x staff members have been involved the development of double-sampling methods for population survey work. Two staff at DoE were also trained in tag scheduling and download procedures, and in basic data handling skills during tailored sessions. Five new and 2x existing volunteers received training and participated in population surveys and productivity monitoring work on BBs on Cayman Brac, and a further 2x DoE interns received training in monitoring and tracking work on Little Cayman. Training in seabird identification, monitoring and research techniques, use of field equipment and data collection protocols was provided, and practical field sessions were provided. 8x high-school students interning at the DoE also received training in the data analysis of camera trap images and processing of population survey data. See Annex 6.7 and the project website for training materials.
Activity 4.2. Produce seabird monitoring field guide to aid staff and volunteers in the field		A seabird monitoring field guide was produced and disseminated to volunteers and relevant local community members / conservation organisations, to streamline monitoring efforts for seabirds in the Cayman Islands (see Annex 6.7 and the project website.
Activity 4.3 Workshops, school visits and publicity to engage and train local volunteers in seabird identification, monitoring and protection		Over the course of the project, 4x official community meetings, 1x school presentation, 1x management plan workshop (see Annex 6.7 and project website), 5x TV interviews, 1x radio interview and 6x news / magazine articles were produced to publicise the project and its outputs. Regular updates on project activities were

		also given on a dedicated project website and twitter feed, and results of the project were, or will be, presented at three scientific conferences (Annex 6.7). Volunteers were provided with training in seabird identification and monitoring during 4x small group training sessions.
Output 5. Development of species conservation plans	5.1. Production of conservation plans for RFBs and BBs for approval by National Conservation Council and Cabinet	Species Action Plans have been produced for important resident seabird populations in draft form using the information gained from project activities. The resulting Species Plans, in their final form after public consultation, will represent a step-change for long-term strategic conservation management of seabirds in the Cayman Islands.
Activity 5.1. Produce conservation plans for RFB and BB in accordance with the NCL Section 17		A Species Action Plan for RFBs, BBs and FBs was drafted during the project, using newly gained information on the status and ecology of the species (see Annex 6.8). As stated in the Y1 annual report, full adoption of plans will not take place until after project completion.
Activity 5.2. Carry out public in accordance with Section 17(4) of the NCL		An informal round of public consultation to report on the findings of the project and development of Species Action Plans was undertaken at the end of the project through meetings within relevant local communities (Annex 6.7 and project website. However, as addressed in the Y1 annual report, formal rounds of consultation on NCL Species Conservation Plans were not possible within project timeframes.

Annex 3 Standard Measures

Code	Description	Totals (plus additional detail as required)
Training Measures		
1	Number of (i) students from the UKOTs; and (ii) other students to receive training (including PhD, masters and other training and receiving a qualification or certificate)	1x Masters student (UK male, Joe Hanlon, University of Liverpool) received training (GIS and data analysis approaches) and undertook a dissertation on population data collected during the project.
2	Number of (i) people in UKOTs; and (ii) other people receiving other forms of long-term (>1yr) training not leading to formal qualification	12x people in the UKOTs (all residents of the Cayman Islands; 1x Caymanian female, 1x Danish female, 3x American females, 1x Jamaican female, 1x male Canadian, 1x German female, 2x UK females, 2x UK males) received field training (tracking and/or population monitoring) during the project that spanned periods exceeding 1 year. 2x people from Europe (project research assistant - Italian male, 1x Canadian) received field and analytical training during seabird tracking periods between 2016 and 2018.
3a	Number of (i) people in UKOTs; and (ii) other people receiving other forms of short-term education/training (i.e. not categories 1-5 above)	UKOTs: ~150 students received short-term education in seabird ecology during school presentations, and ~90 members of the general public were educated in seabird ecology during public community meetings in 2016, 2017 and 2018 (see Annex 6.8). 3x Cayman residents (1x Caymanian female, 1x South African female, 1x American male) received short-term field training (seabird handling/tracking or population monitoring). 2x people from the abroad (1x UK male, 1x Canadian male) received field training (seabird handling and tracking) for short periods in 2016 and/or 2017, as provided field support during staffing issues. 8x high-school students interning at the DoE (6x Caymanian females, 2x Caymanian males) received short-term training in the data analysis of camera trap images and processing of population survey data in 2017 and 2018. An addition 1x American female, volunteering at the DoE also received training in data processing of population survey data. 6x undergraduate students in the UK (5x UK females, 1x UK male) received

Code	Description	Totals (plus additional detail as required)
		training in the data analysis of camera trap images or processing of population survey data.
3b	Number of training weeks (i) in UKOTs; (ii) outside UKOTs not leading to formal qualification	*Training weeks in UKOTs:* • 14 weeks – field training (tracking) • 4 weeks – population monitoring and survey training • 1 week – training in data handling *Training weeks outside UKOTs:* • 2 weeks – training volunteers / students in data handling / processing
4	Number of types of training materials produced. Were these materials made available for use by UKOTs?	1x seabird monitoring guide was produced and disseminated in the UKOT. 1x set of materials to train students, volunteers and staff to extract breeding phenology data from camera images was produced (including PowerPoint presentations, training exercises, a database) 1x set of materials to train volunteers in population monitoring methods was produced (including chick aging charts, PowerPoint presentations, field datasheets)
5	Number of UKOT citizens who have increased capacity to manage natural resources as a result of the project	Eight DoE staff members that have either received training or will benefit from the data collected during the project in their management practices.
Research Measures		
9	Number of species/habitat management plans/ strategies (or action plans) produced for/by Governments, public authorities or other implementing agencies in the UKOTs	1x Species Action Plan produced for three seabird species in the Cayman Islands, which will lead to 3 Species Conservation Plans under the local environmental legislation.
10	Number of formal documents produced to assist work in UKOTs related to species identification, classification and recording.	2 (Species Action Plan; Seabird monitoring guide).
11a	Number of papers published or accepted for publication in peer reviewed journals written by (i) UKOT authors; and (ii) other authors	1x manuscript in review, with view to publish (UK first author, UKOT co-authors). 3x additional papers in preparation (written by UK project partners).
11b	Number of papers published or accepted for publication elsewhere written by (i) UKOT authors; and (ii) other authors	NA
12b	Number of computer-based databases enhanced (containing species/genetic information). Were these databases made available for use by UKOTs?	1x population monitoring database (for use by UKOT) 1x productivity database (for use by UKOT)

Code	Description	Totals (plus additional detail as required)
13a	Number of species reference collections established. Were these collections handed over to UKOTs?	NA
13b	Number of species reference collections enhanced. Were these collections handed over to UKOTs?	NA
Dissemination Measures		
14a	Number of conferences / seminars / workshops / stakeholder meetings organised to present/disseminate findings from UKOT's Darwin project work	4x community meetings to present project outputs (2x meetings - April 2016; 2x meetings – Jan. 2018). 1x school presentation (Feb 2017). 2x presentations to local NGO groups.
14b	Number of conferences / seminars / workshops / stakeholder meetings attended at which findings from the Darwin Plus project work will be presented/ disseminated	5x conference presentations given to dissemination project outputs (2x talks at BirdsCaribbean Conference, Cuba, July 2017; 1x poster at International Bio-logging Conference, Germany, Sept 2017; 1x talk and 1x poster at International Seabird Group Conference, Liverpool UK, Sept 2018).
Physical Measures		
20	Estimated value (£s) of physical assets handed over to UKOT(s)	N/A
21	Number of permanent educational/training/research facilities or organisation established in UKOTs	NA
22	Number of permanent field plots established in UKOTs	3 (study colonies in Little Cayman, Cayman Brac and Vidal Cay, Grand Cayman).
23	Value of resources raised from other sources (e.g., in addition to Darwin funding) for project work	

Annex 4 Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Nationality of lead author	Nationality of institution of lead author	Gender of lead author	Publishers (name, city)	Available from (e.g. weblink, contact address, annex etc.)
Journal	A sex-influenced flexible foraging strategy in a pan-tropical seabird. Lead author: Austin, R.E. et al.	UK	UK	Female	Inter-Research	Currently embargoed as in review. Will be freely available online once published (see Annex 6.3).

Annex 5 Darwin Contacts

Ref No	DPLUS044
Project Title	Assessment and Conservation Actions for Cayman Islands' Seabird Populations
Project Leader Details	
Name	Gina Ebanks-Petrie
Role within Darwin Project	Principle investigator
Address	
Phone	
Email	
Partner 1	
Name	Dr Rhiannon Austin (nee Meier)
Organisation	University of Liverpool
Role within Darwin Project	Project coordinator and research associate
Address	
Fax/Skype	
Email	
Partner 2	
Name	Dr Jonathan Green
Organisation	University of Liverpool
Role within Darwin Project	Seabird researcher and advisor
Address	
Email	
Partner 3	
Name	Dr Stephen Votier
Organisation	University of Exeter
Role within Darwin Project	Seabird researcher and advisor
Address	
Email	
Partner 4	
Name	Patricia Bradley
Organisation	National Trust of the Cayman Islands
Role within Darwin Project	NTCI representative
Address	
Email	

Annex 6 Supplementary material (optional but encouraged as evidence of project achievement)

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	YES
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	NO
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	YES
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	NO
Have you involved your partners in preparation of the report and named the main contributors	YES
Have you completed the Project Expenditure table fully?	YES
Do not include claim forms or other communications with this report.	