Darwin Initiative – Final Report

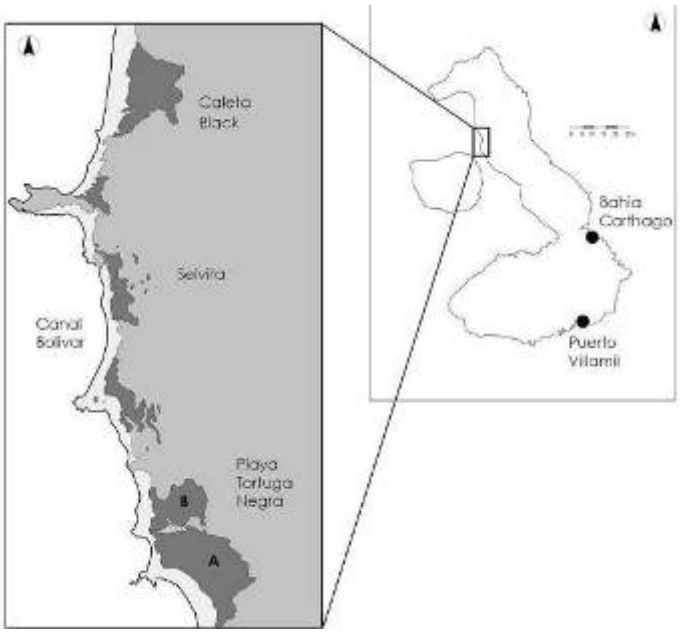
*(To be completed with reference to the Reporting Guidance Notes for Project Leaders (http://darwin.defra.gov.uk/resources/reporting/) - it is expected that this report will be a **maximum** of 20 pages in length, excluding annexes)*

Darwin project information

Project Reference	EIDPO031
Project Title	Restoration of the Mangrove Finch in Isabela, Galápagos
Host country(ies)	Ecuador
UK Contract Holder Institution	Durrell Wildlife Conservation Trust
UK Partner Institution(s)	Charles Darwin Foundation
Host Country Partner Institution(s)	Galápagos National Park
Darwin Grant Value	£171,484
Start/End dates of Project	1st July 2009-31st December 2011
Project Leader Name	H Glyn Young
Project Website	
Report Author(s) and date	H Glyn Young & Francesca Cunninghame

1 Project Background

This project is a continuation of **Project 15005** (2006-2009) Conservation of the Mangrove Finch (*Cactospiza heliobates*) and aimed to build on the results of the original project which identified the main causes of Mangrove Finch decline as parasites and nest predators. The Project continued to monitor and manage the two well known populations in the west while increasing knowledge of the re-discovered eastern population. In line with the Action Plan developed in November 2008, a trial translocation of wild-caught birds to the former site at Bahia Urbina was undertaken. Awareness campaigns were undertaken in the inhabited areas of Isabela.



NOTE. Since the start of the project in 2006, *Camarhynchus heliobates* has become the accepted scientific name for Mangrove Finch.

2 Project support to the Convention on Biological Diversity (CBD)

The overall project (15005 and EIDPO031) has best supported biological diversity through the direct management of *in-situ* threats at Playa Tortuga Negra (PTN) and Caleta Black (CB). Control of predators (notably rats) has ensured the continuing survival of the Mangrove Finch and, it is assumed, other native fauna threatened by exotic predators. Control measures at the receptor site for translocated birds at Poza de los Tiburones, Bahía Urbina, have shown too that suitably accessible mangrove habitat can be restored through predator control. A programme of baiting here will potentially make this site again suitable for Mangrove Finches whether directly translocated or naturally dispersing from sites to the north. The Project's support of programmes to develop control measures for *Philornis* will have further supported biological diversity if and when a method is developed.

The overall project (2006-2011) has established baseline data for the field identification of Mangrove Finch essential in all monitoring at the Isabela sites and for recording the expected spread of the species back into former sites. Protocols for monitoring the finch at PTN and CB were developed and personnel trained in undertaking surveys in very difficult terrain for a bird that is rarely easy to identify. Identification guidelines were published in a birding journal and are available on the web so that visiting birders too can help the Project record distribution. This is particularly important to see whether species visits (less than optimal?) mangroves on east coast of Fernandina, a likely sink population that may require a healthy population at PTN and CB and is regularly visited by birding tourists.

There has been significant research undertaken into the ecology and habitat requirements of the previously little-known Mangrove Finch and several technical papers have been published (see below). Personnel of CDF and GNP, Ecuadorian students and volunteers have been trained throughout project in a variety of skills including bird monitoring, habitat assessment, predator monitoring and control and captive husbandry.

The awareness campaign undertaken in Puerto Villamil has been successful in increasing local awareness in the only human settlement on Isabela for the Mangrove Finch and the importance of mangrove ecosystems in Galápagos. This is particularly important given the proximity of the archipelago's Ramsar site at Poza de los Diablas and the need for significant local support at this site.

Invertebrate studies undertaken and collections made during the course of the Project have furthered knowledge of distribution of many species within Galápagos and understanding of biodiversity in mangrove biomes here. Specimens collected are held by CDF. Genetic resources established through blood sampling of finches at PTN, CB and Bahía Cartago are maintained in libraries at CDF and at overseas laboratories. Sound files from field recordings are held at CDF.

The project has had no involvement with CMS or CITES.

3 Project Partnerships

The project to restore the Mangrove Finch was the result of approaches made by the Galápagos Conservation Trust to Durrell Wildlife Conservation Trust in 2004. The finch was considered to be the rarest bird in the archipelago; the reasons for its decline were unclear and no strategies for its restoration were established. The project, established through planning meetings in Galápagos in 2005, has two local partners: the Charles Darwin Foundation (CDF) and Galápagos National Park Service (GNP). Both these organisations are based in Puerto Ayora, Santa Cruz in adjacent offices. CDF works in partnership with GNP, the government authority in charge of conservation and natural resource issues in Galápagos, providing the scientific knowledge required to protect the unique ecosystem of Galápagos. A Memorandum of Agreement was signed by Durrell and CDF for the life of this project and extended in 2009.

The Project partnership has been very effective and well received. Field Manager Francesca Cunninghame (FC who took over from Dr Birgit Fessl in November 2009) was included onto the staff of CDF for convenience and to ensure that she received local benefits available to CDF staff. Dr. Glyn Young (HGY) and FC were granted the rare status of Collaborative Scientists by GNP; HGY was also granted this status by CDF. HGY and Rachel Atkinson (CDF) jointly co-ordinated overseeing Project until April 2010 when Dr Mark Gardener (CDF) took over project co-ordination.

Annual meetings between partners have been held each year in Galápagos.

As a result of the effective and innovative partnership established for the Mangrove Finch Project, Durrell, CDF and GNP began work on a second songbird restoration programme, Reintroduction of the Floreana Mockingbird *Mimus trifasciatus*, in 2010. This project is run in parallel to the finch project with a separate MOU and similarly employs a field manager embedded within CDF staff. Both project field managers attended Durrell's Conservation Symposium in Jersey in July 2011.

Durrell entered into a further partnership with CDF, GNP, Island Conservation and University of Minnesota The Raptor Centre, as part of Galápagos Hawk *Buteo galapagoensis* mitigation work associated with the aerial broadcast poison drop and rat eradication carried out in a group of small islands in early 2011. Mangrove Finch personnel, notably FC, have helped on this project whenever feasible.

Other collaborations:

Dr Birgit Fessl, Mangrove Finch Project field manager 2006-2009 continues to work with the Project as a consultant and has completed several publications originating from work on the Project.

The Project continues to benefit from close collaboration with Hernan Vargas whose Galápagos based DI project (id 12018) came to an end in 2006. Hernan who took part in the 1996-2000 Mangrove Finch survey and was the initial impetus to conservation of this species now works for The Peregrine Fund in Quito and continues to be consultant to Project.

Ken Petren (University of Cincinnati) has undertaken genetic analyses of wild Mangrove Finch throughout the Project. A joint paper on genetic history of Mangrove Finch will be submitted in the near future.

The Project has collaborated throughout with SUNY (State University of New York) in *Philornis downsi* studies, notably furthering investigation into the development of a pheromone attractant; Project personnel have collected larvae and pupae in Isabela and Santa Cruz and exported them under controlled conditions to New York. FC will host a short symposium on *Philornis* in Galápagos in February 2011.

Brent Barrett (Department of Conservation, New Zealand) brought 10 years of endangered bird management experience, 19th April-28th June 2010, and assisted throughout the finch translocation.

Sharon Deem (St Louis Zoo, WildCare Institute), a CDF volunteer 2008-2011 served as the onsite veterinarian during the finch translocation in 2010. Sharon also acted as veterinary consultant to the Project until her time with CDF came to an end.

Benn Huemann, (University of N. Carolina, PhD student) collaborated with the Project on mapping mangrove on Isabela through remote sensing. BH subsequently published *An Object-Based Classification of Mangroves Using a Hybrid Decision Tree - Support Vector Machine Approach* Remote Sensing 2011(3): 2440-2460.

Sue Maturin (Forest and Bird, New Zealand) volunteered for the Project for three months in 2010 and produced a short documentary film in English and Spanish about the Project, Mangrove *Finch fights on*/ *Pinzon de Mangle Sigue Luchando* see e.g. www.durrell.org/Animals/Birds/Mangrove-finch/. This has proven to be a valuable educational and fundraising resource both in Galápagos and in New Zealand.

Graeme Loh (Department of Conservation, New Zealand) volunteered for the Project for three months in 2010 and brought tree climbing equipment and techniques and trained some of the current field staff. This has resulted in improved nest access for monitoring and management if necessary.

Michael Dvorak (BirdLife Austria) and Sabine Tebbich (University of Vienna) continued to collaborate in offering support throughout an in publishing joint papers with BF and HGY.

Hendrik Brumm (Max Planck Institute Seewiesen, Germany) volunteered for the project and helped in song analysis and other close and invaluable links were maintained with Patty Parker (University of St Louis), and Peter and Rosemary Grant (Princeton University).

4 Project Achievements

4.1 Impact: achievement of positive impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

This project continued the work programme established during three years of 15005 (2006-2009) as Mangrove Finch survival depends on the management programme developed by the Project:

- Rat control continued leading to good fledging rates in two consecutive seasons (average 71% from monitored nests);
- Rat bait consumption was studied following evidence of reduced rat population at PTN (0/150 trap nights in 2009-2010, 2/150 trap nights in 2011). Tracking tunnel studies showed introduced cockroaches and native crickets (which suffer no adverse effects from the bait themselves) were consuming up to 50g of bait per bait station every night;
- Cat control in collaboration with GNP continues to stop feral cat population from increasing at key mangrove sites in Isabela;
- Losses to *P. downsi* infestation remain a problem. Increasing technicians' access to nests through better tree-climbing techniques has allowed more control options for this nest parasite during the breeding season (e.g. through use of diluted pyrethrum in treatment of nests);
- Encouraging results with pheromone work on *Philornis*, has led to a further proposed season of research from SUNY and an international workshop of experts to be held in Galápagos in February 2012.

This project extension was intended in part to establish methodologies for allowing the Mangrove Finch population to re-establish in former sites on Isabela. Several mangrove areas were surveyed looking in particular for the finches' very specific needs (see publications) but also for suitability in access and approach for personnel and for post-release monitoring. One site in particular, at Bahía Urbina, was considered a suitable place to trial translocation techniques including capture of birds at the source, transportation and release of wild-caught birds, birds' ability to find suitable food at release site and post-release monitoring including suitability of site for technicians.

Establishing rat control at the release site ahead of translocation and subsequent predator monitoring showed a significant reduction of rat population (trap rates from 40/90 in May 2010 to 1/90 November 2011). This programme benefits the new mangrove site as a whole and protects a further 30ha of mangrove habitat.

Nine wild-caught Mangrove Finches were moved to a site within their historic distribution as a trial translocation to determine whether this tool can be used to increase their range. This was the first such action with this species and the first bird translocation in the Galápagos. Transport and initial establishment of the birds was successful but within six months of release, four of the nine birds had returned to PTN. Success in capture, transportation and early phase establishment and our ability to monitor the individuals shows that translocation is a potential conservation tool for this species.

An education and awareness programme in Puerto Villamil (the one area of human habitation on Isabela) successfully raised the profile of the Mangrove Finch, a bird few will ever see, within the population. This programme further encouraged interest in mangrove ecosystems in general and especially that at Villamil itself where the Ramsar site is in need of extensive restoration and once held Mangrove Finch.

4.2 Outcomes: achievement of the project purpose and outcomes

The Project has shown that the most significant problem facing the small existing populations of Mangrove Finch is the low reproductive success caused by invasive species. Black rats are the most important threat followed by the parasitic fly *Philornis downsi;* although information on impact of other predators like cats and smooth billed ani *Crotophaga ani* is still missing. Control measures are time and cost intensive especially in an environment like Galápagos; thus evaluation of risk and adaptive management are imperative. We have shown with this study that striking results can be achieved with a simple change in methodology. Empirical data (nesting success, rat monitoring data - table), experimental data (artificial nests) and the applied model all show the efficiency of a simple modification in the established rat control programme, indicating the importance of adaptive management.

4.3 Outputs (and activities)

The logical framework envisaged four main outputs:

1. The principal existing Mangrove Finch populations are restored and healthy.

   The increased breeding success in Mangrove Finch populations at PTN and CB following the establishment of a rat control programme has led to further increases in overall numbers allowing the development of plans to translocate birds to a former site. Although the finch is currently secure at these sites the overall population remains small and will not survive without long-term, well managed, rat control measures. The reduction in egg and chick losses to rats has meant at the nest parasite, *Philornis*, is likely to become a much more significant threat and the need for fly control at PTN and CB (and throughout Galápagos) has been highlighted.

2. Population size, breeding status, habitat suitability and disease risk known for eastern population

   The eastern population at Bahía Cartago was surveyed in February 2008 after 10 years: 4-5 birds were found. The mangrove area here is extensive and access is only possible from the sea and is very difficult. A further survey in March 2009 found only two birds and surveys in February 2010 and April 2011 found none. These latter two surveys recorded large numbers of mosquitoes (a possible source of avian pox to the finches) whereas there are very few of these insects at PTN and CB. Very few other finches and mockingbirds were recorded in 2010 and 2011.

3. Ramsar site restored and evaluation finished for suitability

   The Ramsar site of Poza de los Diablas is one of the largest mangrove areas in Galápagos but is also highly impacted by the proximity of the growing town of Puerto Villamil. A management plan was published in 2003 but implementation has been patchy. The Mangrove Finch Project has been unable to achieve what were obviously very optimistic proposals for restoration. Working outside of political constraints present in the town, the Project's education and awareness programme has highlighted the state of the mangroves here and ensured that they are in the community's consciousness. While it remains a hope that one day Mangrove Finch returns to this site this is well outside of the current scope of the Project.

4. Birds released in suitable site

   The site chosen for reintroduction was Poza de los Tiburones, Bahía Urbina in northern Isabela a site chosen through ability to actively control rats and monitor birds at the site.

   Completion and follow-up monitoring of the trial translocation enabled the appreciation of this management tool in Galápagos. It further showed that former Mangrove Finch habitat could be restored through rat control and finches potentially encouraged to return through natural dispersal from secure breeding sites or through direct translocation. Our knowledge of the birds' ability to return home (flying a distance of 25km across bare lava fields) means we can adapt future translocations to reduce the risk: soft release of pre-fledged chicks collected at the main sites and head-started may be the best way forward.

Another major outcome has been the programme to increase knowledge of Mangrove Finch within the community at Puerto Villamil, Isabela. Although there may not now be any Mangrove Finch within 95km of human settlements the species formerly lived in the Villamil mangroves. The basic knowledge of the species is now evident; this outcome has been noticed at recent presentations with school children. During an introductory question session it became apparent that students know about the species and the main threats faced by it. The awareness programme also undertook:

- Two presentations of video and presentations by field staff to local authorities, nature guides and school students (secondary and primary);
- Printing, launching and distribution of poster (see below) and distribution throughout the town;
- Printing, launching and distribution of educational comic about translocation (see below);
- Printing and displaying of permanent banners at key sites within the Ramsar site;
- Local Isabela television broadcast of Mangrove Finch video and short interview with FC and Cristina Georgii (CDF Education) following comic launch.

Manuals for captive management of birds in Galápagos (Woodpecker Finch *C. pallidus* and Galápagos Mockingbird *Mimus parvulus*), care of captive birds and staff training have been produced. These are the first such internal materials available for staff at CDF and GNP. The Galápagos Mangrove Finch *Camarhynchus heliobates* Recovery Plan was published in 2009 and has been circulated in electronic form (in English and Spanish). The plan will be printed and hard copies distributed.

4.4 Project standard measures and publications

See Annexes 4 and 5.

The Project was detailed in numerous publications by Durrell and Charles Darwin Foundation throughout as well as in international media. There are overlaps with the original project 15005 in reporting outputs and publications. Scientific publications are detailed in 4.5.

Training of GNP personnel continued throughout. However, staffing restrictions within GNP commitments often meant that older, experienced, personnel were seconded to field work. Segundo Gaona continued to be employed by the Project throughout and it is recommended that he takes on a significant role in any future plans after Darwin project has ended. Assuming his other work commitments allow him time, Segundo is suitably trained to oversee all future field activities. David Anchundia, an Ecuadorian volunteer, stayed with the Project for most of the two years and was accepted to do a further degree. GNP and CDF personnel took part in the translocation in 2010 and subsequent post-release monitoring allowing them first-hand experience of this management procedure for the first time in Galápagos.


David Anchundia (left) and Segundo Gaona with Mangrove Finches

The Galápagos Mangrove Finch *Camarhynchus heliobates* Recovery Plan was completed in English and Spanish versions. This was made available in electronic form and distributed widely in Galápagos but, although money was put aside, hard copies have not been printed through difficulties with local printer. An annex detailing the translocation methods was added to the original Recovery Plan.

The awareness campaign in Puerto Vilamill was very successful and all school students (four schools, 300 students) were involved. Cristina Georgii of CDF managed the campaign throughout and oversaw the publication and printing of the comic (2,000 copies).

The Project did not develop a specific website but was incorporated unto those of CDF www.darwinfoundation.org/english/pages/interna.php?txtCodiInfo=124 and Durrell www.durrell.org/animals/birds/mangrove-finch/. The film produced by Sue Maturin (Forest and Bird) was shown widely in Galápagos and can be seen on YouTube www.youtube.com/watch?v=Qd0aEpn4Rrs.

4.5 Technical and Scientific achievements and co-operation

Woodpecker Finch were housed at the CDF station in Puerto Ayora (2007-2008) as a trial to establish best practices for any future captive breeding or rearing programmes for Mangrove Finch. Eggs of Medium Ground-finch *Geospiza fortis* were artificially incubated and chicks were reared in 2009. Aviaries were built for this purpose, funded by Darwin Initiative. This was the first such programme in Galápagos and husbandry guidelines were published and made available to personnel at CDF and GNP.

Good, H., Corry, E., Fessl, B. and Deem, S. 2009. Husbandry guidelines for the Woodpecker Finch (*Camarhynchus pallidus*) at Charles Darwin Foundation. Durrell, CDF, GNP & University of Missouri & St Luis Zoo WildCare Institute. Puerto Ayora, Galápagos, Ecuador.

Personnel at CDF and GNP were trained in bird husbandry and the welfare issues of birds in captivity whether for research or conservation purposes were disseminated within these organisations. Husbandry of this nature had not previously been undertaken with birds in Galápagos and a variety of in-house materials and presentations were produced by Project and Durrell technicians. The trial was replicated with Galápagos Mockingbird as a model for any possible captive-based programme used in work with the Floreana Mockingbird.

The first years of the overall project, including husbandry trials, provided the basis for the Project-hosted International Workshop on Management of Mangrove Finch held in Puerto Villamil, Galápagos in November 2008. Planning was designed to assist stakeholders in the Galápagos (notably GNP, CDF and others in Galápagos) to define, evaluate and plan their conservation role and activities. The process allowed stakeholders to focus their resources on activities which can best achieve their goals. The Recovery Plan was developed at this workshop and was initially completed in 2010. A further annexe on the translocation was added in 2011 and the plan translated into Spanish. The plan, distributed in electronic form to all stakeholders and Project personnel and supporters, will be printed in Spanish and English versions in Galápagos.

Fessl, B., Vargas, H., Carrion, V., Young, R., Deem, S., Rodriguez-Matamoros, J., Atkinson, R., Grenier, C., Carvajal, O., Cruz, F., Tebbich, S. & Young, G. (eds.). 2010. Galápagos Mangrove Finch *Camarhynchus heliobates* Recovery Plan. Durrell Wildlife Conservation Trust, Charles Darwin Foundation and Galápagos National Park.

There have been six peer-reviewed papers published during the course of the two projects:

Brumm, H., Farrington, H., Petren, K. & Fessl, B. 2010. Evolutionary Dead End in the Galápagos: Divergence of Sexual Signals in the Rarest of Darwin's Finches. PloS One e11191.doi: 10.1371/journal.pone.0011191

Cunninghame, F., Young, H.G & Fessl, B. 2111. A trial conservation translocation of the mangrove finch in the Galápagos Islands, Ecuador. In Soorae, P. S. (Ed.) 2011. *Global Re-introduction Perspectives 3*: *More Case Studies From Around The Globe*. IUCN/SSC Re-introduction Specialist Group and Abu Dhabi, UAE: Environment Agency. Pages 151-156.

Fessl, B., Young, H.G., Young, R.P., Rodriguez-Matamoros, J., Dvorak, M., Tebbich, S. & Fa, J.E. 2010. How to save the rarest Darwin's finch from extinction: The mangrove finch on Isabela island. *Philosophical Transactions of Royal Society of London, Series B-Biological Sciences*. 365:1019-1030.

Fessl, B., Dvorak, M., Vargas. F.H. & Young, H.G. 2011. Recent conservation efforts and identification of the Critically Endangered mangrove finch *Camarhynchus heliobates* in Galápagos. *Cotinga* 33:27-33.

Fessl, B., Loaiza, A.D., Tebbich, S. & Young, H.G. 2011. Feeding and nesting requirements of the critically endangered Mangrove Finch (*Camarhynchus heliobates). Journal of Ornithology* 152: 453-460.

Dvorak, M., Fessl, B., Nemeth, E., Kleindorfer, S. & Tebbich, S. 2012. Distribution and abundance of Darwin's finches and other land birds on Santa Cruz Island, Galápagos: evidence for declining populations. *Oryx*. Published online early November 2011.

Details from the Project were presented at two symposia:

Fessl, B., Young, G. & Carrion, V. 2009. Conservation of Darwin's finches: how to ensure recovery of the critically endangered mangrove finch. In: Wollf, M. and Gardener, M. (Eds.) *Proceedings of the Galapagos Science Symposium 2009.* Charles Darwin Foundation, Galapagos: 191-194.

Cunninghame, F. 2010. Conservation of the Mangrove Finch in the Galápagos Islands, Ecuador. Presentation at the XXIII National Bird Observers Reunion. National Network of Bird Watchers Colombia and OCOTEA Environmental. Boyacá, Colombia 14-18 October 2010.

4.6 Capacity building

Perhaps surprisingly there has been a lot less conservation activity of this kind in Galápagos than is widely believed. This well formulated and managed programme of activity for one species in its limited habitat has set a template for other species' management in future. It is perhaps the highest accolade that in discussion on other endangered birds in the archipelago it was several times stated that what each of these needed was its own Birgit (a reference to the skill and determination of the first Project field manager, Birgit Fessl). The model has already been used to establish a further important project to return the Floreana Mockingbird to its natal island through a partnership between GNP, CDF and Durrell.

The host country partners have seen in action the necessity to undertake detailed systematic study of this and other restricted range endemic species and see how similar programmes could be developed for many other species. GNP personnel have been trained in bird monitoring techniques and are able to compare and contrast different methodologies. The need for consistent and repeatable methodologies in both bird monitoring and predator control have become established in GNP workplans. There are unfortunately problems in Galápagos with recruitment and staffing levels which means that typically the same personnel have been made available by GNP throughout the project with little opportunity to train new staff.

Student recruitment was difficult in the first phase of the project, in part through the seemingly hostile field conditions. No local students were found in Galápagos but there was great interest from mainland Ecuador and two students, Abraham D. Loaiza (University del Central Ecuador) and Viviana Morales Quimbiamba (University Politecnica Salesiana sede Quito) were funded through the Project. A further student (David Anchundia) was a volunteer with the project for 15 months which resulted in him then being accepted on a Masters programme at Wake Forest University in the United States.

GNP, CDF and Island Conservation funded the 2011 rat eradication on the islands of Rábida, Bartolomé and Bainbridge Islets. The Mangrove Finch Project field manager conducted field work for the capture and holding in captivity of Galapagos Hawks (*Buteo galapagoensis*) and took over coordinating all follow up monitoring through to the present day.

The future management of the Mangrove Finch and its habitat will require a good understanding of dispersal from the main sites and recolonisation of former sites on Isabela and Fernandina. This can only be achieved if the bird is seen and recorded. They are very few potential observers of a bird that no longer occurs near any human habitation and it is most likely to be seen by GNP tour guides and visiting birding tourists. However, until recently, difficulties in its identification have hindered this form of monitoring. The Project has established usable methods for identification through publications and has trained the majority of guides and CDF personnel.

4.7 Sustainability and Legacy

The Project has shown that the future for the Mangrove Finch can be secured through well managed programmes of predator control (particularly for rats) with accompanying monitoring to establish levels of predator numbers. Birds will disperse from the main sites and management of potential former sites will provide suitable habitat for re-colonisation. Translocation of birds from the main sites to former areas will enhance re-establishment particularly for the distant mangroves at Bahía Cartago and Puerto Villamil. However, the Project has also shown that this species may only survive if it remains highlighted within GNP and CDF work plans. It is recommended that there remains a dedicated ‘species manager’ tasked with ensuring that predator control measures continue to be undertaken regularly, on time and in such a way to sufficiently suppress predator threats. This ‘manager’ need not necessarily be full time but might include this role with others in their annual work plan.

The Darwin Initiative funding will end in 2012; however, the project has confirmed a further two years funding with IUCN (Save Our Species fund). Included in this funding is the sponsorship of a paid position of an adequate person within the GNP to further capacitate and involve the institution in Mangrove Finch management. A further translocation trial will be undertaken using head-starting. The trial will use pre-fledged chicks collected at the main sites (possibly exclusively PTN) that will be reared in a temporary facility at the natal or receptor site by trained aviculturalists. These birds will be released shortly after fledging as they are unlikely to attempt to return back to natal areas. The 2010 trial showed that there is sufficient food at managed receptor sites for the finches.

The Project continued to highlight the importance of *Philornis* as a major threat to the continuing existence of Mangrove Finch and possibly all other songbirds in the archipelago. GNP and CDF will maintain their active involvement in supporting visiting scientists and *ex-situ* collaborators with all aspects of study to identify attractants and to develop controls (e.g. in issuing permits for field study and export of specimens). This interest has been highlighted by GNP hosting of a joint four day workshop with CDF in late January 2012 with the attendance of world experts.

Perhaps the most important legacies of this project have been the highlighting of this little known and rarely seen songbird with both the international community but also the population of Puerto Villamil. Coupled with this has been the recognition within local bodies that well managed single-species programmes may hold the key to the survival of the archipelago's increasing number of threatened animals.

5 Lessons learned, dissemination and communication

The key lessons learned have been: that Galápagos needs more site based and species-led conservation initiatives as these bring high levels of success in conservation of threatened endemic species. It is all too easy to lose sight of specific and often localised problems through attempting to manage large encompassing projects that are often unwieldy and fail to achieve their original aim. Rat control has been seen to improve success rates of nesting Mangrove Finch and localised control programmes will reverse problems rapidly. This practice of localised, co-ordinated, control is probably much more effective than attempts at widespread control in inhospitable terrain (e.g. in Isabela). Declines in Medium Tree Finch *Camarhynchus pauper* on Floreana have led to this species to be designated as Critically Endangered (in 2009) and management techniques developed for Mangrove Finch are transferrable. The project to return the Floreana Mockingbird to Floreana already uses a plan based on that developed during work with the Mangrove Finch.

Philornis parasitism and the threat of other avian diseases such as avian pox have been identified as potentially major threats to Mangrove Finch and all native landbirds in Galápagos. Further work on these issues is essential and will require multi-institutional collaboration. This will be increased in 2012 with a workshop in Galápagos hosted by the Project and publication of a Philornis Action Plan and development of an endangered bird emergency response. These actions will involve local, locally based and international ornithologists and conservation managers from GNP.

Further development of capacity for naturalist guides (an important source of awareness dissemination in Galápagos) has been maintained through presentations at Guides Courses organized jointly by GNP and CDF. A total of 500 guides attended the courses across three islands (Santa Cruz, San Cristobal and Isabela) and related materials were distributed to guides including recorded bird calls and photos to help them in identification. A paper on the difficulties of actually identifying Mangrove Finch was published in the journal Cotinga in 2011. This paper will hopefully increase the number of reliable reports from local and visiting ornithologists (notably birding tourists) of the species as it inevitably disperses from the managed sites at PTN and CB.

The Project has been well received by partners and highlighted as a 'model' programme not least because of the dedication and skill of the two field managers employed. Partners have been regularly updated on progress and results. GNP guides have been annually trained in understanding the Project and in disseminating results to tourists.

Communication between partners has been very good and problems with isolation of the Project and occasional conflicts of interest such as tying up the best ornithologists in the archipelago have been overcome by the Project Leader and Field Manager. The Project interacts extremely well with GNP and has been referred to (unofficially) as the best working relationship with them of any recent projects.

5.1 Darwin identity

Darwin Initiative was publicised in all reports etc produced by partners in relation to Project. Materials such as pens, badges and stickers were widely used and circulated.

The Mangrove Finch Project was considered almost separate from its joint partners' programmes as a separate entity within the Galápagos where it was considered as a relatively unique project (restoration of a single species). The Darwin Initiative support for the Project was synonymous with that of the partners. Darwin Initiative has a long history of involvement in Galápagos and, therefore, is a widely known and respected institution in the archipelago.

6 Monitoring and evaluation

This project extension was delayed due to the late availability of the new field manager (FC) after BF leaving. Darwin Initiative allowed money not used during this time to be transferred to Year 3 (after August 2011) to enable basic field trips for Mangrove Finch monitoring and predator control. The translocation was still able to be carried out at the end of the 2009-10 breeding season even though the newly appointed field manager had only been in Galápagos for four months.

The result of the translocation highlighted the logistical problems associated with the remote field site and previously unknown aspects of the finches. However, these problems were overcome by combining an experienced field team in bird transfer and handling with logistical support from local GNP personnel. This bodes well for future translocation plans.

The Field Manager oversaw ability of GNP to overcome remoteness with construction of aviaries and establishment of long term campsite in remote Santiago Island for keeping hawks in captivity for two months.

The Project was monitored informally by partners and included an annual visit by the Project Leader. Monthly reports by the Field Manager have been circulated to all partners, consultants and actively involved collaborators since the inception of the project in 2006. All consultants and collaborators including recognised experts, e.g. Birgit Fessl, Hernan Vargas (The Peregrine Fund), Peter and Rosemary Grant (Princeton University), Lukas Keller (University of Zurich), John Fa (Durrell), Sonia Kleindorfer (Flinders University), Sabine Tebbich (University of Vienna), Patty Parker (University of Missouri) and Arkhat Abzhanov (Harvard University) have been consulted directly throughout the project and reviewed all outputs. Several peer reviewed papers have been published.

Problems printing the Action Plan in Galápagos continue and, with money put aside for this purpose, will be undertaken with a new printer.

6.1 Actions taken in response to annual report reviews

Problems identified in previous reports included inaccessibility of nests. Current advances in tree climbing techniques using ropes and harnesses have increased our access, in 2010/2011 breeding season we gained close access to 50% of active nests.

The reviewer of the Year 1 report highlighted the staff problems which the project has had since the start of the post project funding. Although not explicitly stated, the reviewer had the impression that there was some concern amongst the project leaders that participation by GNP staff in forthcoming field at Bahía Urbina was not guaranteed. Staffing problems are sadly a feature of life in Galápagos where turnover is seemingly high in all areas in the islands. The GNP has fully supported the project throughout and recognises its importance; however, the Project has not been able to train as many personnel as either it or GNP would have liked. Personnel for the translocation in 2010 and

In relation to translocation activities, the reviewer noted the invertebrate survey at Bahia Cartago to assess whether the site would support a population of Mangrove Finches, but was uncertain whether a similar survey would be undertaken at the Bahia Urbina site prior to 2010.

The reviewer expressed further concerns about the capture and handling of Mangrove Finches when the population was so low and of consumption of rodent baits by non-target species notably hermit crabs and cockroaches. Bird captures have only been undertaken by experienced bird-ringers with prior training outside of Galápagos. GNP only issues permission to ring specific species so all others are released immediately and to date only Mangrove and Woodpecker Finches have been ringed and sampled. Darwin's finches are notably hardy and none of any species are known to have succumbed during trapping in this project and HGY has not heard of any dying in any other projects.

Consumption of baits may be an issue and it has been shown that cockroaches in particular consume a lot of bait (hermit crabs are only ever found at the very edge of the mangles). This is undoubtedly significant as these insects impact on the length of time bait is available for rat consumption in the dispensers. If baiting effort in future is reduced to specific times of the year only, through logistics of arranging site visits etc., it is possible that the bait will last for a shorter period than expected if only rats are consuming it. There is no evidence of secondary poisoning of either insects or of any birds eating insects or their, often bright blue, faeces passed after eating poison.

7 Finance and administration

7.1 Project expenditure

Project expenditure will follow once all project receipts are available.

7.2 Additional funds or in-kind contributions secured

Durrell, CDF and GNP provided staff time and office space etc. and GNP provided field personnel and boat transportation between Santa Cruz and Isabela Islands throughout. The GNP caseta (marine watch observatory) south of PTN was made available for food storage and occasional accommodation and communication with Puerto Ayora. GNP provided all of the *Klerat* rat poison used during the project.

Galápagos Conservancy and Galápagos Conservation Trust funded the *Philornis* project co-ordinated by the Mangrove Finch Project. GNP, CDF and Island Conservation funded the 2011 rat eradication on the islands of Rábida, Bartolomé and Bainbridge in which the Project field manager conducted field work for the capture and holding in captivity of Galápagos Hawks and took over coordinating all follow up monitoring through to the present day.

Further in-kind contributions were received from:

- Graeme Loh (Department of Conservation, New Zealand) provided professional tree climbing equipment;
- Sue Maturin (Forest and Bird, New Zealand) provided and used her own personal video camera for filming of the documentary in the field;
- Ken Petren Laboratory (University of Cincinnati) received blood samples for genetic analyses from wild Mangrove Finch and captive Woodpecker Finch;
- Peter and Rosemary Grant (Princeton University) sent further Mangrove Finch samples for analysis at a Swiss laboratory under their research title to avoid Project having to pay registration fees.

From July 2011, CDF, Durrell and Project personnel began actively seeking funds in order to continue the Project beyond the Darwin funding. In December 2011 funding in the region of £120,000 was secured with IUCN Save Our Species fund. A further $1000 was received from Friends of Galápagos, New Zealand.

SUNY (State University of New York) will contribute money equivalent to one month's wages for the Field Manager during 2012 as contribution to the Project's ongoing support for *Philornis* studies.

7.3 Value of DI funding

The project would not have been possible without Darwin Initiative funding. The Galápagos archipelago is very isolated and the field sites in western and eastern Isabela are amongst the hardest, and most expensive, bird sites in the world to work in. Funding covered the most significant costs: remuneration for field personnel particularly Francesca Cunninghame and experienced local field assistant Segundo Gaona for two years; establishment of a field camp and all supplies necessary for field work. All translocation costs, materials, boat hire etc. were funded entirely by Darwin Initiative. All international travel for the Project Leader and Field Manager were covered by Darwin funds.

Annex 1 Report of progress and achievements against final project logframe for the life of the project

Project summary	Measurable Indicators	Progress and Achievements	Actions required/planned for next period
Goal: To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources		(report on any contribution towards positive impact on biodiversity or positive changes in the conditions of human communities associated with biodiversity eg steps towards sustainable use or equitable sharing of costs or benefits)	
Purpose Increase of population size in the two well known populations in the west; increase of knowledge of the eastern population and establishment of an additional viable population. Implementation of the Action Plan and, if needed, the emergency plan developed during the original Project.	Intensive rat eradication programme and establishment of a buffer zone in year 1. Population growth confirmed by field research in all three sites Y2. Health assessment in historical sites (including Cartago) Y1. Establishment of aviaries in Villamil (if necessary) Y2. of birds to Cartago if research proves it necessary (Y2). Ramsar site restored (part one) : depending on co-funding from other organisations Y2 Education programme started and continued throughout Y1+2.	The original project (15005) and this project extension have established best practices for ensuring survival of Mangrove Finch at least two sites on Isabela. These practices are documented and staff are trained so that other mangrove areas can be restored with sufficient support. Captive breeding has been ruled out following trials but translocation has been shown as a workable method of assisting finch to re-establish in former sites. Restoration of Ramsar site has proven over-optimistic within the lifetime of this project extension; however, an awareness programme in Villamil is developing an understanding of the importance of mangrove ecosystems in this the only human habitation on the island.	The project was expected to finish in 2011; however, following late start of Field Manager and ongoing work programme the project has continued toward end of funds. Management of predators at finch sites and monitoring of finches and predators needs to continue almost indefinitely in a systematic way. These programmes are best suited to a dedicated position within GNP and establishment of this position will be sought on completion of the Project. Funding has been secured to continue work after completion of Darwin Initiative involvement particularly to increase programme of translocations to former sites. Captive-rearing and release (head-starting) of pre-fledged chicks will be undertaken in 2012.

Project summary	Measurable Indicators	Progress and Achievements	Actions required/planned for next period
Output 1. The three existing mangrove finch populations are restored and healthy	• Population has grown by at least 25% in all known sites (PTN, CB, Cartago Y2 • Monitoring programme implemented by GNP Y2 • Populations of rats, cats and anis reduced drastically Y1	Population has continued to grow at PTN and CB and dispersal is becoming evident. Monitoring of predators shows efficiency of programme. Management of Cartago has not begun through logistical constraints and, coincidentally, Mangrove Finch population there has probably died out.	
Activity 1.1 Predator control, censuses and capacity building		Control programmes very effective, censuses undertaken and GNP personnel trained.	
Activity 1.2 Bird ringing and blood sampling for genetic analysis and disease check and habitat surveys		Undertaken throughout project.	
Output 2. Population size, breeding status, habitat suitability and disease risk known for eastern population	• Invertebrate community in key substrates assessed Y1 • Population size and breeding status known Y1	Only two birds located in 2009. Logistical problems have prevented thorough assessment of site.	
Output 3. Ramsar site restored and evaluation finished for suitability	• Introduced species eradicated or drastically reduced Y1+2 • Natural hydrological conditions restored Y1 • Disease risk assessed Y1 Invertebrate community in key substrates assessed Y1	Original plans were over-optimistic and hampered by severe logistical problems. Awareness campaign in Puerto Villamil has been very successful in raising understanding of mangrove ecosystems and their value.	
Activity 3.1 Reduce significantly invasive species (rats, cats, ani, domestic chicken, *Paspallum vaginatum* (a grass) and work with restoration of Ramsar site. Impact study of introduced competitors and health risks	•		

Project summary	Measurable Indicators	Progress and Achievements	Actions required/planned for next period
Output 4. Birds released in suitable site	• Aviary built in Villamil Y1 • Suitable site identified (see also point 2, 3). Y1 • Captive Management Plan established and implemented and birds released Y2 4 GNP & CDF staff fully trained Y1+2		
Activity 4.1 Building aviaries and harvesting of eggs/chicks or adults (according to captive management plan).	•	Captive-breeding was ruled out following completion of the Action Plan. Poza de los Tiburones (Bahía Urbina) identified as suitable receptor site and birds translocated in 2010.	
		Captive-breeding was ruled out following completion of the Action Plan. Direct translocation undertaken instead.	

Annex 2 Project's final logframe, including criteria and indicators

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Goal: Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.			
Sub-Goal: Assure stabilization of two main mangrove finch populations and establishment of a third viable population.	• Restored populations are self-supporting and need minimal intervention. • A third viable population established.	Field survey reports and publications from CDF and GNP.	
Purpose Increase of population size in the two well known populations in the west; increase of knowledge of the eastern population and establishment of an additional viable population. Implementation of the Action Plan and, if needed, the emergency plan developed during the original Project.	Intensive rat eradication programme and establishment of a buffer zone in year 1. Population growth confirmed by field research in all three sites Y2. Health assessment in historical sites (including Cartago) Y1. Establishment of aviaries in Villamil (if necessary) Y2. of birds to Cartago if research proves it necessary (Y2). Ramsar site restored (part one) : depending on co-funding from other organisations Y2 Education programme started and continued throughout Y1+2. Supplementation	• Husbandry guidelines finished • New invasive species management in the areas implemented in long term work plan of GNP. • Local guides trained. • Park guards trained in census techniques. • Scientific papers • Project reports • Education material • Ramsar site Action Plan implemented • Mangrove finch Action Plan implemented	Full cooperation from GNP and CDF will be required. The restoration of the Ramsar site is dependent on external funding. Invasive species control in inhabited area (Villamil) needs support from municipality.
Outputs (add or delete rows as necessary) 1. The three existing mangrove finch populations are restored and healthy	• Population has grown by at least 25% in all known sites (PTN, CB, Cartago Y2 • Monitoring programme implemented by GNP Y2 • Populations of rats, cats and anis reduced drastically Y1	• Bird census and monitoring of breeding success • Rat monitoring	• Extreme weather conditions or other catastrophic events (e.g. volcanic eruption) • Political decision preventing GNP actions
2. Population size, breeding status, habitat suitability and disease risk known for eastern population	• Invertebrate community in key substrates assessed Y1 • Population size and breeding status known Y1	• Bird census and monitoring of breeding success • Health report • Invertebrate community in key substrates analysed	

Project summary	Measurable Indicators	Means of verification	Important Assumptions
3. Ramsar site restored and evaluation finished for suitability	• Introduced species eradicated or drastically reduced Y1+2 • Natural hydrological conditions restored Y1 • Disease risk assessed Y1 • Invertebrate community in key substrates assessed Y1	• Monitoring of introduced species • Monitoring of aquatic community • Health report • Invertebrate community in key substrates analysed	• No co-funding obtained • Municipality and/or community opposed to project
4. Birds released in suitable site	• Aviary built in Villamil Y1 • Suitable site identified (see also point 2, 3). Y1 • Captive Management Plan established and implemented and birds released Y2 • 4 GNP & CDF staff fully trained Y1+2	• Captive Management Plan • Workshop of captive breeding • Assessment of survival of released birds	Health risks prevent captive breeding and/or translocation
Activities (details in workplan) 1 Predator control, censuses and capacity building 2 Bird ringing and blood sampling for genetic analysis and disease check and habitat surveys 3 Reduce significantly invasive species (rats, cats, ani, domestic chicken, *Paspallum vaginatum* (a grass) and work with restoration of Ramsar site. Impact study of introduced competitors and health risks. 4 Building aviaries and harvesting of eggs/chicks or adults (according to captive management plan). 5 Diagnostic study of community perception of conservation. 6 Awareness campaign.			
Monitoring activities: Indicator 1 Density of rats in areas after intense control measurements Indicator 2 Mangrove finch population estimate established through point count method Indicator 3 Breeding success established through direct nest observations Indicator 4 Survival of translocated birds through telemetry Indicator 5 Prevalence of disease vectors in birds in relevant mangroves areas Indicator 6 Attitude of local community towards conservation aims before and after awareness campaign			

Annex 3 Project contribution to Articles under the CBD

Project Contribution to Articles under the Convention on Biological Diversity

Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use		Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	20	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation	30	Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation		Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity		Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures		Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	25	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
13. Public Education and Awareness	20	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimizing Adverse Impacts		Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources	05	Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.

Article No./Title	Project %	Article Description
16. Access to and Transfer of Technology		Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information		Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
19. Bio-safety Protocol		Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Other Contribution		Smaller contributions (eg of 5%) or less should be summed and included here.
Total %	100%	Check % = total 100

Annex 4 Standard Measures

Code	Description	Totals (plus additional detail as required)
Training Measures		
1a	Number of people to submit PhD thesis	0
1b	Number of PhD qualifications obtained	0
2	Number of Masters qualifications obtained	0
3	Number of other qualifications obtained	0
4a	Number of undergraduate students receiving training	3
4b	Number of training weeks provided to undergraduate students	12
4c	Number of postgraduate students receiving training (not 1-3 above)	1
4d	Number of training weeks for postgraduate students	85
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(ie not categories 1-4 above)	1
6a	Number of people receiving other forms of short-term education/training (ie not categories 1-5 above)	6
6b	Number of training weeks not leading to formal qualification	12
7	Number of types of training materials produced for use by host country(s)	1
Research Measures		
8	Number of weeks spent by UK project staff on project work in host country(s)	6
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	2
10	Number of formal documents produced to assist work related to species identification, classification and recording.	0
11a	Number of papers published or accepted for publication in peer reviewed journals	5
11b	Number of papers published or accepted for publication elsewhere	1
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	0
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	0

Code	Description	Totals (plus additional detail as required)
13a	Number of species reference collections established and handed over to host country(s)	0
13b	Number of species reference collections enhanced and handed over to host country(s)	0
Dissemination Measures		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	1
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	2
15a	Number of national press releases or publicity articles in host country(s)	1
15b	Number of local press releases or publicity articles in host country(s)	4
15c	Number of national press releases or publicity articles in UK	2
15d	Number of local press releases or publicity articles in UK	2
16a	Number of issues of newsletters produced in the host country(s)	1
16b	Estimated circulation of each newsletter in the host country(s)	0
16c	Estimated circulation of each newsletter in the UK	0
17a	Number of dissemination networks established	0
17b	Number of dissemination networks enhanced or extended	0
18a	Number of national TV programmes/features in host country(s)	1
18b	Number of national TV programme/features in the UK	0
18c	Number of local TV programme/features in host country	3
18d	Number of local TV programme features in the UK	0
19a	Number of national radio interviews/features in host country(s)	0
19b	Number of national radio interviews/features in the UK	0
19c	Number of local radio interviews/features in host country (s)	0
19d	Number of local radio interviews/features in the UK	0

Code	Description	Totals (plus additional detail as required)
Physical Measures		
20	Estimated value (£s) of physical assets handed over to host country(s)	
21	Number of permanent educational/training/research facilities or organisation established	0
22	Number of permanent field plots established	0
23	Value of additional resources raised for project	
Other Measures used by the project and not currently including in DI standard measures		

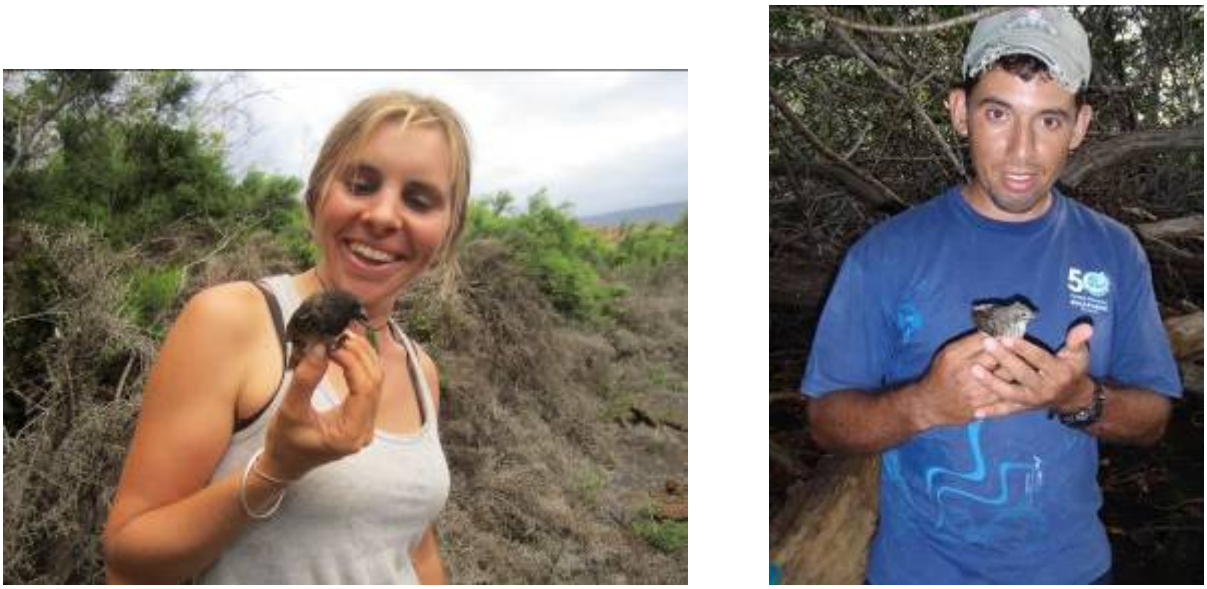
Annex 5 Publications

Type * (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Manual	Husbandry Guidelines for the Woodpecker Finch (*Camarhynchus pallidus*) at Charles Darwin Foundation. Good, H., Corry, L., Fessl, B. & Deem, S. 2008	Durrell & Charles Darwin Foundation. Puerto Ayora, Galápagos	Durrell & Charles Darwin Foundation Darwin Initiative http://darwin.defra.gov.uk/documents/15005/21296/15-005%20Woodpecker%20finch%20guidelines%20September%202009.pdf	
Manual	Husbandry Guidelines for the Galápagos Mockingbird (*Mimus parvulus*) at Charles Darwin Foundation. Good, H., Corry, L., Fessl, B. & Deem, S. 2008	Durrell & Charles Darwin Foundation. Puerto Ayora, Galápagos	Durrell & Charles Darwin Foundation	
Manual	Captive Care Guidelines for Avian Species. Deem, S.L., Fessl, B., Good, H., Jiménez-Uzcátegui, G., Tebbich, S., Teschke, I., Zabala, J. & Parker, P. 2009	Charles Darwin Foundation. Puerto Ayora, Galápagos	Charles Darwin Foundation	
Manual	Training Manual of Zookeeper Workshop, Charles Darwin Foundation and Galápagos National Park. Georgii, C. & Good, H. 2008.	Charles Darwin Foundation. Puerto Ayora, Galápagos	Charles Darwin Foundation	
Action Plan Report	Galápagos Mangrove Finch *Camarhynchus heliobates* Recovery Plan 2010-2015. 2009	Charles Darwin Foundation. Puerto Ayora, Galápagos	Charles Darwin Foundation Darwin Initiative http://darwin.defra.gov.uk/documents/EIDPO031/21570/EIDPO031%20AR1%20Ann5%20Mangrove%20Finch%20plan%202010-2015.pdf	
Report	Pathogens and parasites: an increasing threat to the conservation of Galápagos avifauna. Deem, S.L, Cruz, M., Jiménez-Uzcátegui., G., Fessl, B., Miller, R.E. & Parker, P.G. 2009.	Charles Darwin Foundation. Puerto Ayora, Galápagos	Charles Darwin Foundation http://www.galapagos.org/2009/doc1.html	

Type * (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Journal	The critically endangered mangrove finch: conservation and identification. 2011. Fessl, Dvorak & Young	*Cotinga* Journal of Neotropical Bird Club	Neotropical Bird Club http://www.neotropicalbirdclub.org/articles/33/Fessl.pdf	
Journal	How to save the rarest Darwin's finch from extinction? 2011. Fessl, Dvorak, Young, Matamoros, Tebbich, Young & Fa	*Philosophical Transactions, special issue Darwin's Finches*	The Royal Society http://rstb.royalsocietypublishing.org/content/365/1543/1019.full	
Journal	Evolutionary Dead End in the Galápagos: Divergence of Sexual Signals in the Rarest of Darwin's Finches. 2010. Brumm, Farrington, Petren & Fessl	*PLoS One*	PLoS One http://www.plosone.org/article/info:doi%2F10.1371%2Fjournal.pone.0011191	
Journal	Feeding and nesting requirements of the critically endangered Mangrove Finch. 2011 Fessl, Loaiza, Tebbich & Young.	*Journal of Ornithology*	SpringerLink http://www.springerlink.com/content/c660ml0m7943m731/	
Book	A trial conservation translocation of the mangrove finch in the Galápagos Islands, Ecuador. 2011 Cunninghame, Young & Fessl. In: Soorae, P. S. (Ed.) 2011. *Global Re-introduction Perspectives 3*: *More Case Studies From Around The Globe.* Pages 151-156.	IUCN/SSC Re-introduction Specialist Group and Abu Dhabi, UAE: Environment Agency.	IUCN http://www.iucnsscrsg.org/rsg_book.php	
Report	Why does the mangrove finch matter? 2011. Cunninghame	Annual Report 2010. Charles Darwin Foundation. Puerto Ayora, Galápagos	Charles Darwin Foundation http://www.darwinfoundation.org/english/_upload/annual-report-cdf2010.pdf	
Video	Mangrove finches fight on. 2011. Video by Sue Maturin	Sue Maturin. Forest and Bird, NZ	Many websites e.g. http://www.talking-naturally.co.uk/critically-endangered-mangrove-finch-youtube/ http://www.durrell.org/animals/birds/mangrove-finch/	

Mangrove Finch *Camarhynchus heliobates*

Mangrove Finch in the hand. Photos by Francesca Cunninghame



Francesca Cunninghame (left) and Roberto Jimenéz (GNP) with Mangrove Finch. Photos by Francesca Cunninghame

Mangrove Finch. Photos by Michael Dvorak, BirdLife Austria

Playa Tortuga Negra (front) and Caleta Black (back): the current world range of the Mangrove Finch

Satellite photo of Poza de los Tiburones, Bahía Urbina, Isabela.

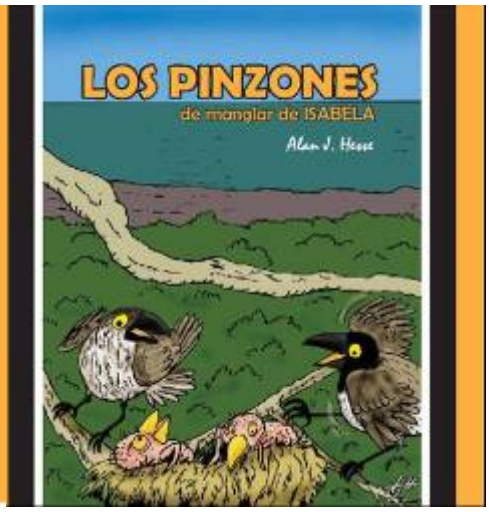
Translocation of Mangrove Finch to Poza de los Tiburones, Bahía Urbina, May 2010

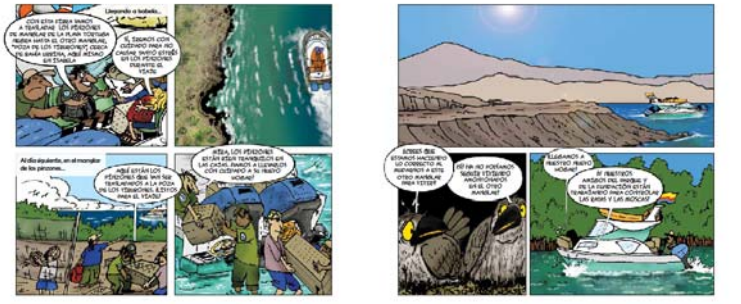
All photos by Brent Barrett

Education and awareness programme in Puerto Villamil, Isabela.

Photos by Christina Georgii

Los Pinzones comic launched in Puerto Vilamill, Isabela.





Photos by Christina Georgii

Annex 6 Darwin Contacts

Ref No	EIDPO031
Project Title	Restoration of the Mangrove Finch in Isabela, Galápagos
UK Leader Details	
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Role within Darwin Project	Project Leader
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Phone	
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Email	
Partner 1	
Name	Dr Mark Gardener
Organisation	Charles Darwin Foundation
Role within Darwin Project	CDF co-Project Leader
Address	Charles Darwin Research Station, Puerto Ayora, Santa Cruz, Galápagos, Ecuador
Fax	
Email	
Partner 2 (if relevant)	
Name	Washington Tapia
Organisation	Galápagos National Park
Role within Darwin Project	Government partner
Address	Central Office, Puerto Ayora, Santa Cruz, Galápagos, Ecuador
Fax	
Email	