

# ***Darwin Initiative Annual Report***

## **Important note:**

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

**Submission deadline 30 April 2008**

## **Darwin Project Information**

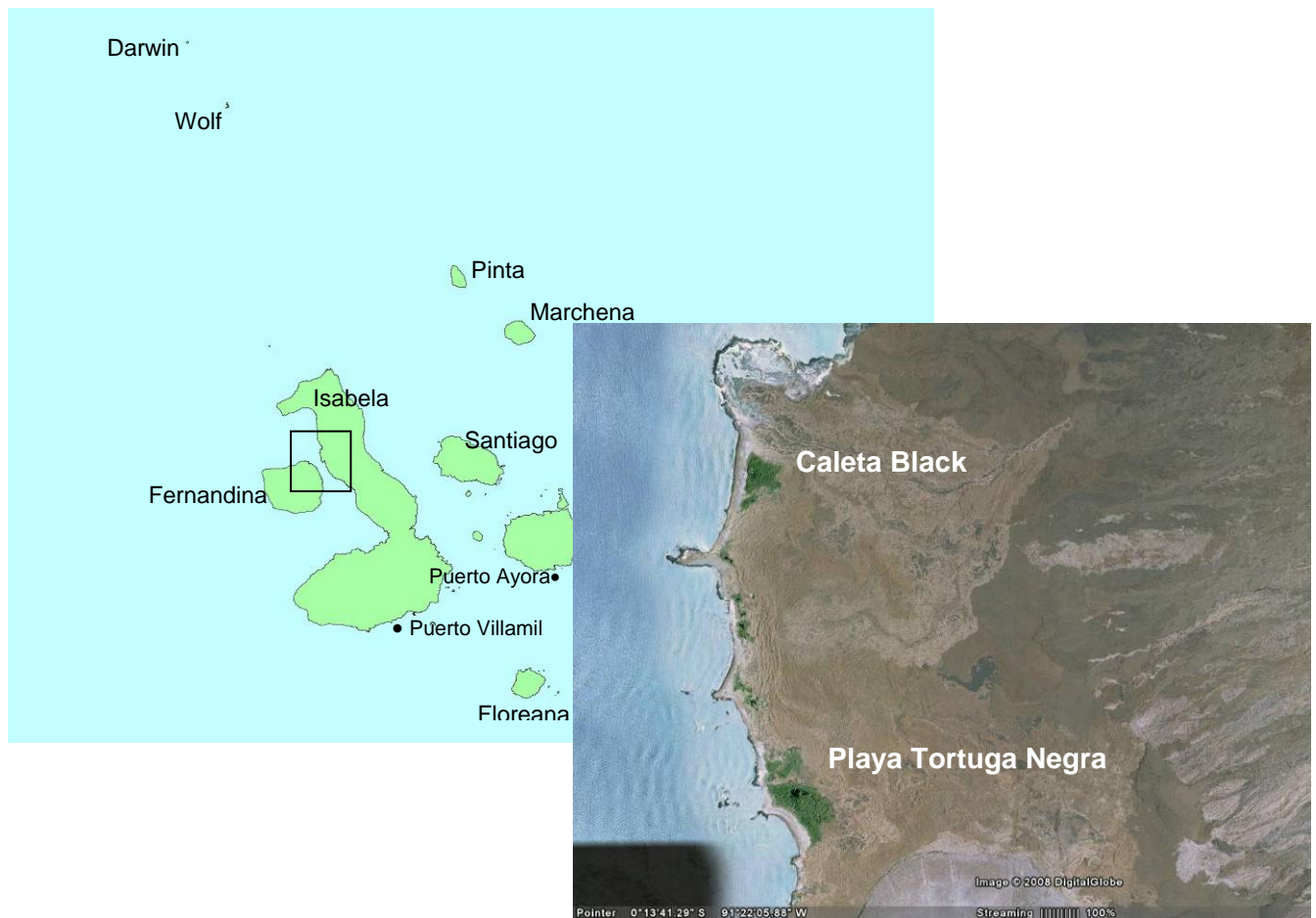
Project Ref Number	15/005
Project Title	CONSERVATION OF THE MANGROVE FINCH ( <i>CACTOSPIZA HELIOBATES</i> )
Country(ies)	ECUADOR: GALÁPAGOS ISLANDS
UK Contract Holder Institution	DURRELL WILDLIFE CONSERVATION TRUST
UK Partner Institution(s)	n/a
Host country Partner Institution(s)	CHARLES DARWIN FOUNDATION GALÁPAGOS NATIONAL PARK
Darwin Grant Value	£173,500
Start/End dates of Project	1 JUNE 2006 TO 31 MAY 2009
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1 APRIL 2007 to 31 MARCH 2008 ANNUAL REPORT NUMBER 2
Project Leader Name	HYWEL GLYN YOUNG
Project website	None yet
Author(s), date	HYWEL GLYN YOUNG & BIRGIT FESSL, MAY 2008

## **1. Project Background**

The key goal of this project (the Project) is to assist in the conservation of the critically endangered and geographically restricted Mangrove Finch (*Cactospiza heliobates*) in the Galápagos Islands. This will be achieved through focused field research on the last remaining population of the species, and by means of interventions to control the main recognised agents of decline (i.e. disease and predation). Necessary skills for future *in-country* head-starting and release in order to establish new Mangrove Finch populations in localities from which they have been recently extirpated are being acquired through a trial captive breeding programme. The Durrell Wildlife Conservation Trust (Durrell) will assist in skills transfer to build the required institutional capacity in Galápagos. In conjunction with Ecuadorian institutions, the project will implement a medium to long-term action plan to ensure the survival of this species beyond the project lifetime, and thus help Ecuador meet its CBD obligations.

## **2. Project Partnerships**

The project has two local partners: the Charles Darwin Foundation (CDF) and Galápagos National Park (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



**Figure 1. Galápagos Islands, Ecuador, and location of principal distribution of Mangrove Finch *Cactospiza heliobates***

conservation and natural resource issues in Galápagos, providing the scientific knowledge required to protect the unique ecosystem of Galápagos. A Memorandum of Agreement has been signed by Durrell and CDF.

The Project partnership continues to be very effective and well received. Field Manager Dr. Birgit Fessl has been included onto the staff of CDF for convenience and to ensure that she receives local benefits available to CDF staff. Wages etc. for B Fessl come from Project funds transferred to CDF. HGY and B Fessl have been granted the rare status of Collaborative Scientists by GNP; HGY has also been granted this status by CDF. HGY and Bryan Milstead (CDF) jointly co-ordinate overseeing Project; however BM left CDF in March 2008.

Durrell experience with issues involving many aspects of conservation including captive breeding and rearing continue to be further utilised by CDF for other projects in Galápagos including the conservation the Floreana Mockingbird *Nesomimus trifasciatus* (Action Plan published in February 2008).

The Project continues to benefit from close collaboration with Hernan Vargas whose Galápagos based DI project (project id 12018) came to an end in 2006. H Vargas now works for The Peregrine Fund based in Panama and continues to be consultant to Project.

### 3. Project progress

The Project has run efficiently throughout Year 2 with Field Manager Birgit Fessl in residence in the Galápagos throughout. Field visits have run smoothly with a well established team that now includes a thesis student. Visits were made to other former Mangrove Finch sites and a potential release site at Puerto Villamil, Isabela.

### 3.4 Progress in carrying out project activities

#### 1. Field research programme

BF undertook eight field visits to Playa Tortuga Negra and Caleta Black during the year (26<sup>th</sup> March-14<sup>th</sup> April 2007, 3<sup>rd</sup>-10<sup>th</sup> May, 20<sup>th</sup>-26<sup>th</sup> September, 10<sup>th</sup>-23<sup>rd</sup> November, 5<sup>th</sup>-13<sup>th</sup> December, 11<sup>th</sup>-24<sup>th</sup> January 2008, 6<sup>th</sup>-29<sup>th</sup> February and 13<sup>th</sup>-29<sup>th</sup> March). During these visits the team camped on the beach at Playa Tortuga Negra.

Data was collected on nesting behaviour of Mangrove Finch and as many nests as possible were followed from nest construction to fledging. Rats were monitored and an extensive trapping and poisoning programme ran throughout the year. Invertebrate collections were undertaken by Abraham David Loaiza (see below). Artificial nest trials were undertaken in November to investigate prevalence of rat predation on finch nests. Thirty six nests were put up in Playa Tortuga Negra and a further 15 were put up in a small forest between PTN and Caleta Black. The nests were checked on day 3, 6 and 9 on which the nest was taken down. Two plasticine eggs dipped in egg white were placed in each nest and replaced if predated. Seventy eight cases of predation were recorded in which the predator was doubtless a rat in 65%. In the other incidents the predator could not be identified but several were considered to be mockingbirds. The trial was repeated in January when predation was as high in the small forest where no rat control was undertaken but only 25% of nests were predated in PTN where rats are controlled and in half of the cases rats were identified as the predator.

Visits were made to areas considered former sites of Mangrove Finch (see **Appendix 3: Figure 3** for map):

- During mid-November 2006, a group of ornithologists reported that they have seen several Mangrove Finches in Punta Espinoza, on the island Fernandina. According to the guide, one bird was lured in with playback (this technique is now prohibited). Hernan Vargas had visited this site previously and did not observe Mangrove Finches. The area was checked on 3<sup>rd</sup> of April 2007, 23<sup>rd</sup> of January 2008 and 25<sup>th</sup> without success. Neither Mangrove Finch nor Woodpecker Finch *C. pallida* were found and only three ground finches were observed in the whole area of Punta Espinoza. Punta Espinoza mangrove habitat is very different from that at Playa Tortuga Negra and is not considered suitable.
- Bahía Elizabeth lagoon, Isabela, was visited on 9<sup>th</sup> April. This former Mangrove Finch site is a beautiful place but not suitable for mangrove finches. The whole area is washed out by the tides and the predominant tree species is red mangrove: there is little leaf litter and very little dead wood.
- Carthago Bay, Isabela, was visited 6<sup>th</sup>-10<sup>th</sup> February. In a search done in 1997 and repeated in 1998 a few Mangrove Finches were found in the area south of Carthago Bay. These birds sang very differently and were then thought to be the last birds from a former larger population (see Dvorak *et al.* 2004 for more details). No further surveys were undertaken until 2008 and checks in neighbouring regions were negative. The east coast of Isabela has extended mangrove stands and could be potentially used as a re-introduction site. We wanted to check the former encounter sites and the surrounding mangrove stands for presence/ absence of the species.

During the first morning the original encounter point from 1997 was checked: the presence of two singing males was confirmed. A short recording was made and from this recording new playbacks were generated which were subsequently used for the remaining survey. In the following days Mangrove Finches were found in the two adjacent mangrove forests (to the north and to the south) No birds were found in the other areas searched for (see

map). All 4-5 Mangrove Finches reacted poorly to the playback. Singing activity was very low and birds were seen flying distances of over 200m. In all areas some ground finches with very similar songs to Mangrove Finch were heard and seen.

The low reaction to playbacks might be related to the finches' large home ranges. Maybe, they just do not hear the "intruder". The low population density might explain their low singing activity. The presence of ground finches singing Mangrove Finch song could be interpreted as Mangrove Finches formerly being more widespread in these areas. A possible explanation for the low population is that the habitat is sub-optimal for the species: there is no real separation from the sea and thus little leaf litter and laying dead wood is available (both key substrates for the species). However, as predation by alien species may play its role, conservation actions such as rat and cat control will be initiated in the area around Carthago and first actions are planned for August 2008.

- Punta Moreno and Bahia Urbina were visited between 15<sup>th</sup> and 18<sup>th</sup> February. A forest north of Punta Moreno (west coast of Isabela) is a historical collection site for the Mangrove Finch. However, landing was not possible in 1997 and 1998 and this area had not been revisited. Bahia Urbina has extended mangroves, though not separated by the sea, and could thus be a potential site. Several ground finches singing Mangrove Finch songs (type Playa Tortuga Negra) were encountered but the presence of the Mangrove Finch could not be confirmed.

The first investigations into possible release sites in Puerto Villamil, Isabela, were undertaken in May 2008. Three days were spent in Villamil to get impressions of the state of the mangrove areas:

- **Poza de Diablos:** visit to large lagoon with kayak. This lagoon had formerly been connected to the sea (flooded by high tide events) but due to the construction of a road it is now cut off and mainly fed by rain water from the highlands. There is a rather large belt of mangroves around the lagoon with sprinkled islets in it and it is a known nesting place for flamingos. The plant species composition is rather different with a lot of Button Mangrove *Conocarpus erectus* which is absent in the current distribution range of the Mangrove Finch. Button Mangrove produces leaf litter and considerable amounts of this preferred feeding substrate were present. The Poza is part of the National Park and a Ramsar site (site 1202), though parts of the mangrove belt are located in private property. Mangroves are protected by law and owners are not allowed to cut trees down.
- **Estuario:** to the west of the Poza de Diablos, there is an extended mangrove area, partly flooded by the sea and with different species compositions. The whole area is a visitor site with paths. In the area called the estuario (=estuary), there are huge Black Mangroves (up to 20m), mixed with mainly White Mangroves. Parts are flooded with the tides but there are considerable amounts of dead wood and leaf litter, both preferred feeding substrates of the Mangrove Finch. The area with the huge Black Mangrove stands is not accessible for the public.

A couple of km to the west of Villamil, there are several mangrove stands along the coast, partly around lagoons, separated by the sea by a beach partly following the coast line. Most of the beach side mangroves were invaded by sand or dead leaves and wood washed out by the incoming sea. The inland strip looked more promising, though it was not very broad. There was a considerable amount of dead wood and a mixed community of White, Red and Button Mangrove. A further visit in February 2008 was undertaken to measure vegetation features (%species, ground cover, height, demography etc.) at the Ramsar site and the "Estuario".

## 2. Captive rearing programme

The aviaries were completed at the end of 2007 and provide nine separate units for songbirds in an aviary complex (see **Appendix 3**) at the FCD Station opposite the older research cages. The first occupants, 10 Woodpecker Finches transferred from a completed research project,

were moved into the aviaries in February 2008. As the sexes of the finches were undetermined birds were predominantly held as singles (i.e. one bird per aviary).

Harriet Good of Durrell Wildlife Conservation Trust has been seconded to the Project from Durrell's Bird Department. HG arrived in March 2007 and will stay in Galápagos for approximately six months in order to settle the birds into the aviaries, develop captive husbandry protocols, produce guidelines in English and Spanish and train local counterparts. Galápagos Mockingbirds *N. parvulus* (1-2 pairs) will also be housed in the aviaries later in the year as part of trials aimed at developing similar protocols for captive breeding and rearing Floreana Mockingbird.

Canary-like pox was widespread in Puerto Ayora during the wet season and many wild birds were infected. Many of the captive Woodpecker Finches contracted the disease but none perished.

### 3. Conservation action

Control of rats was continued throughout the year and the currently implemented control system appears very effective. The GNP poisoned cats but success of this programme was unknown – cats were still seen and may be a serious threat to recently fledged finch chicks. Anis were not controlled and four birds were seen. Nests and eggs were collected for *Philornis* analysis and studies to discover an attractant for *Philornis* continue at FCD.

### 4. Capacity building

After previous failings it was encouraging to finally have a student on the Project. Abraham David Loaiza arrived in Galápagos from Ecuador in May 2007. Abraham's thesis is entitled "Feeding behaviour of the Mangrove Finch" and will be completed at the end of 2008. This study is co-financed by Galápagos Travel. A second student, Viviana Janeth Morales Quimbiamba, arrived from Ecuador in March 2008 and will undertake a thesis entitled "Endoparasites in wild and captive Darwin finches" based around the captive programme.

One GNP guard was trained in two different census techniques and three guards have been trained in positioning of rat bait tubes and provision of bait. Rat control will transferred to GNP during Year 3.

BF took part in training sessions for GNP guides in order to update them in the Project and all aspects of Mangrove Finch conservation.

A full list of Project participants is detailed in **Appendix 3**.

### 5. Public awareness

To date no public awareness campaigns have been initiated: the remaining populations of Mangrove Finch do not live near people. Tourists do occasionally visit Playa Tortuga Negra within organised trips and when possible BF gives a mini lecture at the mangle edge.

GNP guides were asked to look for Mangrove Finch at other sites in Isabela and, particularly, Fernandina (Punta Espinoza) but have not reported any sightings.

## 3.4 Progress towards Project Outputs

### 1. Institute system for monitoring species' ecology, habitat, genetic status and determinants of population growth.

Monitoring is underway and different census methodologies are being tested. Genetic analysis was finally undertaken in 2008 after delays through legislative difficulties. The results still need to be analysed. Monthly reports are produced and circulated to partners and consultants.

2. *Technical skills in GNP & CDF are strengthened to enable long term conservation of Mangrove Finch.*

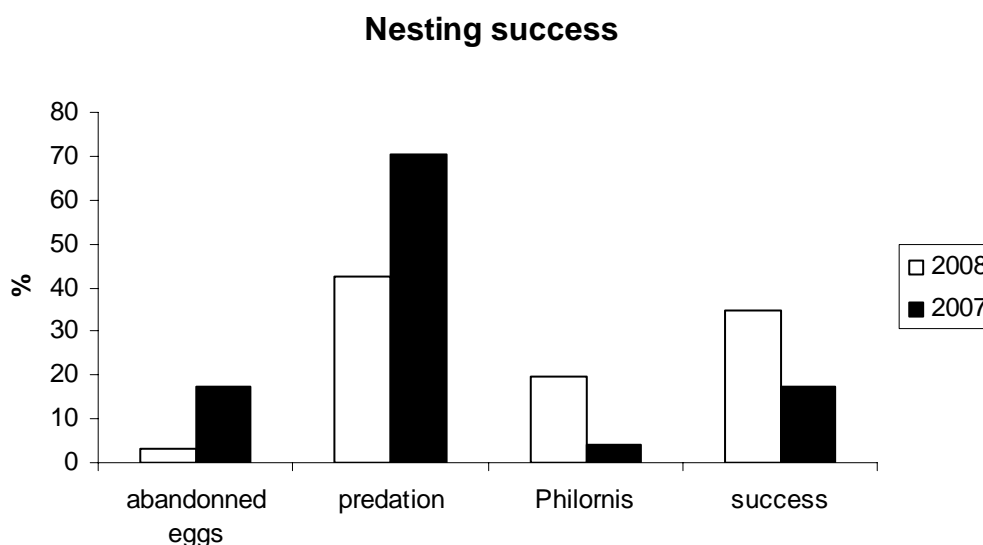
BF is training GNP personnel in Mangrove Finch monitoring and control of invasive species. Two students are undertaking these relevant to conservation of Mangrove Finch and Harriet Good (Durrell) and Cistina Georgii (FCD) are establishing training protocols for captive breeding facility.

3. *Species conservation action plan implemented*

Action plan has not yet been developed a meeting will be held within Year 3.

4. *Population limits established and declines halted.*

Not yet fully established (see preliminary results (**Appendix 3: Table 4**)). The data also show higher fledgling success this year in comparison to year 2007 probably through effective rat control (**Figure 2**).



**Figure 2.** Nesting success between 2007 and 2008 for nests that developed till incubation or more. This year, there were less abandoned eggs, less predation probably due to a successful rat control but, as a consequence?, more death due to *Philornis*.

5. *Awareness of Mangrove Finch raised in local and international community*

Situation is understood in international community (e.g. in *Rare Birds Yearbook 2007*) but less established in local community (NB species does not currently live near any people). Establishment of breeding facilities and or release sites on Isabela will be preceded by extensive awareness campaigns which may be linked to Ramsar status of Puerto Villamil wetlands.

6. *Post-project workplan is in place to continue conservation action plan.*

Not yet applicable.

**3.4 Standard Measures**

**Table 1 Project Standard Output Measures**

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date	Total planned from application
17A	Steering committee formed	Yes	n/a			Yes	
14A	Stakeholders meeting establishes project protocols	Yes	n/a			Yes	
16A	Report from Stakeholders meeting produced and circulated	Yes	n/a			Yes	
22	Captive facilities built and functioning	Planned	Yes			Yes	
12A	Electronic databases established	Yes	Yes			Yes	
12A	GIS of all sites developed	Yes	Yes			Yes	
12A	Standardised data collection forms produced	Yes	Yes			Yes	
9	Habitat assessment report produced	No				No	
2	2 MSc Students trained	Not started	Started			Started	
6A	Steering committee reports published and end of year summaries circulated	Yes	-			Yes	
	Results of genetic analysis produced	n/a				Started	
14A	PHVA held in Galápagos	n/a	n/a			n/a	
9	Mangrove Finch Conservation Action Plan published	n/a	n/a			n/a	
11B	4 Scientific papers produced and submitted	None yet	None yet			None yet	

<b>15A</b>	Articles produced in UK and National press and for radio broadcasts	3				3	
<b>17A</b>	Website area in Durrell and CDF websites established	CDF species profile	Durrell Conservation report			CDF Durrell	
<b>18A</b>	National TV interviews	No	(Japanese tv)			No	

In Table 2, provide full details of all publications and material produced over the last year that can be publicly accessed, eg title, name of publisher, contact details, cost. Mark (\*) all publications and other material that you have included with this report.

**Table 2 Publications**

Type *	Detail	Publishers	Available from	Cost £
(eg journals, manual, CDs)	(title, author, year)	(name, city)	(eg contact address, website)	
Durrell Conservation Programme	Report on Durrell website	Durrell Wildlife Conservation Trust	<a href="http://www.durrell.org/Conservation/Where-we-work/Galapagos/">http://www.durrell.org/Conservation/Where-we-work/Galapagos/</a>	Free on-line
The Re-introduction of the Floreana Mockingbird to its Island of Origin	Workshop report	Charles Darwin Foundation and Galápagos National Park	Charles Darwin Foundation	Free

### 3.4 Progress towards the project purpose and outcomes

The project purpose is to establish the ecology and population parameters of Mangrove Finch, identify causes of decline, develop measures to arrest decline in numbers and establish a plan to restore populations in areas where extirpated.

### 3.4 Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

Mangrove habitat is rare in the extremely arid Galápagos archipelago. The Project will map this habitat in the archipelago through remote censusing in co-operation with Steve Walsh of University of North Carolina. The rapid improvement in knowledge of the highly specialised Mangrove Finch (possibly world's most specialised mangrove-living bird species) and its habitat are going a long way to understanding the biodiversity of the archipelago's mangrove ecosystems.

## 4. Monitoring, evaluation and lessons



The Project has been monitored by HGY and B Milstead with support from Andrew Terry and John Fa (Durrell). 2008 was a second consecutive successful year in terms of reproduction in the wild finches. Predator evaluation and control are showing signs of success and the Project is beginning to better understand the threats facing the Mangrove Finch.

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

- Activity 1.1. In relation to census techniques, was there any evidence that playback altered the behaviour of the birds? (respond in **next annual report**).

We only used playbacks with the census in 2007 as a comparison with other, previous, census techniques (i.e. Vargas and Peter Grant). There were some birds following the playback and counts were, therefore, slightly higher. We no longer use playbacks while doing the census in 2008 but do for searches in the other sites east and west zone of Isabela.

For the tourists and use of playbacks it may be that this is not a threat to the birds: however, it is now prohibited. There is no danger that tourists would enter the forest as this has long been prohibited and a guide would risk his licence if he allows it - and if they would, the finches will not be disturbed. BirdLife and Tropical Birding have been contacted re observations of Mangrove Finch. We talked to the guide who reported finches on Fernandina and, while he believes that these were Mangrove Finches, he was not 100% certain. We have been to Fernandina three times over the breeding season (and in 2005 with H Vargas) and have failed to find any Mangrove Finch.

Access to Playa Tortuga Negra has not been banned. Tourists can only visit one site on Fernandina (Punta Espinoza) that is near to any mangrove and access to the mangle is impractical for tourists and prohibited.

- Activity 1.3. It would be interesting to learn from **the second annual report** whether linking the captive breeding programmes of Mangrove Finch and Floreana Mockingbird will enhance the likely success of one or both programmes. How many birds will actually be taken from the wild to establish the captive breeding populations of the various species?

Initially the captive programme will be run as a trial and only closely related species will be used in order to establish best husbandry practices and train relevant personnel. With no previous projects of a similar nature in the Galápagos the opportunity to include basic mockingbird trials in the facility seemed appropriate as Durrell's expertise and staff could be used in both projects. The Mangrove Finch Project has become a model for potential similar bird projects in the archipelago.

In Year 2 ten Woodpecker Finches were transferred to the captive programme and no mockingbirds.

- Output 4 Capacity building: Dr Fessl is training GNP personnel in Mangrove Finch monitoring and control of invasive species, but no details of the training programme are provided: these should be included with the **next annual report**.

These programmes have not yet been formalised; however, some details are included in this report.

- Dissemination: Monthly reports are produced and circulated to partners. As mentioned above, these should be included with the **second annual report**, to enable the reviewer to comment on the quality of communication and dissemination.

See attachments.

- The report states that exit strategies have yet to be determined. Although the profile of Mangrove Finch has increased since the start of the Darwin project, it is important that clearly defined exits strategies are in place, and these should be detailed in the **second year report**.

No exit strategy for Mangrove Finch conservation can yet been determined. The species workshop, tentatively planned for November 2008, will plan the exit of the Mangrove Finch Project and development of the next phase. It is proposed that following the completion of the Project restoration of mangles in Isabela (Poza de los Diablos?) will be undertaken and captive bred or reared finches released.

## 6. Other comments on progress not covered elsewhere

## 7. Sustainability

The Mangrove Finch has been identified, following initiation of Project, as the most endangered bird (animal?) in Galápagos and the importance of this species' conservation is now taken very seriously by GNP and CDF. It has been made highest priority, with Floreana Mockingbird, and is prominent in publicity material from CDF (e.g. on CDF website [www.darwinfoundation.org](http://www.darwinfoundation.org)).

Exit strategies have not yet been determined; however, conservation work will now undoubtedly be continued by partners after duration of Project. Exit strategy will be established after recommendations are made at PHVA or workshop in 2008 on any future release or translocation programmes and new sites identified. The aviaries at CDF will be used for this project but will find usage after the trial is completed, especially as similar projects (e.g. with mockingbirds) are planned. The presence of a dedicated project manager has been well received in Galápagos conservation and will become a model for other projects.

## 8. Dissemination

Dissemination of results to date has been limited to distribution of reports to partners and consultants and news of Mangrove Finch and Project to members.

## 9. Project Expenditure

**Table 3 Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)**

Item	Budget (please indicate which document you refer to if other than your project application)	Expenditure	Balance
Rent, rates, heating, overheads etc			
Office costs (eg postage, telephone, stationery)			
Travel and subsistence			
Printing			
Conferences, seminars, etc			
Capital items/equipment			
Others (maintenance of captive birds)			
Salaries (specify)			
H G YOUNG			
B FESSL (Project			

manager)	
BF Insurance	
H VARGAS (Consultant)	
R YOUNG (Consultant)	
FIELD ASSISTANT/STUDENT	
INVERTEBRATE/ <i>Philornis</i> TECHNICIANS	
CDRS Aviary technician	
LOCAL CONTRACT	
Other staff costs	
TOTAL	

Highlight any agreed changes to the budget and explain any variation in expenditure where this is +/- 10% of the budget.

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

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

In an expedition searching for the critically endangered finch in former inhabited areas, the Project team led by Birgit Fessl confirmed in February 2008 the presence of Mangrove Finch in the area of Carthago Bay, Isabela 11 years after their first discovery in this location. The researchers could identify at least 4 birds at different locations by their characteristic beak and plumage as well as by a peculiar song that is different to the song of the only other known breeding population in western Isabela. The presence of Mangrove Finches after such a period of time leads to the possibility that there is a small but stable population in the extended mangrove area of Carthago Bay and its vicinity. *In situ* conservation actions, e.g. rat and cat control, are scheduled for the following months. Travel costs were funded by the Swiss FOGO (Friends of Galápagos).

The Darwin Initiative funded aviaries were completed at the Charles Darwin Foundation, Puerto Ayora, Santa Cruz in late 2007. In early 2008 the nine aviary units were occupied by Woodpecker Finches which will be used in a trial to develop husbandry protocols for the captive management of Mangrove Finch. Harriet Good, a member of the Durrell Wildlife Conservation Trust Bird Staff has been seconded to the project for six months to undertake the initial phases of the trial. The aviaries will also hold two pairs of Galápagos Mockingbird in similar trials for possible captive breeding and rearing of Floreana Mockingbird. The aviaries will not be on show to tourists.

## Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2007/08

Project summary	Measurable Indicators	Progress and Achievements April 2007 - March 2008	Actions required/planned for next period
<p><b>Goal:</b> <i>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</i></p> <p><i>The conservation of biological diversity,</i></p> <p><i>The sustainable use of its components, and</i></p> <p><i>The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</i></p>			<p><i>(do not fill not applicable)</i></p>
<p><b>Purpose</b></p> <p>Long term conservation of the Mangrove Finch ensured through intensive field research efforts and building capacity in small population management in partner institutions, CDF and GNP</p>	<p>Stakeholders meeting between key partners held at start of Y1 to identify research priorities. Understanding of species ecology and demography by end Y2. If required, captive management facility set up at CDF HQ mid or end of Y2. PHVA at end Y2 to design species conservation action plan and establish requirements for captive population. CDF &amp; GNP successfully implemented species conservation action plan by beginning Y3. Evidence of stability or growth in Mangrove Finch population and historical sites recolonised by project end</p>	<p>Programme running smoothly with regular field visits to established camp at Playa Tortuga Negra. Nests and ringed birds monitored throughout the year.</p> <p>Captive facility completed and now in operation.</p>	

<p><b>Output 1.</b> Institute system for monitoring species' ecology, habitat, genetic status and determinants of population growth.</p>	<p>Protocols for repeatable monitoring established by end Y1. All partners agree key findings of field research at PHVA end Y2; Successful testing of invasive species control measures by end Y2; Genetic analysis completed by end Y2.</p>	<p>Site visits made throughout Year 2. GNP personnel in all field visits and surveys.</p>
<p>Activity 1.1 Population surveys.</p>		<p>Birds were regularly surveyed and different methodologies tested. GNP personnel were trained in survey techniques and undertook some surveys unaided. Paper on population size and census methodologies and genetic makeup of population are in draft.</p>
<p>Activity 1.2 Blood samples taken for population genetics study</p>		<p>Submission of samples to Petren Lab was delayed through protracted permit problems. However, samples have arrived and analysis has begun.</p>
<p>Activity 1.3 Assessment of sites for release of captive reared birds.</p>		<p>Several potential sites were visited and Ramsar site at Puerto Villamil (Poza de los Diablos), Isabela was assessed more thoroughly. Site will need some level of restoration and intensive predator controls.</p>
<p><b>Output 2.</b> Captive rearing programme</p>	<p>Aviaries will be built to rear finches for restocking and/or restoration and establishment of new populations.</p>	
<p>Activity 2.1. Aviaries built.</p>		<p>Aviary complex was constructed in late 2007 and received the first birds in March 2008. Durrell Wildlife Conservation Trust personnel seconded to Project to manage trial and train key personnel.</p>
<p>Activity 2.2. Captive birds aquired.</p>		<p>10 Woodpecker Finches were transferred from a research project in March 2008 and will make up captive population for husbandry trials.</p>

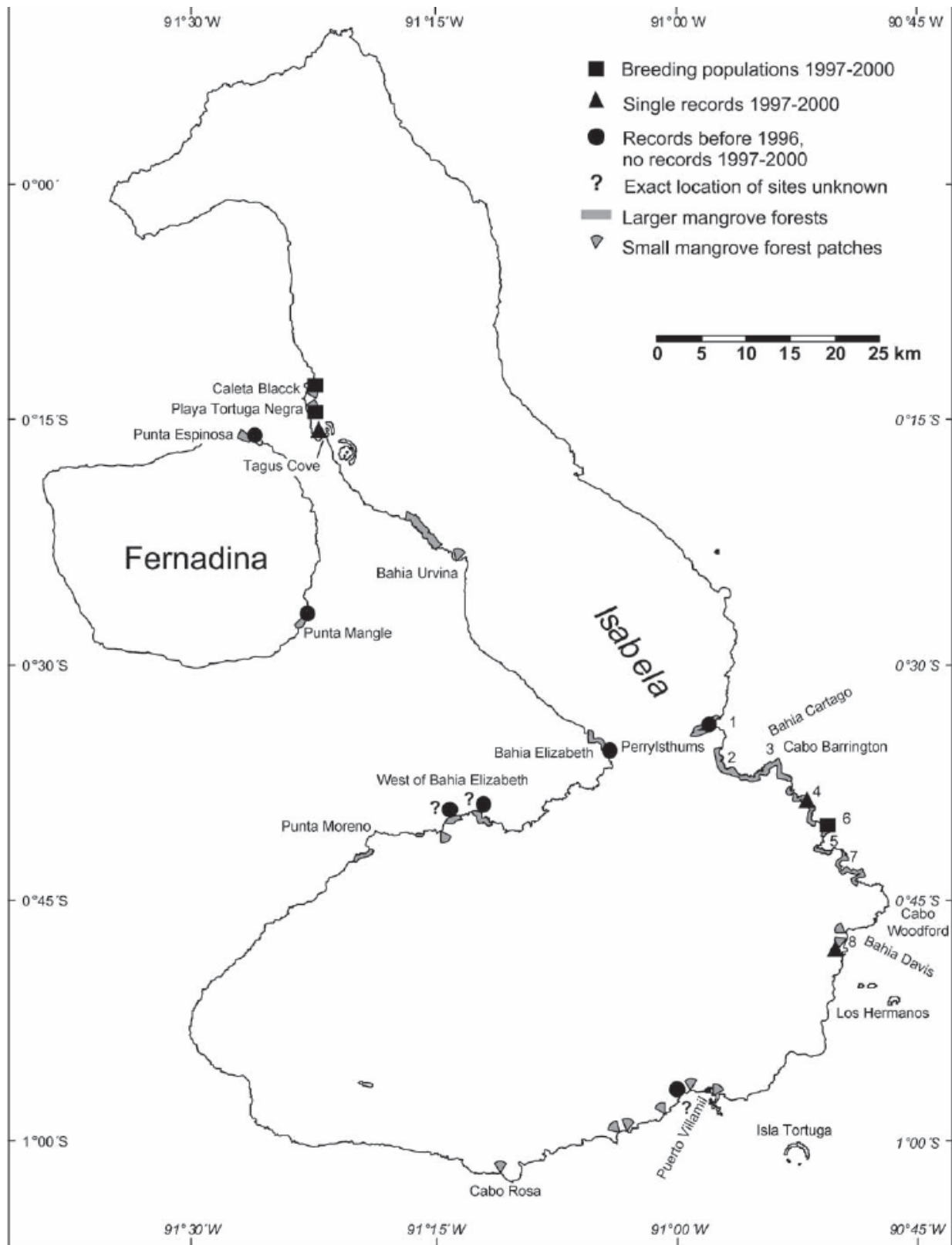
<b>Output 3.</b> Conservation action	Invasive species controls tested	
Activity 3.1 Invasive species control		Efficacy of controls monitored through use of poisoning and trapping. Poisoning appears successful in reducing rat numbers and increasing fledging success of Mangrove Finch.
Activity 3.2 <i>Philornis</i> controls tested		Projects aimed at developing attractants for adult <i>Philornis</i> and the artificial rearing of the fly are underway.
<b>Output 4.</b> Capacity building	Y1-3: assess training needs, on the job training.	GNP personnel have been trained throughout. All invasive mammal monitoring and control is managed by GNP but is still undertaken as part of field visits. Personnel are undergoing training in census techniques and nest monitoring.  GNP personnel being identified for training in captive husbandry.
<b>Output 5.</b> Public awareness	Y1-3: radio interviews, press releases, newspaper articles, website established. Community based activities on Isabela.	Public awareness has been fairly limited to date but will be initiated thoroughly in Y3. Mangrove Finch does not live near any people.

## Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p><b>Goal:</b></p> <p><b>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve</b></p> <ul style="list-style-type: none"> <li>• <b>the conservation of biological diversity,</b></li> <li>• <b>the sustainable use of its components, and</b></li> <li>• <b>the fair and equitable sharing of benefits arising out of the utilisation of genetic resources</b></li> </ul>			
<p><b>Purpose</b></p> <p>Long term conservation of the Mangrove Finch ensured through intensive field research efforts and building capacity in small population management in partner institutions, CDF and GNP</p>	<p>Stakeholders meeting between key partners held at start of Y1 to identify research priorities. Understanding of species ecology and demography by end Y2. If required, captive management facility set up at CDF HQ mid or end of Y2. PHVA at end Y2 to design species conservation action plan and establish requirements for captive population. CDF &amp; GNP successfully implemented species conservation action plan by beginning Y3. Evidence of stability or growth in Mangrove Finch population and historical sites recolonised by project end</p>	<p>Species conservation action plan; Project reports from partner institutions; Published scientific papers</p> <p>Monitoring programme results</p> <p>Mangrove Finch conservation activities included in long term workplan of CDF and GNP end Y3.</p>	<p>Full cooperation from GNP and CDF will be required</p>
<p><b>Outputs</b></p> <p>1. Institute system for monitoring species' ecology, habitat, genetic status and determinants of population growth.</p>	<p>Protocols for repeatable monitoring established by end Y1. All partners agree key findings of field research at PHVA end Y2; Successful testing of invasive species control measures by end Y2; Genetic analysis completed by end Y2.</p>	<p>Project reports; Published papers; Microsatellite library results published.</p>	<p>Trained staff remain working on project</p> <p>Effective collaboration between project partners</p>
<p>2. Technical skills in GNP &amp; CDF are strengthened to enable long term conservation of Mangrove Finch.</p> <p>Minimum of 2 personnel trained in captive management skills that can be transferred to other species.</p>	<p>4 GNP &amp; CDF staff and 2 university students fully trained by Project Leader in field research, invasive species control and captive management techniques, creation of database management by end Y2; Training workshops, on the job training Y1-2; PHVA run by GNP/CDF to design species conservation action plan end Y2; Meeting to agree on future fund-raising strategy mid Y3; Action plan initiated and led by GNP/CDF in Y3</p>	<p>Project reports; On the job evaluation and at workshops</p>	

3. Species conservation action plan implemented	Monitoring programme running successfully by end Y3; Invasive species control measures tested (Y1-2) and implemented in Y3; Captive rearing and management facility run by GNP at end Y3; Successful trial release of captive reared birds in Y3	Project evaluation at end Y3; Copies of action plan and project reports sent to Darwin Initiative
4. Population limits established and declines halted.	Monitoring programme will provide data to show trends in population size by end Y3	Published papers; End project report
5. Awareness of Mangrove Finch raised in local and international community	Radio interviews held; Press releases; International newspaper articles; Reports and scientific papers published; Website created. Community based projects in Isabella and links with existing tortoise programmes and children's clubs here	Transcripts, papers, reports sent to Darwin Initiative
6. Post-project workplan is in place to continue conservation action plan	CDF & GNP to produce workplan for the continuation of species conservation action plan at end Y3	CDF & GNP annual workplan; End of project evaluation report; DW visit end Y4
<b>Activities</b>	<b>Activity milestones (summary of project implementation timetable)</b>	
1. Field research programme	Y1: research protocols agreed at workshop. Implementation of monitoring. Y1-2: population surveys, bird ringing and blood sampling, nest success study, habitat surveys and monitoring, impact of invasive species study; genetic analysis. Assessment of sites for release of captive reared birds. Y3: continuation of monitoring in all sites including released birds.	
2. Captive rearing programme	Y2: facility built, birds caught, protocols established. Y2-3: captive rearing. Y3: release of captive reared birds to historical sites.	
3. Conservation action	Y2: invasive species controls tested, action plan agreed at workshop. Y3: invasive species control activities implemented.	
4. Capacity building	Y1-3: assess training needs, on the job training. PHVA and conservation action plan workshop. Y3: conservation action plan initiated and led by CDF & GNP.	
5. Public awareness	Y1-3: radio interviews, press releases, newspaper articles, website established. Y2-3 papers written and submitted to peer-reviewed journals. Community based activities on Isabela.	





**Figure 3.** Historical locations of Mangrove Finch on Isabela and Fernandina, Galápagos (from Dvorak *et al.* 2004)



**Darwin Aviaries at CDF, Puerto Ayora, Galápagos and Woodpecker Finches**



**Fieldwork, Playa Tortuga Negra, Isabela, Galápagos**



**Ten day old Mangrove Finch, Playa Tortuga Negra, March 2008**