



## **Building capacity and determining disease threats to endemic Galapagos fauna**

**Darwin project: 162-12-017**

**Annual report 2003/2004**

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# ***Darwin Initiative for the Survival of Species***

## ***Annual Report***

### **1. Darwin Project Information**

Project Ref. Number	162-12-017
Project Title	<i>Building capacity and determining disease threats to endemic Galapagos fauna</i>
Country(ies)	<i>United Kingdom, Ecuador</i>
UK Contractor	<i>Institute of Zoology, Zoological Society of London</i>
Partner Organisation(s)	<i>Galapagos National Park; Program of Biotechnology, University of Guayaquil, Ecuador</i>
Darwin Grant Value	<i>£195,381 (£75,469 for 2003/4)</i>
Start/End dates	<i>Start 1<sup>st</sup> October 2004, End 30<sup>th</sup> September 2006</i>
Reporting period (1 Apr 2003 to 31 Mar 2004) and report number (1,2,3..)	<i>Report to 31<sup>st</sup> March 2004 Annual Report Number 1</i>
Project website	<i>To be developed</i>
Author(s), date	<i>Dr. Simon Goodman, Dr. Andrew Cunningham and Dr. Virna Cedeño, 30<sup>th</sup> April 2004</i>

### **2. Project Background**

This project is based in the Galapagos archipelago, Ecuador and is a partnership between the Institute of Zoology (Zoological Society of London), The Galapagos National Park Service and the Program of Biotechnology, University of Guayaquil, Guayaquil, Ecuador. The project was established in response to the urgent need for an assessment of disease threats to the Galapagos fauna and for capacity within the Galapagos to determine and address these threats to the archipelago's unique biodiversity.

### **3. Project Purpose and Outputs**

#### *Purpose*

To establish the ability of researchers and managers in the Galapagos National Park to determine the nature and prevalence of disease threats to endemic fauna stemming from the introduction of novel pathogens and vectors, and to build a capacity for the continued monitoring of introduced diseases in these populations.

#### *Outputs*

- Identity and prevalence of key pathogens and vectors that threaten endemic species determined.
- A management plan for endemic species in relation to disease threats.
- Establishment of a wildlife disease laboratory and a continuing monitoring programme with trained personnel.
- Educational events and materials (locals & tourists).
- Media representation

*Progress and Achievements against logical framework – see Annex 1.*

Neither the outputs nor operational plan have been modified over the last year.

#### **4. Progress**

The project started on 1st October 2003 following a deferral of 6 months at the request of the Darwin Initiative. Prior to the official start date Simon Goodman and Andrew Cunningham made a preliminary trip to Galapagos in July 2003 to meet all project participants and collaborators to discuss the set up and initiation of the main project work. These meetings were very successful in cementing political support for the laboratory and project on the islands. This was followed by a further visit to Galapagos by Simon Goodman in October-November 2003. In the first 6 months to March 2004 project activities have focused on establishing the laboratory, identifying project staff members, devising training programs, purchasing and shipping equipment, and making links with stakeholders for wildlife disease issues in Galapagos.

#### ***Milestones for 2003-2004***

##### *Institutional Capacity Building and Training*

All the milestones for Institutional capacity building and training have been met for the first six months. Project initiation activities such as meeting and gaining support of non-partner stakeholders, drawing up of memorandums of understanding between the partners have all been completed. The laboratory is on schedule to be operational by May-June 2004, with refurbishment almost completed and all the equipment purchased. The project staff, a veterinary pathologist (Marylin Cruz) and a field assistant (Leandro Patiño) have been selected and their initial training commenced. However the start of their full time employment on the project was delayed until April 2004 due to several changes of the Galapagos Park Director during June 2003 to November 2003, which meant final approval of staff contracts was delayed (see below).

##### *Research and disease monitoring programme*

Collection of material for disease surveillance and testing is now ongoing in collaboration with researchers from the Dept. of Biology, University of St. Louis-Missouri and St. Louis Zoo, USA, amongst others. This collaboration significantly enhances the biological, geographical and temporal diversity of our sampling capacity.

##### *Education and conservation awareness*

Preparation of educational and awareness material, plus tourist presentations was due to start in January 2004. However the implementation of these activities has been delayed until May 2004 due to the problems with staff contracts. This delay will not significantly affect this component of the project as some preparation of materials and presentations has been carried out in the meantime by the authors. The main activities under this theme (e.g. local community workshops) are scheduled for later in the project.

##### *Dissemination of results and reporting*

The project has already been featured in local and international media including Galapagos TV, The Scientist magazine and Der Spiegel magazine. A list of all known media outputs is presented in Annex 3. The first newsletter scheduled for

March 2004 will now be released in June 2004 to coincide with the laboratory becoming operational. The October report to the Darwin Initiative was submitted on time. In February 2004 Simon Goodman was invited to speak about the project by the Galapagos Conservation Trust at the International Symposium on Galapagos to be held at Jersey Zoo in late June 2004.

#### *Additional Outputs and Activities*

An international workshop on the threat posed to Galapagos fauna by West Nile Virus has been organised for the 29<sup>th</sup> of April 2004. The workshop will assess the likelihood that West Nile Virus will reach Galapagos and what preventative, surveillance and mitigation measures are required. The workshop will involve all local stakeholders including the Galapagos National Park service, SESA, SICGAL and the Charles Darwin Research Station, plus international experts in West Nile Virus.

#### *Project Achievements in 2003/2004*

This report covers just the first 6 months of the project so most of the project achievements in this period cover the establishment of the project and laboratory as described in the 'Milestones' section above.

Additional achievements comprise the initial training of the project staff. After the project staff were selected in November 2003, although their contracts could not be finalised until April 2004, an initial training programme was begun. This included taught and practical courses in molecular biology and genetics run by Dr. Cedeño, and training in necropsy techniques by collaborating staff from the University of Missouri-St. Louis based at the Charles Darwin Research Station. The impact of this training is that the project staff will now be able to take up project activities once contracts begin in April 2004.

Through a network of collaborators more than 200 samples have been collected from Galapagos bird and reptile species for molecular and histological analysis once the laboratory is operational in June 2004.

#### *Problems encountered*

Some administrative difficulties have been experienced with the Galapagos National Park Service stemming from changes in the Galapagos National Park Service director. The Park director is a political appointment, with the director being appointed by the Ecuadorian Minister for the Environment. The Minister for the Environment has changed twice in the period July 2003 to March 2004, and with him the Park director. It is important to note that this has not changed Park support for the project (see section 6), but did delay the signing of the project MOU and finalisation of staff contracts to March 2004. These difficulties have now been resolved and the indications are that the current Director will remain in position for the foreseeable future.

At first importation of the laboratory equipment in to Ecuador appeared to be a lengthy and costly process but assistance from the British Embassy in Quito appears to have resolved these difficulties.

#### *Project enhancement*

The design and capabilities of the project has been significantly enhanced over the last year by large increases in investment in the project by both the University of Guayaquil and the Galapagos National Park Service. The additional investment amounts to a minimum of \$110,000 in the period October 2003 to September 2004. The University has made available to the project a large building in Puerto Ayora,

Santa Cruz Island, Galapagos that will provide 100m<sup>2</sup> of laboratory space (see Annex 4), 100m<sup>2</sup> of class room space and 100m<sup>2</sup> of office/library space. In conjunction the University has provided \$80,000 dollars to cover refurbishment costs and installation of laboratory infrastructure. The National Park Service is providing an additional \$30,000 to cover security (a perimeter wall and guard for the building) and other infrastructure including communications connections.

A further exciting enhancement that has been levered by the awarding of the DI grant for this project is a new Masters programme in molecular biology and conservation by the University of Guayaquil. This programme, which started in October 2003 is directly linked in with the Darwin Initiative project. The course is co-ordinated by our scientific partner Dr. Cedeño and colleagues at the University of Guayaquil Programme of Biotechnology. In the first year 20 students in Galapagos and 35 students in mainland Ecuador will take the course, with most of these students benefiting from training in the Darwin laboratory. From the 2004/2005 academic year the course will be open to students from across South America, which will mean the profile and impacts of our project will extend across the whole continent. Over the duration of the Darwin project it is anticipated that around 90 South American Masters students will receiving training under the umbrella of the project.

We have also secured additional grants for \$2000 from the British Embassy in Quito, and \$4000 from the Galapagos Conservation Trust as support towards the purchase of a -80oC freezer for the project. The provision of this freezer is a major enhancement to the project as this will allow us to provide an *in situ* frozen archive of biological specimens in Galapagos. Together with the Galapagos National Parks service and the Charles Darwin Research Station, new provisions are being implemented to the sample collection permit system in Galapagos so all researchers will be requested to leave a duplicate set of samples on the island. This archive will not only provide a central scientific resource for Galapagos but will raise the profile of the project with visiting international scientists to the archipelago.

Finally a significant amount of equipment has been donated by a private biotechnology company, the Exelixis corporation in San Francisco USA, including six high quality dissecting microscopes with light-sources, a microtome and a histoembedding machine for preparing tissue specimens for histological analysis (Total value >\$23,000). A volunteer from the company, Dr. Helen Francis-Lang assisted with the purchase of a large amount of equipment in the United States at discounted prices, enabling us to obtain a significantly enhanced equipment inventory with apparatus to value of \$300,000 (new list price) from our original budget of £50,000. This extra equipment now means we have a laboratory equipped to international standards for molecular biology and pathology, greatly improving our scientific capacity.

## *Workplan for the next reporting period*

### ***Institutional Capacity Building and Training***

- April/May 2004 Staff employed and training programmes started
- April 29<sup>th</sup> 2004 International workshop on West Nile Virus Threat to Galapagos, held in Galapagos National Park
- May-June 2004 Laboratory operational
- August 2004 Staff training workshop, including marine mammal pathology, held by Simon Goodman, Andrew Cunningham and Paul Jepson (ZSL)
- February 2005 Staff training workshop held by Simon Goodman and Andrew Cunningham

### ***Research and disease monitoring programme***

- April 2004 to March 2005 – Avian sampling and testing programme continues
- July 2004 to December 2004 – Development and implementation of novel PCR assays for avian pathogens
- May 2004 to August 2004 – Collection of blood samples from domestic dogs and cats to assess risk of pathogen transfer into Galapagos pinniped populations
- September 2004 to December 2005 – Collection of blood samples from Galapagos sea lion colonies
- January 2005 to May 2005 testing of carnivore blood samples
- May 2004 to March 2005 mosquito sampling begins, collaborations initialised for host preference and West Nile Virus vector competence assays (with New York State Department of Health).
- April 2004 to March 2005 – opportunistic pathology analysis of other taxa

### ***Education and conservation awareness***

- June 2004 - Educational materials (leaflets, posters and presentations) for tourists and local community completed.
- June 2004 – Regular presentations to tourists about Galapagos wildlife epidemiology project begins
- August 2004 – Local community workshop on disease threats to Galapagos fauna.
- July 2004 - University of Guayaquil Masters students begin research projects in laboratory.

### ***Dissemination of results and reporting***

- June 2004 - Simon Goodman presents invited talk on Galapagos wildlife epidemiology project at the international symposium on Galapagos at Jersey Zoo organised by the Galapagos Conservation Trust UK.
- June 2004 – Project website operational
- June 2004 – Tendering for broadcast media feature on project
- June 2004 – 1<sup>st</sup> project Newsletter released corresponding with laboratory becoming operational
- July 2004- Scientific paper submitted on outcomes from West Nile Virus Threats workshop
- October 2004 – 2<sup>nd</sup> Newsletter released
- October 2004 – Half year report submitted

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

*Not applicable*

## **6. Partnerships**

### *Collaboration between ZSL and the host country partners*

The collaboration between ZSL and the host country partners has been excellent. Although several changes in the Galapagos National Park Service Director have occurred due to political instability in the central government of Ecuador, the level of support and co-operation we have experienced has been exemplary. The three Park directors we have worked with so far have all expressed their immense interest and support for the Darwin project, and see it as a vital component for developing and maintain the capacity of the National Park Service to manage the biodiversity resources of Galapagos. This is evidenced by the contributions of Park staff time, accommodation and logistical support we have received. We cannot understate the level of enthusiasm and helpfulness we have experienced. The Memorandum of Understanding between ZSL and the National Park Service was signed by the most recent Director, Dr. Edwin Nuala. Similar levels of enthusiasm and support have been received from the University of Guayaquil.

The commitment of both organisations to the project has been clearly demonstrated by the massive additional investment they have put into the project as reported in section 4 (Project Enhancements). Dr. Virna Cedeño should be highly commended for her central role in facilitating the leverage and implementation of these additional developments.

### *Collaboration with other organisations*

The project has been able to establish links with a large number of Ecuadorian and international organisations that have interests in disease threats to Galapagos biodiversity. These include Secretary of Science and Technology (SENACYT) Ecuador, Foundation of Science and Technology (FUNDACYT) Ecuador, Servicio Ecuatoriano De Sanidad Agropecuaria (SESA), the Fundación Charles Darwin (via the Charles Darwin Research Station (CDRS), the Department of Biology University of St. Louis-Missouri, St. Louis Zoo, World Wildlife Fund (WWF) Ecuador, WildAid Ecuador, Consortium for Conservation Medicine USA, the New York State Department of Health, and the Galapagos Conservation Trust (GCT) UK.

The key collaborations in Galapagos are with SESA, CDRS and the St. Louis Institutions. The Darwin Initiative laboratory will help SESA and CDRS staff with their activities in managing disease threats to Galapagos fauna, while ZSL and St. Louis will pursue complementary academic research activities on disease and conservation including joint sampling/screening activities. WWF Ecuador will have an office in the Darwin Initiative laboratory and discussions are underway to set up joint conservation projects using the laboratory including molecular identification of illegally taken shark fins from the Galapagos Marine Reserve. Collaborations with the other international organisations focus of specific disease risks such as Canine Distemper Virus transfer into marine mammal populations (WildAid), and West Nile Virus (Consortium for Conservation Medicine and New York State Department of Health).

## **7. Impact and Sustainability**

During the course of the first 6 months setting the project up we have met with all the major stakeholders with interests in disease threats to Galapagos biodiversity as described above. In addition through Dr. Cedeño we have obtained political support for the project in the local Galapagos and central Ecuadorian governments. The Mayor of Santa Cruz island has been involved in the donation to the project of the laboratory and the land on which it stands, while we have met with the head of the

Ecuadorian science agencies SENACYT and FUNDACYT, Dr. Louis Romo. These organisations are equivalent to the UK government science ministry and Royal Society/UK Research Councils respectively. Dr. Romo has expressed his support for the project and we are exploring the possibility of developing a scholarship scheme to provide support for students to work in the Darwin laboratory. Finally during our July visit to Ecuador we met with the Vice-President of Ecuador, Dr. Alfredo Palacios Gonzalez, who has agreed to open to laboratory upon its completion. These links demonstrate a large professional and political desire to develop scientific capacity and biodiversity conservation in Ecuador. Public awareness and interest will be developed through the course of our project which is still in its early stages. Dissemination of project activities to the general public in Ecuador has begun through features in local broadcast and print media as already described.

An exit strategy that will ensure continuation of the project once Darwin funding ceases is already in place as the University of Guayaquil and Galapagos National Park Service have already committed to continued funding. The strength of this commitment is demonstrated by the additional investment provided this year. We are also pursuing new grant applications with UK and international funding bodies to ensure laboratory activities continue to grow and can be sustained at the highest possible capacity.

#### **8. Post-Project Follow up Activities** (max 300 words)

*Not applicable, this project is in it's first year of three.*

#### **9. Outputs, Outcomes and Dissemination**

##### *Outputs*

Apart from one newsletter we proposed to release on the annual report date and some further dissemination activities via the media, no outputs were scheduled for delivery in the first 6 months of the project. It has now been decided to release the first newsletter in June 2004 when the laboratory is fully operational to have a bigger impact, and to increase opportunities for media coverage. However, the project has had media coverage in the host country, internationally and in the UK as described in Annex 3. Progress towards the remaining outputs has been described above.

##### *Dissemination in host country*

The project has been featured in one local television news programme in Galapagos, comprising a 15 minute interview with our scientific partner Dr. Cedeño screened on Galapagos TV on 16<sup>th</sup> November 2003. This was complemented by an article in the Ecuadorian national El Universo newspaper 20<sup>th</sup> July 2003. In both cases the pieces dealt with the importance of disease surveillance for biodiversity conservation presented for general audiences and discussed the role of the Darwin Initiative in funding the project. Galapagos TV has an audience of approximately 20,000 people. On November 8<sup>th</sup> 2003, Dr. Virna Cedeño gave a conference for town officials, at the town library, Puerto Ayora, Santa Cruz, Galapagos, on the occasion of the signing of the agreement between Santa Cruz council and the University of Guayaquil to ratify the use of the building and the Molecular Biology Masters Programme. Dr. Leon Roldos, Rector of Guayaquil University attended. Dr. Cedeño gave a presentation outlining the importance of molecular biology for Ecuador, the role of the Darwin project, and Darwin Initiative funding.

The staff trained by the project will continue to educate Ecuadorian professionals and Galapagos residents in wildlife disease issues after the end of the project using funding already guaranteed by the Galapagos National Park Service and the University of Guayaquil (see original grant application).



**Table 1. Project Outputs (According to Standard Output Measures)**

Code No.	Quantity	Description
14A	1	Afternoon conference for Puerto Ayora town officials explaining the purpose of the project
15A	1	Article in El Universo newspaper, Ecuador
15C	6	Articles in publications of the Galapagos Conservation Trust, Zoological Society of London , Institute of Zoology, ScienceDEVNET, The Scientist, Der Spiegel (see Annex 3)
18C	1	Galapagos TV feature on project

**Table 2: Publications**

No publications scheduled in the first 6 months of the project

Type *	Detail	Publishers	Available from	Cost £
(e.g. journals, manual, CDs)	(title, author, year)	(name, city)	(e.g. contact address, website)	

## 10. 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 schedule)	Expenditure	Balance

### *Additional Income and support*

Grant of \$2000 from the British Embassy in Quito.

Grant of \$4000 from the Galapagos Conservation Trust, UK.

Donation of equipment of estimated value \$23,000 from the Exelixis Corporation, San Francisco, USA.

Additional investment of ~\$110,000 by the University of Guayaquil and Galapagos National Park Service in providing and refurbishing a new laboratory building.

## **11. Monitoring, Evaluation and Lessons**

The means of verification for indicators of project outputs are all tied to documentary evidence. Outputs related to research or management issues (e.g. papers or management plans) will receive peer review which indicate their quality against comparable international work. Further the success of outputs such as workshops can be assessed by the endorsement of workshop reports by participating international expert attendees. The success of policy level outputs are being assessed by getting commitments from senior managers and government officials to use material generated by project. These commitments will be documented in Memorandums of Understanding and workshop reports. The success of educational and awareness programmes can be assessed by the students who have participated in the project passing their courses and the willingness of the local community to implement policies discussed during workshops, as assessed by post-workshop follow-up discussions. These evaluation and monitoring schemes will be implemented as the project moves on to its main phase over the next year.

Some political instability can be expected in Ecuador that may affect administrative approval of some project activities. However, support for the project remains strong and no substantial problems are expected that would compromise implementation of the main activities. Further for activities involving development of infrastructure such as building work or equipment importation, lead-in times can be experienced beyond those normally expected in the UK. Therefore allowances for these potential sources of delays need to be built into future project planning.

**12. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum)**

■ **I agree for ECTF and the Darwin Secretariat to publish the content of this section**

In this section you have the chance to let us know about outstanding achievements of your project over the year that you consider worth highlighting to ECTF and the Darwin Secretariat. This could relate to achievements already mentioned in this report, on which you would like to expand further, or achievements that were in addition to the ones planned and deserve particular attention e.g. in terms of best practice. The idea is to use this section for various promotion and dissemination purposes, including e.g. publication in the Defra Annual Report, Darwin promotion material, or on the Darwin website. As we will not be able to ask projects on an individual basis for their consent to publish the content of this section, please note the above agreement clause.

## Annex 1: Report of progress and achievements against Logical Framework for Financial Year: 2003/2004

Project summary	Measurable Indicators	Progress and Achievements April 2003-Mar 2004	Actions required/planned for next period
<p><b>Goal:</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</p> <ul style="list-style-type: none"> <li>• The conservation of biological diversity,</li> <li>• The sustainable use of its components, and</li> <li>• The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</li> </ul>			
<p><b>Purpose</b></p> <p>To establish the ability of researchers and managers in the Galapagos national park to determine the nature and prevalence of disease threats to endemic fauna (with a focus on birds) stemming from the introduction of novel pathogens and vectors, and to build a capacity for the continued monitoring of introduced diseases in these populations.</p>	<p>New knowledge on the nature and prevalence of diseases and their vectors for endemic and potential reservoir species.</p> <p>A conservation management plan for endemic species in relation to disease threats endorsed by the National Park authorities and Ecuadorian government.</p> <p>Increased understanding of disease threats to endemic wildlife among professional and local people.</p>	<p>Note this project has been running for only 6 months as it started in October 2003. In this time we have levered additional funding to enhance the laboratory capacity in Galapagos that will increase capacity to generate new knowledge; established strong links with stakeholders that will increase uptake of the and implementation of project findings; and have precipitated development of a new Masters course at the University of Guayaquil that will increase the number of people receiving training under the project.</p>	<p>Project will continue to proceed as detailed in the original log-frame and implementation timetable</p>
<p><b>Outputs</b></p>			
<p>Identity and prevalence of key pathogens and vectors that threaten endemic species determined.</p>	<p>Findings endorsed by international conservation and scientific communities.</p>	<p>Links with collaborating organisations developed to broaden taxonomic and geographic coverage of surveys. Workshop on West Nile Virus threat to Galapagos organised for April 29<sup>th</sup> 2004.</p>	<p>For 2004-2005 activities will focus on collecting the data required to identify prevalence of key pathogens and vectors through a programme of field surveys and laboratory analysis.</p>

A management plan for endemic species in relation to disease threats.	Management plan peer reviewed and presented at international meeting on wildlife disease.	MOU with stakeholders developed to produce, ratify and implement management plan. Workshop organised for April 2004 to develop West Nile Virus management plan for Galapagos.	For 2004-2005 activities will focus on collecting the data required to inform the management plan, and building further relationships with policy makers.
An wildlife disease lab and continuing monitoring programme with trained personnel established.	Laboratory operational and at least 2 staff trained in wildlife pathology continuing to monitor disease.	Laboratory building refurbished Equipment purchased and shipped to Ecuador Staff identified and training programme devised	Lead time for building work and getting customs clearance can be substantial, but all necessary links are now in place to expedite future activities in this area. In the next period the lab will be fully functional by May-June 2004, and staff installed.
Educational events and materials (locals & tourists).	Participation of locals & tourists in events, material distributed.	Links with key agencies established to permit dissemination of material	Local contacts will be essential to the success of this output. Educational material will be completed and dissemination will begin using the contacts established in the first 6 months of the project.
Media representation	Project featured in local and international media	Project has been featured in local and international media, see Annex 3	Media contacts now identified to permit further dissemination of project achievements.

*Note: Please do NOT expand rows to include activities since their completion and outcomes should be reported under the column on progress and achievements at output and purpose levels.*

## Annex 2: Original Logical Framework

<i>Project summary</i>	<i>Measurable indicators</i>	<i>Means of verification</i>	<i>Important assumptions</i>
<p><i>Goal:</i></p> <p>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</p> <ul style="list-style-type: none"> <li>the conservation of biological diversity,</li> <li>the sustainable use of its components, and</li> <li>the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</li> </ul>			
<p><i>Purpose</i></p> <p>To establish the ability of researchers and managers in the Galapagos national park to determine the nature and prevalence of disease threats to endemic fauna (with a focus on birds) stemming from the introduction of novel pathogens and vectors, and to build a capacity for the continued monitoring of introduced diseases in these populations.</p>	<p>New knowledge on the nature and prevalence of diseases and their vectors for endemic and potential reservoir species.</p> <p>A conservation management plan for endemic species in relation to disease threats endorsed by the National Park authorities and Ecuadorian government.</p> <p>Increased understanding of disease threats to endemic wildlife among professional and local people.</p>	<p>Project reports, and workshop reports involving partner organisations, publications in peer reviewed journals.</p> <p>Management plan document and correspondence.</p> <p>Records of training workshops with professional workers, and educational programme with local people and tourists, including educational materials generated for both. Students trained under programme pass their courses.</p>	<p>Researchers and managers use project findings to help minimise disease impacts on endemic species.</p> <p>Disease monitoring programme receives continued funding to maintain its activities. Note continuing funding from Galapagos National Park Service and University of Guayaquil is already agreed.</p>
<p><i>Outputs</i></p> <p>Identity and prevalence of key pathogens and vectors that threaten endemic species determined.</p> <p>A management plan for endemic species in relation to disease threats.</p> <p>An wildlife disease lab and continuing monitoring programme with trained personnel established.</p> <p>Educational events and materials (locals &amp; tourists).</p> <p>Media representation</p>	<p>Findings endorsed by international conservation and scientific communities.</p> <p>Management plan peer reviewed and presented at international meeting on wildlife disease.</p> <p>Laboratory operational and at least 2 staff trained in wildlife pathology continuing to monitor disease.</p> <p>Participation of locals &amp; tourists in events, material distributed.</p> <p>Project featured in local media</p>	<p>Publication of results in peer reviewed international scientific journals.</p> <p>Management plan published and distributed. Copies sent to Darwin Initiative. Proceedings from meeting.</p> <p>Annual and field reports, peer reviewed papers, continued output of data supporting management programmes.</p> <p>Educational leaflets and posters, press releases, reports</p> <p>Articles &amp; recordings</p>	<p>Laboratory and monitoring programme active after year 1.</p> <p>Monitoring programme generates data required for management plan.</p> <p>Links to educational organisations and media are established (agreements are in place to do this via the Galapagos National Park Service).</p>
<p><i>Activities</i></p> <p>Capacity building and training.</p> <p>Research &amp; Disease Monitoring</p> <p>Education programme</p> <p>Dissemination of results</p>	<p><b>Activity Milestones (Summary of Project Implementation Timetable)</b></p> <p>Yr1: Establish pathology laboratory and run training workshop, finalise project diagnostic protocols and sampling strategy; Yr2 and Yr3 Follow up training workshops, 2 in each year</p> <p>Yr1: Develop diagnostic procedures including genetic based testing, start screening of samples collected during monitoring program. Yr2 and Yr3: Continuation of screening, Workshops to discuss results. Scientific publications and management plan written in year 3.</p> <p>Yr1: Work with local organisations and schools to develop educational programme and materials to inform about conservation biology and disease threats, programmes for local people and tourists. Yr2: and Yr 3. Continue to run programmes</p> <p>In each year: Annual reports and news letters, establish and up date project website. Engage local and international media interest. Yr2 and Yr3: Presentation of results at international conferences, workshops, papers submitted to international peer reviewed journals by 1 year after end of project.</p>		

## Annex 3: Media representation and dissemination 2003-2004

### Press

1. La biología molecular llegó a Galápagos, *El Universo*: Newspaper article, National Newspaper, Ecuador, 20th July 2003:  
<http://www.eluniverso.com/core/eluniverso.asp?page=noticia&id=687&tab=1&contid=FE058DD3D3ED4C848C10A304BBD0F171>
2. Molecular science comes to the Galapagos: *SciDevNet*, Web-article, 8th August 2003:  
<http://www.scidev.net/news/index.cfm?fuseaction=readnews&itemid=954&language=1>
3. Galapagos lab, Joint effort will create molecular biology facility on evolution's islands: *The Scientist Magazine*, Webarticle, 12th August 2003: <http://www.biomedcentral.com/news/20030812/02>
4. Biolabor in der Wildnis, *Der Spiegel*, print edition, p. 126, 18th August 2003, (*In German*).

### Reports and Newsletters

1. Institute of Zoology, Zoological Society of London Newsletter, April 2003.
2. Galapagos Conservation Trust Newsletter, June 2003, [http://www.gct.org/jun03\\_3.html](http://www.gct.org/jun03_3.html)
3. Centre for Ecology and Evolution, London, UK newsletter, May 2003
4. Zoological Society of London, Annual report 2003

### Internet

1. ZSL website, 25th March 2003, Press release for project announcement:  
[http://www.zsl.org/press/pr\\_0000001207.html](http://www.zsl.org/press/pr_0000001207.html)
2. IoZ website August 12th 2003: <http://www.zoo.cam.ac.uk/ioz/news.htm#Wildlife%20epidemiology%20lab>

### Broadcast Media

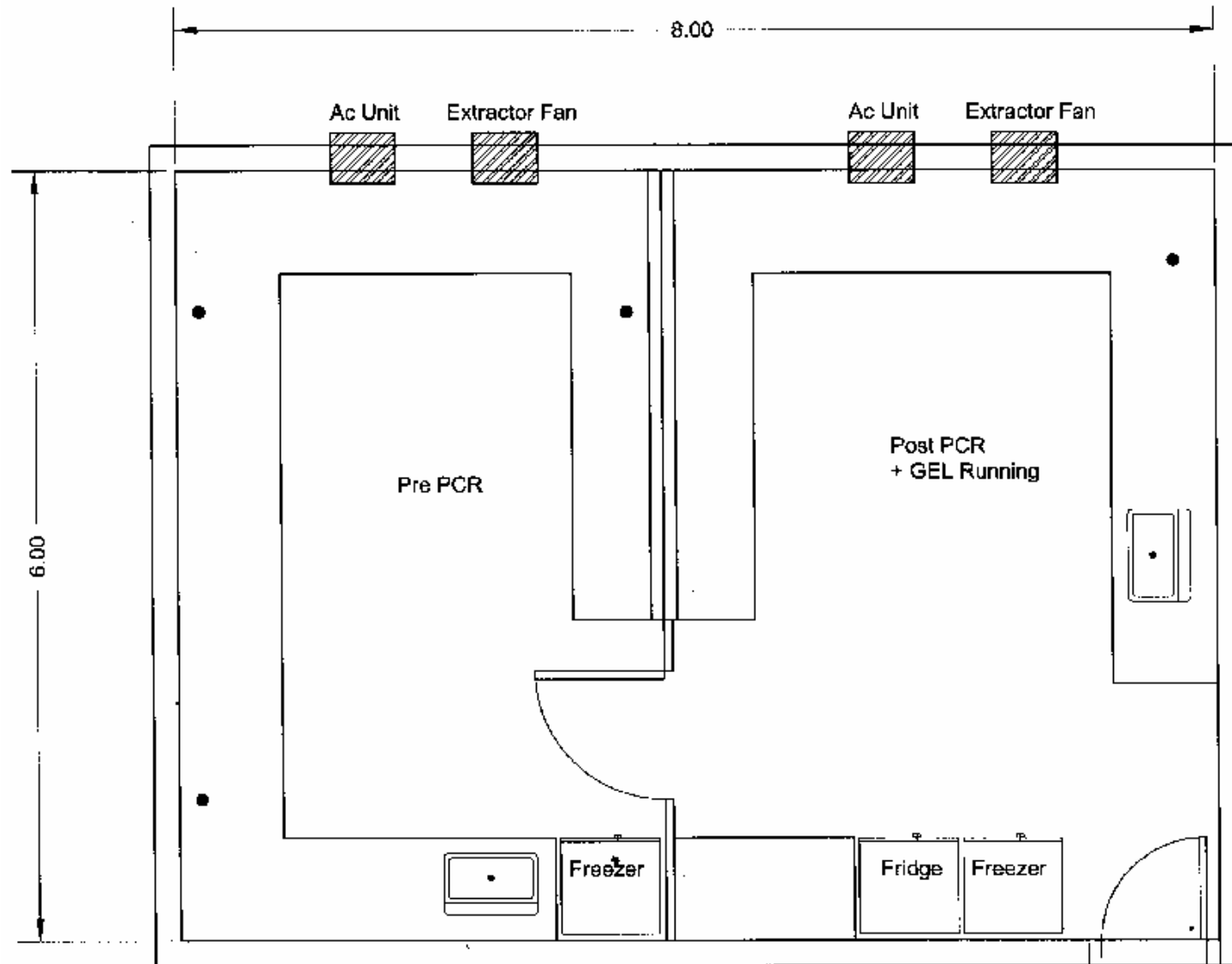
1. TV interview with Virna Cedeño, 'Tierra de Volcanes', Galapagos News, Sunday 16<sup>th</sup> November 2003.

### Conferences/Presentations

1. August 13th 2003 – Dr. Simon Goodman, Institute of Zoology: 'Overview of project Darwin Initiative disease threats project in Galapagos'.
2. November 8th 2003 – Dr. Virna Cedeño, Town Library Puerto Ayora, Santa Cruz, Galapagos. On the occasion of the signing of the agreement between Santa Cruz council and the University of Guayaquil to ratify the use of the building and the Molecular Biology Masters Programme. Dr. Leon Roldos, Rector of Guayaquil University attended. Dr. Cedeño gave a presentation outlining the importance of Molecular Biology for Ecuador and the role of the Darwin project.

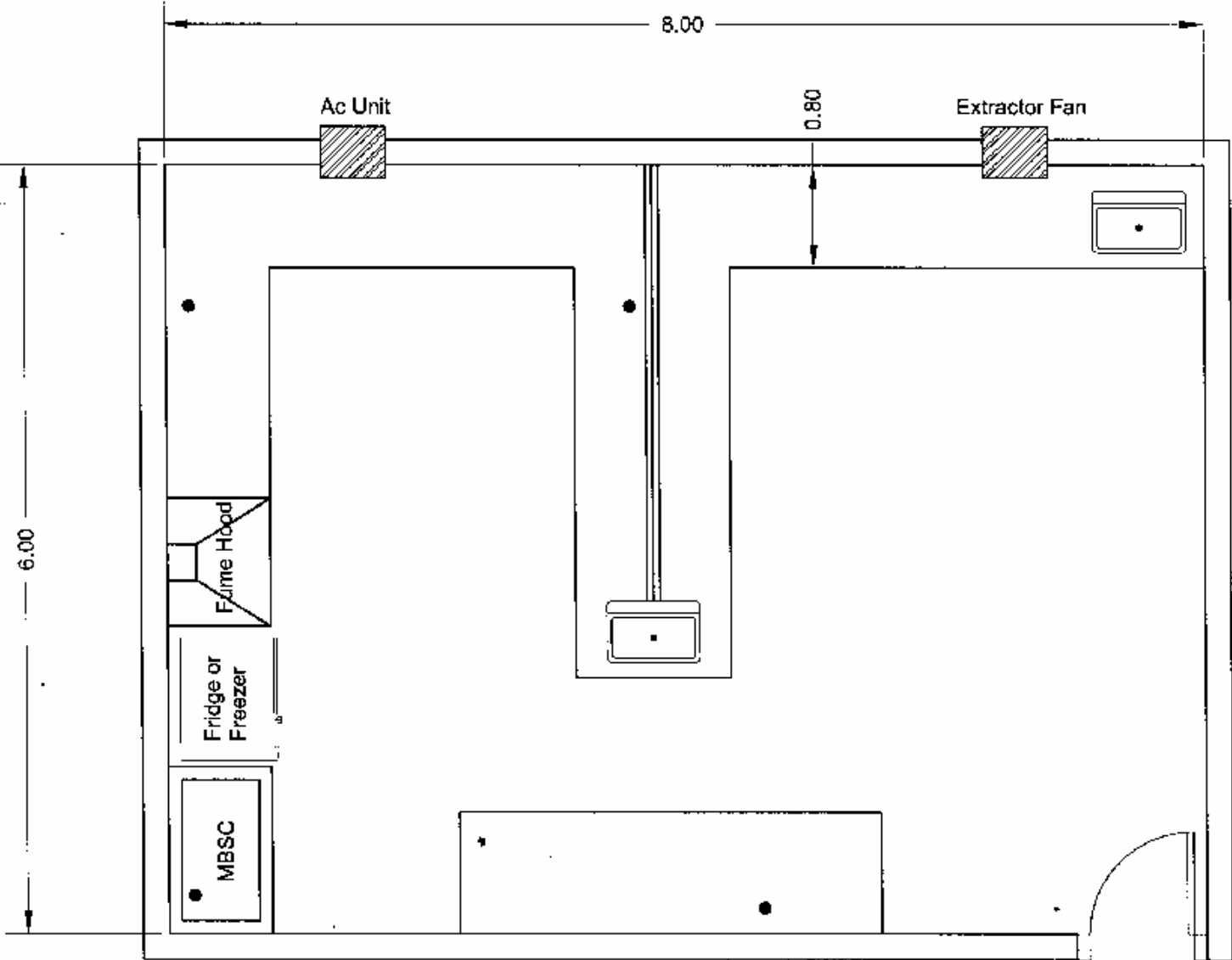
## Annex 4. Plans for Galapagos Epidemiology and Pathology laboratory

Molecular Biology Lab (measurements in metres)





Pathology Lab (measurements in metres)





The building that will house the new laboratories



Refurbishment of the pathology laboratory in progress