



Evaluation of Closed Projects Panama and Costa Rica

Visit - November 2007

Final Report - January 2008

The Darwin Initiative

The Darwin Initiative is a UK Government small grants programme which was launched at the Rio Earth Summit in 1992. It aims to assist countries rich in biodiversity but constrained by financial resources to implement the Convention on Biological Diversity (CBD). The Initiative is funded and managed by the UK Department of Environment, Food and Rural Affairs (Defra). This is the UK Government's main support to other countries (including the UK's Overseas Territories) in their implementation of the CBD, and more recently the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) and the Convention on the Conservation of Migratory Species of Wild Animals (CMS), through the funding of collaborative projects which draw on UK biodiversity expertise.

Monitoring and Evaluation

The Darwin Initiative has a comprehensive Monitoring and Evaluation (M&E) programme in place which is central to informing on the progress of the Darwin Initiative against its goal – 'to support countries that are rich in resources but poor in financial resources to meet their commitments under one or more of the major biodiversity conventions: the Convention on Biological Diversity; the Convention on Migratory Species; and the Convention on International Trade in Endangered Species'.

The M&E programme is used in a number of ways to help inform on best practice, to support ongoing projects in their delivery, to strengthen the Darwin Initiative itself, and to demonstrate the gains Darwin Initiative projects have made in conserving biodiversity through partnerships between the UK and developing countries.

The Darwin Initiative M&E programme is essentially centred on performance monitoring and impact evaluation. The M&E programme assesses legacy and impact at different levels with lessons drawn out from each level:

- At the project level – in terms of host country institutions and local partners and beneficiaries, and in terms of conservation achievements;
- At the national and ecoregion level – in terms of host country policies and programmes, and, if relevant, at a cross-boundary and eco-region level;
- At the international level – in terms of emerging best practices, and the conventions themselves;
- At the UK level – in terms of legacy and impact within UK institutions.

This report was undertaken by Anna Karp on behalf of the Darwin Initiative

Cover Photo Credit: Survivor Phoenix

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Cover image: view of Las Perlas Special Management Zone. Image lent by HWU/STRI

List of acronyms

ANAM	<i>Autoridad Nacional del Ambiente, Panamá</i>
ARAP	<i>Autoridad de los Recursos Acuáticos, Panamá</i>
CBD	Convention of Biological Diversity
ECTF	Edinburgh Centre for Tropical Forestry, United Kingdom
ENACC	<i>Estrategia Nacional de Cambio Climático</i>
FO	Foreign Office, United Kingdom
GEF	Global Environmental Facility
HWU	Heriot-Watt University, United Kingdom
IDB	Inter-American Development Bank
INBio	<i>Instituto Nacional de Biodiversidad, Costa Rica</i>
MINAE	<i>Ministerio de Ambiente y Energía, Costa Rica</i>
NHM	Natural History Museum
NFP	National Focal Point
PILA	<i>Parque Nacional La Amistad</i>
SMZ	Special Management Zone
STRI	Smithsonian Tropical Research Institute
UCR	<i>Universidad de Costa Rica</i>
UICN	<i>Unión Mundial para la Naturaleza</i>
UNDP	United Nations Development Programme

Executive Summary

The evaluation of closed projects in Panama and Costa Rica was carried out through a series of telephone interviews, correspondence with project leaders, team members and a field visit to both countries where face to face interviews took place. The five projects evaluated span from 1993 – 2006 with a post project still ongoing EIDIPO17 which follows on from 12-021. The scope of projects varied from a pilot for software development for insect identification (6-050), to the conservation of a marine management zone (12-021), the development of capacity building for the monitoring of species (12-020), the capacity development of Central American National Focal Points (10-023), to the set up of an insect collection (3-101). All the projects were considered to be relevant, and to have furthered biodiversity conservation.

Capacity building projects were very effective in that they introduced new approaches to doing science. Project 12-021 helped set up laboratories in the field, where part of the classification of species was conducted. These methodologies are at present being replicated in other Darwin projects (15-027) and were considered to be innovative at the time.

Project 6-050 introduced an informatics based approach for insect identification; the software developed as a result, DAISY, is now ready to be used by para taxonomists in hand held devices. The theoretical infrastructure of using automated insect identification systems survived in Costa Rica through the hands of a local researcher, in spite of the DAISY software no longer being available at the University of Costa Rica. Nonetheless, there is now a thriving branch of Informatics at the University of Costa Rica which focuses on how to use informatics to aid biological research. The evaluation of this project (6-050) highlighted the need to have appropriate Memorandums of Understanding between parties which clarify property and access rights, for projects that have a technological innovation component within their purpose. For example, projects that develop new software should make this available to a wide net of beneficiaries who are part of the Darwin Initiative network.

In terms of impact, project 12-021 produced a good volume of scientific data, which helped inform legislative processes in Panama. The project was the catalyst of a science based policy making process which attracted the interest of multiple donors. Had there not been Darwin Initiative funding in place to do the science to back up a policy and legislative process, it is quite possible that the regulatory protection of the highly vegetated archipelago of *Las Perlas* may not have happened.

Project 3-101 has had a good longevity, two of its main outputs, a collection and guidebook of the *Pimplinae* wasps continues to be in use. Likewise, a guide on the biodiversity of Central America also continues to be used, regionally (10-023). Of the five countries participating on project 10-023, it was only possible to interview a participant from Costa Rica.

INBio and the Smithsonian Research Institute are two well established partner institutions that are driven by scientific research and have a strong resource base in terms of installations, such as laboratories, collections, etc as well as human resources and sources of finance. The evaluation concluded that well established host country partners are a key driver in the success of projects because they have a higher likelihood of building upon the finance provided by Darwin, and the purposes achieved by projects.

The Darwin Initiative is recognized as a high profile fund in both Panama and Costa Rica. Former Darwin team members now hold senior positions in various conservation agencies. Throughout all projects, the Initiative's imagery was used in communications and dissemination outputs; good websites exist, which are kept up to date and provide species information to a wide range of users.

Recommendations

- UK and host country project leaders should seek support to their applications at an appropriate level. For example, if a project is seeking to work in a specific protected area, an MoU should be signed with the protected area's management committee. The Darwin Initiative Secretariat and projects leaders can seek the assistance of the Foreign Office Embassies to verify host country the right agencies are included in the MoU, at an appropriate level.
- UK and host country project leaders should sign an appropriate contract with regards to Intellectual Property rights, when seeking finance for projects that have a degree of technological innovation. For example, when seeking finance to develop or test software. The Darwin Initiative Secretariat should ensure appropriate mechanisms are in place so potential benefits can be used at cost by the Darwin Initiative.

Project 12-021 shows that concurrent finance, on longer timeframes, is appropriate for projects that are aiming to achieve an ambitious purpose, such as the securing of a protected area for conservation. A recommendation is that projects with an ambitious purpose receive funding for a longer period.

Background

1.1 Darwin Projects in Costa Rica

An evaluation of four closed Darwin Initiative projects in Costa Rica was commissioned by ECTF on November 2007 because there was a cluster of projects that had been completed in the country. Included in this review was one project in Panama, 12-021 (Marine biodiversity assessment and development in Perlas Archipelago). This report encompasses the findings from both countries. The projects reviewed are shown in Table 1.

Table 1 List of Closed Projects in Costa Rica and Panama

DI Ref	3-101	6-050 – CR	10-023	12-020	12-021
Country	Costa Rica	Costa Rica	Central America and Caribbean	Costa Rica and Nicaragua	Panama
UK Institution and Project Leader/Contact	NHM Ian Gauld	NHM Ian Gauld	NHM Alister Taylor	University of Wales, Bangor Dr Fergus Sinclair	Heriot-Watt University Dr James Mair
Partner Institution(s)/ Contact(s) per Project	INBio	University of Costa Rica UCR Prof J-C Briceño Dr P E Hanson	Central American Commission for Environment CCAD Bruno Busto Brol	National Institute of Biodiversity, Costa Rica Nelson Zamora	Smithsonian Tropical Research Institute, Panama. Hector M. Guzmán
			IUCN Regional Office for MesoAmerica Alberto Salas	CATIE Dr Bryan Finegan	
Website		http://www.tumblrindex.co.uk/daisy	No longer active	http://darwin.bangor.ac.uk	http://striweb.si.edu/darwin_initiative/index.html
Project Grant Values/project	£46,500	£142,894	£70,355	£173,661	£168,154
Project's Start / End Date:	1/11/93 - 1998	1/4/97 – 31/3/00	1/7/01 – 31/3/02	1/8/03 – 28/2/06	1/4/03 – 30/6/06

Project 10-023 had a regional scope and not only included Costa Rica and Panama but also included Belize, Guatemala, Honduras, Nicaragua, El Salvador and Panama etc. Only the Costa Rica aspect of this project is assessed. Project 12-020 shares staff with the ongoing project 15-027 (Baseline tools for Management of *Parque Nacional La Amistad*). Projects 3-101, 6-050 and 12-020 involve INBio. Project EIDIPO17 (Conservation Management Zoning Implementation and Facilitation in Perlas Archipelago, Panama) follows on from 12-021. Projects starting before the year 2000 did not have a Logical Framework. There is no documentation for 3-101 and only partial documentation for the early projects.

Peer reviewed publications per project are included in the Reference Section.

1.2 Biodiversity in Costa Rica

A small country, with a population of c. 4,600,000 people and a small land footprint of 51,100 km², Costa Rica is located in the Neo tropics, and is considered to be one of the top 20 richest countries in terms of the biological diversity of species and ecosystems

Costa Rica has an advanced regulatory and institutional framework for environmental protection and conservation. Government policy has favoured the protection of natural resources as a way to generate revenue through tourism and has developed fiscal incentives to ensure natural resources are conserved, through systems of payment for environmental services.

The Ministry of the Environment and Energy, MINAE is charged with the task of protecting the environment, and the National System of Conservation Areas (SINAC) is charged with the conservation of the country's biodiversity alongside the National Commission for Biodiversity Management (CONAGEBIO). Over 25% of Costa Rica's territory is protected. There is a solid base of non-governmental organizations such as the National Institute of Biodiversity (INBio), Conservation International, The Nature conservancy, which support biodiversity conservation.

Policy innovation includes Costa Rica's purpose to become the first country to be Carbon Neutral, by 2021. The strategy is led by the interdisciplinary group '*Estrategia Nacional de Cambio Climático de Costa Rica*' (ENCCC), which is working under the auspice of MINAE. To achieve this, the Government will promote the use of cleaner energy, and will further promote environmental incentives.

The initiative will also include the creation of an eco-label, 'C –Neutral' for Costa Rican products and service such as tourism, and will strongly advocate the environmental sensitisation of its people. The country is keen to show an alternative economic growth and development pattern, and to benefit commercially from this. Costa Rica is a country that values the economic benefits that its biodiversity provides.

1.3 Biodiversity in Panama

Panama has a high density of diverse species, relative to the size of the country. With a land area of c. 77,082 km², Panama is surrounded by two oceans and is the narrowest country in the Americas, hence the construction of the Panama Canal.

The National Authority of the Environment (ANAM) is in charge of natural resource management while the National System of Protected Areas (SINAC) administered by ANAM, has as a mandate to conserve ecosystems, habitats and species. The Aquatic Resource Authority (ARAP) has been recently set up, and amongst other functions, it undertakes the conservation of the marine environment.

Approximately 25% of the country is protected, totalling approximately c. 1,990,000 hectares. Certain regions of Panama remain to an extent, undeveloped, such as the Archipelago de Las Perlas. However, one of the biggest threats the country's biodiversity is facing is a lax approach to development planning coupled with a push towards developing a tourism industry which can strengthen economic growth.

2. Closed Projects in Costa Rica

2.1 Development of human resources to participate in the Costa Rica National Biodiversity Inventory, to Inventory Parasitic wasps (3-101)

Project Purpose

Training of a Costa Rican biologist in techniques necessary for his participation in an inventory of Costa Rican fauna and in the production of field guides.

Relevance

The host country partner, *Instituto Nacional de Biodiversidad* (INBio), had been founded very recently, in 1989, and had the objective of establishing a solid specimen collection. By 1993, when 3-010 began, INBio had an insect collection of 1,584,416 specimens, of which only 7,117 were catalogued to species level. This collection had been generated by Dr Daniel Janzen and a team of INBio parataxonomists. Nowadays, both INBio and the University of Costa Rica (UCR) have good collections, in impressive facilities; INBio has used bar-coding to catalogue their specimens from the outset.

This Darwin project had a strong capacity building component, which was focused on training a member of INBio in inventorying techniques using the *Pimplinae* subfamily of Costa Rica, which is a subfamily of the *Ichneumonidae*. The *Pimplinae* collection had a manageable volume of taxa: therefore clear outcomes could be achieved through the Darwin project. At the time the project was highly relevant.

The main output, which remains in use today and was published in 1998 is the comprehensive publication titled '*Guía de los Pimplinae de Costa Rica: (Hymenoptera: Ichneumonidae)*' authored collaboratively by Ian D Gauld, Jesus A Ugalde and Paul Hanson.

Efficiency and Effectiveness

No records exist on the Darwin library, available for this review. From the conversations with the main partner and trainee, Jesús Ugalde, and Dr Paul Hansen, co-author of the guide, the project delivered in all aspects which were outlined during its conception¹.

Impact

The project started in 1993 as part of the first round of Darwin finance. From this point onwards there has been no other financial support. Its direct impact has been threefold.

Firstly, the *Pimplinae* guide remains very useful. It is complemented by the wasps' collection at INBio and the two resources provide reference material for research on wasps² for MSc and PHD students. The guide has clear, detailed pictures and is written in accessible Spanish. Secondly, the INBio collection has been very well preserved and continues to grow, 16 years from the beginning of this project.

Thirdly, the then Darwin fellow who's training was a strong focus of the project, Jesus Ugalde, is now INBio's Director of Conservation. Part of Ugalde's capacity building included two visits to the NHM, to work on *Pimplinae*, which directly strengthened his formation as then curator of the INBio collection. During one of the month-long visits, specimens were compared to those in the NHM collection and typologies were established. The Darwin project provided an opportunity for Dr Gauld and Ugalde to work closely together, Dr Gauld advised Ugalde on the Masters degree thesis produced for UCR in 2002.

¹ There is no application proposal on file for this project.

² This is according to PHD student Betsabé Ruiz from Mexico's National University, UNAM who is working with the wasp collection at UCR and INBio and was using the *Pimplinae* guide at the time of this evaluation.

Sustainability and Legacy

As mentioned before, the collection established in INBio as part of Darwin has continued to grow and is well preserved. The list of specimens can be found online, in INBio's webpage³ which adds a strong element of sustainability for this project.

Roland Zuñiga, a younger INBio curator, has been mentored by Dr Gauld, this has not been as part of the Darwin Project but it speaks of an ongoing relationship with the team at INBio on behalf of Dr Gauld, formerly of the UK Natural History Museum and Darwin project leader. An element of their collaboration included producing a publication for which the *Pimplinae* guide was used as a model. Zuñiga improved on the Darwin *Pimplinae* guide by adding maps which indicate where specimens have been collected. This fact proves that the output has also been a useful building block for taxonomic literature in Costa Rica.

On an institutional level, INBio continues to work closely with the NHM, a relationship which was pretty much a direct result of Ian Gauld's collaboration with INBio, via the Darwin 3-101 and strengthened by subsequent Darwin projects (see Table 1).

2.2 DAISY – automatic insect identification for inventorying Costa Rican biodiversity (6-050)

Project Purpose

To develop a computerised automated identification system for one group of common insects.

Relevance

There is neither an application form on record nor a logical framework available to evaluate the project against. Documents available include final reports, final project report reviews and correspondence.

At the time the project was highly innovative because it helped the University of Costa Rica (UCR) Biology and Computing Sciences departments to think of a new, potentially easier, way of doing taxonomy. The project developed a computerised system for identification of parasitic wasps. DAISY, the pilot software, helped identify species through visual imagery with a low margin of error.

The DAISY team was led by Ian Gauld from the NHM and Paul Hansen as co-partners from the UCR's Biology Department. The UK informatics aspect was led by Mark O'Neill, then an independent consultant who collaborated directly with Juan Carlos Briceño, from UCR's Computing Sciences Department⁴.

Efficiency and Effectiveness

From conversations with the team, it is concluded the project was implemented effectively and that its purpose was achieved. The fact that UCR staff and students have developed parallel software and that DAISY has evolved in the UK attest to this.

At the time scheduled for completing this project, the year 2000, the project leader faced difficult circumstances beyond his control. A final project report was submitted in June 2001 followed by a revised version in July 2002⁵, which received a critical review which raised two queries:

- 1) It was not clear what legacy remained in Costa Rica in terms of capacity building
- 2) It was not clear who owned the intellectual property rights of the software developed.

³ <http://www.inbio.ac.cr/es/default.html>

⁴ Ignacio Solis from UCR also contributed to the programming aspects of DAISY but was not contactable

⁵ Documentation exists to prove that the NHM and the project team did what was reasonably possible to document the outcomes of the project, under difficult circumstances.

The first query raised by the final report reviewer is relevant to this report and is discussed in the impact section. The second query is somewhat out of the scope of this review but the issue it raises, whether IPR agreements are needed and when to draft them, is picked up for Best Practice purposes in the Sustainability and Legacy subsection and the Recommendations section.

Impact

The main impact of the project in the University of Costa Rica is the transfer of technology and the intellectual infrastructure that Juan Carlos Briceño has developed through his own research and taught courses which is a direct consequence of having participated in the implementation of DAISY's computational model.

The UCR has 'tropicalized' DAISY to create a parallel cataloguing method based on visual imagery and morphology, which can be referred to as *Laurace Costarricensis Automatic Taxonomical System* (LCATS) when used to catalogue plant leaf specimens. Published applications of the Costa Rican automatic classification method include:

- a) Botanical classification: trees from the *lauracea costarricense* species were classified using the borders of their leaves. This species is difficult to recognize due to similarity of leaves.
- b) Artificial taxonomical classification: applied to shapes any object based on its borders.
- c) Automatic recognition of car number plates (published entirely by students)

There are currently no computers or copies of the DAISY software which are in use at the UCR. Shortly after the completion of 3-101, all the informatics team members left the University; lack of financial resources prevented training someone else to continue to use DAISY.

Sustainability and Legacy

In Costa Rica, capacity continues to be developed on DAISY related subjects. The UCR now has elective courses on the *Licenciatura en Ciencias de la Computación e Informática* (the equivalent to a BSc in Informatics and Computer Science), which are:

- *Procesado Digital de Señales Biológicas* (Digital processing of biological signals)
- *Análisis de Formas y su Clasificación* (Analysis of forms and their classification)
- *Procesado Digital de Imágenes* (Digital processing of images).

Student theses are underway and include: automatic identification of people using photographs of the iris, identification using fingerprints and of human faces. Published research and taught electives are good indicators of students continuing to be trained within a discipline that was introduced through DAISY. This clears up the query regarding legacy raised on the second report of the final review of the project.

As to the UK, and in terms of legacy with a wide practical scope, DAISY has continued to evolve and have a practical application through the work of Mark O'Neill and is now mature enough to be commercialised.

Table 2 What DAISY can do**DAISY: at the forefront of innovation**

DAISY is now a practical tool which makes species identifications easier. It has been tested extensively on species such as British bumblebees (*Bombus*, *Megabombus*), palearctic biting midges (*Ceratopogonids*), British moths and butterflies (*Lepidoptera*) amongst others. These tests show that even when an unknown specimen cannot be identified to species level, DAISY is, in most cases, able to narrow the search space to relatively few possibilities, on the range of 2 – 10. This is very valuable for the classification of species that are very similar.

On one hand, DAISY is useful for para-taxonomists that are not highly specialised. On the other hand, it helps free up the time of specialised taxonomists, so they can do classification of new species. DAISY will be piloted in Honduras using hand held devices early in 2008, through cooperation with a local NGO. Highlights of what DAISY can now achieve include:

- Identification of tens of specimens per second using modest computer hardware
- Identification of organisms which are from diverse species
- Classification without restrictions to any sets of patterns such as imagery and morphology (i.e. characteristics of the body of the specimen)
- It runs with an intuitive easy to use interface (now at the point of being able to run in Microsoft OS).
- Results can be shared over the internet or mobile phones.

DAISY is ready to be deployed in the field, to be used by research teams equipped with hand held devices such as blackberries.

For the purpose of this report, IPR is referenced to inform Best Practice and to help clear the second query raised in the final report review, referred to before regarding intellectual property rights. It is not possible to know whether when this project was awarded funding, property rights were a contractual consideration, as there are few records.

Upon completion of the Darwin project, the property rights for DAISY were transferred to O'Neill with the caveat that the Natural History Museum and UCR retain rights to use the software (O' Neill, pers comm.). Staff members at the NHM⁶ are reported to continue to use DAISY⁷. No consequent funding had been secured to continue the DAISY work at UCR.

Nowadays, DAISY is an application that is ready to be commercialised. Mark O' Neill continues to be in touch with the UCR⁸, primarily planning a project which will look at identifying pest species of *Anastrepha* fruit flies which may be of sufficient commercial value to attract funds.

A best practice recommendation emerging from the DAISY experience is that IPR considerations should be clarified prior to financing projects which have elements of technology development and innovation. This can be done in the form of a Memorandum of Understanding drafted and signed by all parties and can ensure that Darwin Initiative projects get access rights, to use Darwin funded technology at cost. The NHM and UCR having use rights of DAISY can be an opportunity to deploy this technology in the field.

⁶ Professor Norman MacLeod, Keeper of Palaeontology) and Dr Ian Kitching (Entomology) reportedly use DAISY.

⁷ At the time, it was considered the transferral of software development rights from the Darwin Project to Mark O'Neill was the best way forward to avoid DAISY's stagnation.

⁸ Daniel Briceño

2.3 Enhanced biodiversity conservation through capacity building in Central America (10-023)

Project Purpose

To assist the countries of Central America assess implementation of the Biodiversity Convention (CBD).⁹

Relevance

There is evidence the purpose of the project was achieved. The project was led by UNEP-WCMC with the *Comisión Centroamericana de Medio Ambiente y Desarrollo* (CCAD) as regional partner. When implemented, the project was relevant because the National Focal Points of the partner countries (bar Costa Rica) were not fully up to date with the reporting requirements needed to inform the CBD on national progress towards the CBD goal.

The project was implemented with representatives from Belize, Costa Rica, Guatemala, Honduras, Nicaragua, El Salvador and Panama. The reviewer was only able to speak to the representative of Costa Rica¹⁰. Therefore, the ECP considers Costa Rica only¹¹ and is as such, limited.

Efficiency and Effectiveness

This was a short project which was implemented via working group meetings/workshops, and individual country work on behalf of National Focal Points (NFP) and their teams, from each participating country. Each country produced a report as part of the Darwin Project, using an assessment methodology which had been devised by UNEP-WCMC and which had been used successfully in CEE/NIS countries. The project took place during the run up to countries presenting their Second National Report to the CBD.

The Costa Rica NFP, Ms Lesbia Sevilla, stated that at the time Costa Rica was the most advanced country of the Central American group in terms of reporting to the CBD because Costa Rica had already started work on the Second National Report. As such, she found Costa Rica's reporting experience could have been taken into account in the design of the Darwin Project's methodology. She underlined that what worked in the UK and CEE/NIS countries could have been adapted more effectively to fit the needs of Central America had more participation of the NFP's been allowed to re-jig the methodology at the inception stage, or during the group's first meeting. In her view, the work for the Darwin report did not directly contribute to what needed drafting for the Second National Report to the CBD, thereby generating overlapping workload.

Impact

The CCAD's report 'Biodiversity in Mesoamerica: regional report on compliance with the Convention on Biological Diversity, CBD' in 2002, which was produced partly with Darwin finance embodies the most positive impact of the project. According to Ms Sevilla, the glossy publication continues to be used and has set a precedent for a second volume which is planned to follow shortly. The report provides an insight of the biodiversity in the region, in an accessible format.

Sustainability and Legacy

As highlighted by Ms Sevilla, the Darwin project facilitated the official consultation process that the *Ministerio del Ambiente y Energía* (MINAE) held with external stakeholders, which greatly helped to inform the Second National Report to the CBD. Costa Rica is currently preparing for the drafting of its Fourth National Report to the CBD and is struggling to find finance to carry out participatory consultations which brings to the fore the relevance of the Darwin project.

⁹ The logical framework includes this statement at Goal Level, which the reviewer considers as the purpose of the project.

¹⁰ The representative from Panama could not be tracked down and the other countries were not included in the scope of this ECP.

¹¹ At the time of the visit Alberto Salas (IUCN) and Bruno Busto (CCAD) were not available and did not respond to requests for a telecomm. Likewise, Marisol Dimas, at the time NFP of Panama, could not be tracked down. The UK PL, Alistair Taylor, was very helpful and provided timely information.

2.4 Building Nicaraguan and Costa Rican capacity in biodiversity conservation (12-020)

Project Purpose

To build capacity in biodiversity assessment, conservation and management in Nicaragua and Costa Rica, through the facilitation of regional and international knowledge exchange and training.

Relevance

The project was highly relevant in that it established twelve permanent sample plots for long term monitoring in the San Juan – La Selva Biological corridor. It helped in inventory the area by developing practical biodiversity inventorying methodologies which can be replicated (three workshops were held for approximately forty students). It developed the capacity of a Nicaraguan student to Master's level and supported in the consolidation of specimen collections for INBio.

The project dovetailed with a conservation process led by the '*Comité biológico San Juan- La Selva*'. The scientific information generated will be used by the National System of Protected Areas (SINAC)¹² to inform the implementation of the Management plan for the *Refugio Nacional de Vida Silvestre Mixto Maquenque* (National Mixed Wildlife Refuge) - Maquenque was the focal area of the project in Costa Rica.

Efficiency and Effectiveness

INBio came across as a highly effective and professional research oriented institute. Conversations with the Costa Rica project leader, Nelson Zamora, Angel Solis who was in charge of entomology and Jesus Ugalde (3-101) confirmed this impression. From conversations with some of the Costa Rica and Nicaragua team members, it seems that the project was implemented effectively.

The process of generation and analysis of biodiversity information, particularly the collection and identification of plants and insect species was done in the field. Specimens were then processed and added to the existing collections at INBio, where mounting and coding took place. The development of structured methodologies for this, and the human capacity developed which enabled the collection and identification of specimens in the field within a temporary laboratory, indicates the project was implemented effectively and had an impact on how project participants can do field research.

Impact

The *San Juan-La Selva* Biological Corridor committee has indicated that the information gathered is useful for its action plans. The committee is conformed of institutions such as: the National University of Costa Rica (UNA), the Organization for Tropical Studies, INBio, amongst others. Some of these organizations are academic, and the project helped develop capacity of their students. For example, the plots established will continue to be monitored periodically by students from the Forest Engineering career from the UNA as well as Forestry students from CATIE.

More specifically in terms of capacity development, a Nicaraguan student carried out a Master's degree at a Costa Rican University and now continues to work in conservation related work for San Juan la Selva, now based in Nicaragua.

The on-site biodiversity analysis methodology developed is currently being replicated in other projects, for example within the PILA park, as part of Darwin project 15-027 (Baseline tools for Management of *Parque Nacional La Amistad*), specifically through the entomological work of Angel Solis. There were new plant species discovered as part of the project which are described extensively in the project's website in both English and Spanish.

¹² SINAC is managed by MINAE (Ministerio de Ambiente y Energía)

Sustainability and Legacy

There is no considerable funding secured and it is too early to measure sustainability for this project. However, in the words of Nelson Zamora, the project's biggest legacy is to have helped to visualize regional processes for conservation and biodiversity research, in particular in terms of trans-boundary resources.

3. Closed Projects: Panama

3.1 Marine biodiversity assessment and development in Perlas Archipelago, Panama (12-021)

Project Purpose

To build up research expertise in a team dedicated to obtaining habitat information and to producing management plans for the marine and coastal environment of Las Perlas in the Gulf of Panama in order to enable the designation of a Marine National Park.

Relevance

At the time this project began it was very relevant because little scientific information on the state of the Marine resources of Las Perlas really existed. The area was becoming increasingly popular as a tourist destination and as a highly desirable area spot for property development because it is located 20 minutes away by plane from Panama City. Fish and seafood stocks are in sharp decline. Local fishing communities have embraced conservation initiatives for this reason.

Efficiency and Effectiveness

The British partner was Heriot-Watt University (HWU) and the Panamanian partner was the Smithsonian Institution, a US Government funded research institution whose only research base outside the US is in Panama; the Smithsonian Tropical Research Institute (STRI). These institutions and team continue to collaborate since they were awarded post project funding when the first project was coming to an end, which allowed for continuity. Without the concomitant funding, this project would have not achieved the full protection of the Marine Park.

STRI is well placed in terms of infrastructure assets; it has boats, labs, and research equipment. Most of its overheads are funded, and therefore members of their staff do not endure the stress of having to cover their cost. Both HWU and STRI attract a variety of students, who participate on projects on a short term basis. The project team made the most of this human resource, by employing 'Short Term Darwin Fellows' who helped - effectively in a consulting basis- to carry out the 25+ studies which have been produced over the past five years.

The financing of a project to do science in partnership with a solid host country academic institution provided the fertile ground for the project achieving its purpose. The project was highly efficient in using results from science to create dissemination material and in fundraising for complementary aspects of the project such as awareness raising and lobbying. It is clear that Darwin provided the seed funding for what is now a multi donor project worth in the region of £1,000,000 (See Tables 3 and 4).

Table 3 Finance Timeline and Projections Post Darwin

Darwin Phase	Darwin Project				Darwin Post project		Darwin Ex-Post/ Sustainability			
	Date in Half Year Periods	2003	2004	2005	2006	2007	2008	2009	2010	2011
Donor Finance (duration of input)										
Darwin P Smithsonian/HWU										
Darwin PP Smithsonian/HWU										
GEF I										
GEF II*										
IDB										
FO/British Embassy										
Conservation International										
International Community Foundation										
Albatros Media Foundation										
Avina Foundation										

NB: GEF II*: 500,000 are pencilled in for Las Perlas. Project Approved, budget not yet allocated. The amount is an approximation and is yet to be formalized.

Impact

The main impact of the project has been providing the necessary scientific information for the securing of the Las Perlas Archipelago as a marine protected area under the category of a Special Management Zone (SMZ), and making such information available to policy makers and legislators, through a steady awareness raising campaign which has used media effectively. Las Perlas is now protected through Law 18 dated May 2007. Law 18 was passed at Congress, by consensus, a process that makes it as strong as possible¹³.

Other conservation measures have followed on from the SMZ including the Municipality led regulation, '*Acuerdo Municipal No. 5*', passed on October 2006 which protects the biggest watershed in the archipelago located in *Isla del Rey* as *Reserva Hidrológica* (Isla del Rey hydrological reserve). San José, a privately owned island has subsequently joined a network of privately protected areas.

In an archipelago with unclear property rights, where development planning is not straightforward¹⁴ the above achievements are particularly significant.

Human capacity was developed through the full sponsoring of three Panamanian students to study MSc degrees in the UK; this was coupled with practical work at Las Perlas. One of these students continued to work on the post project. In total 25 students at MSc and PhD levels have graduated who have participated in academic aspects of 12-021.

¹³ Law 18 would have to be amended by Congress and therefore is not at the peril of changes at Executive or Ministerial level.

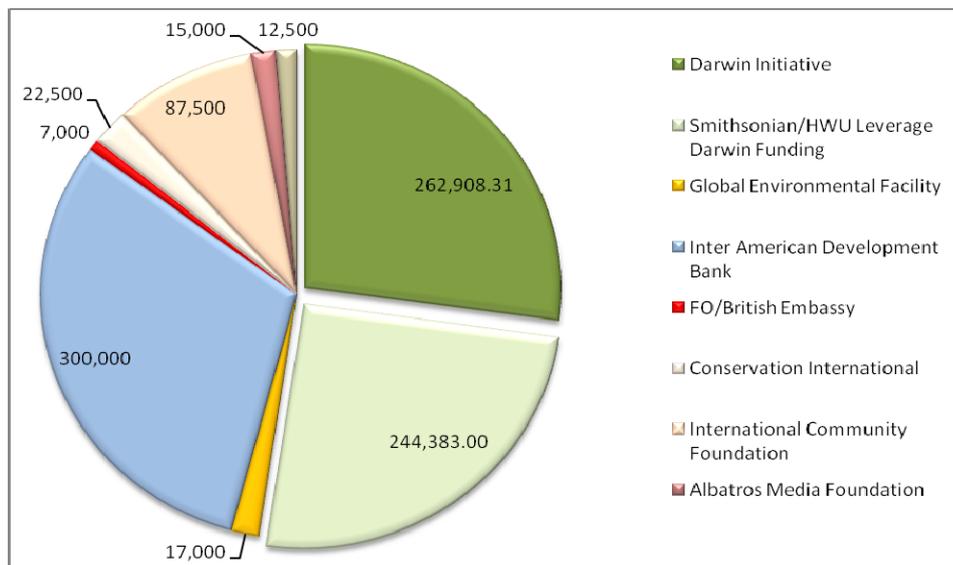
¹⁴ As discussed during various meetings, with stakeholders from NGO, Government etc.

Sustainability and Legacy

The project's website can be found on http://striweb.si.edu/darwin_initiative/index.html. The site is maintained up to date and all research and media products can be found there. Accessible, transparent information use is a tenet the project team have used effectively. The portal, coupled with journal articles and published material, gives the scientific information gathered during the project a higher degree of longevity.

On the back of Darwin/HWU/SRTI finance, the project has become financially sustainable and has diversified its portfolio of funders. Because the Government of Panama (through ARAP) has been involved in the passing of Law 18, directly via the *Comisión de Diputados*, and the project has built consensus with stakeholders, the project has the potential to attract varied donors including International Financial Institutions (i.e. the Inter-American Development Bank). Funding which has been secured to date, which includes capital and in kind donations is itemized in Table 4:

Table 4 HWU/STRI Secured Finance: Pounds Sterling



NB: Please note that there is finance for a second GEF project as well, details of which have not been disclosed to date. The Darwin Initiative finance is the value of both the project and the post project.

From secured funding and projections included in Tables 3 and 4 it can be concluded that the HWU/STRI team have managed to obtain financial sustainability, which will enable the development of an Inter-American Development Bank financed Management Plan for the Special Management Zone in Las Perlas. The United Nations Development Programme's Global Environmental Facility Phase II (GEF II) project is pencilled down to focus on identifying and build on socio economic alternatives for islanders, such as eco-tourism. This is a good example of a contiguous¹⁵ Darwin project.

¹⁵ According to PD Hardcastle's categorization of Darwin Projects (ECP Indonesia 2006), contiguous projects need to have follow-on support immediately after the project ends to avoid catastrophic loss.

4. Discussion

Three of the five projects reviewed were focused on capacity building (3-101), (10-023) and (12-020). The first two were tailored to have a tight remit and delivered outputs which continue to be useful. All had a very practical scope. The latter generated a methodology which has a wide scope for replication in the field, and which is being used as part of an ongoing Darwin project (15-027).

The project in Las Perlas (12-021) has, within a short timeframe, delivered a major legacy because it was allowed to continue through EDIPO017. In the absence of a sustainable tourism policy, the archipelago's resources were threatened because of unclear property rights, weak local institutions with little bargaining power (i.e. at municipality level), and decreasing fish stocks. The Darwin funding provided a basis to generate comprehensive high quality science which has been disseminated at policy and regulatory level, with communities and within the academic remit. The awareness raising component of this project is outstanding, with a variety of mediums being targeted such as TV, newspapers, and practical outreach material.

All projects seemed to have produced good science, bar 10-023 because that was not its remit. All projects worked at a level which was appropriate, with the right language, for example, 3-101 delivered a guide of excellent quality, in Spanish.

The partnership model proved to work best when two conditions were met. Firstly, when UK project leaders had a strong involvement in the project - be it on a mentoring level or intellectual exchange level - and secondly, when funding was granted to well-established host country institutions. In the case of Panama and Costa Rica, both STRI and INBio have a practical research remit and diverse sources of finance. They are able to sustain and evolve the outputs from projects thereby contributing to the enhancement of the Darwin Initiative's legacy.

INBio has an excellent insect collection which continues to be used and grow, to which project (3-101) made a targeted, practical contribution. In the case of STRI, the institution has a scientific research vision, which allows for generating Best Practice, such as: comprehensive dissemination of research information, transparency, and use of human resources through 'Short term Darwin Fellowships' (12-021 and EIDPO17).

(12-021) in Panama highlights that if Darwin Initiative funding is provided to projects which have an ambitious purpose such as the remit of supporting the process of setting up a protected area, the timeframe of funding has to be realistic. In this case, financial sustainability has been secured because the team set up a diversified portfolio of donors that provide finance at the right level (thereby increasing the likelihood that the biodiversity will be conserved sustainably). For example the FO/Embassy, Albatros, International Community Fund supported awareness raising activities and the Inter American Development Bank is financing the tendered contract to develop a the Special Management Zone (SMZ) Management Plan. Panama is a small country; Ministerial and high level regulatory involvement was possible which greatly contributed to the securing of the SMZ.

5. Conclusions

There is evidence that Darwin Initiative projects have continued to contribute to host countries' implementation of the CBD through: human capacity development, production of scientific research, technology transfer, dissemination of scientific information and the introduction of new approaches on how to do conservation.

All projects proved to be good value for money, and the majority of their outputs contribute to securing the Darwin Initiative's legacy in Costa Rica and Panama. A longer implementation timeframe resulted in a set of comprehensive results in the case of 12-021 which gives an example of what can be achieved when projects of an ambitious nature receive follow on Darwin funding.

The main recommendation is that UK Darwin Initiative project leaders should sign a Memorandum of Understanding with host country project partners, and with local government at the appropriate level when working in Protected Areas or projects that affect the interests of multiple stakeholders. Concerns were expressed by Lesbia Sevilla (10-023) on how Darwin projects seem an imposition when approval and a blessing for a Darwin project is given at Ministerial level, without consultation to mid-level management staff and operational officers. An MoU gives the opportunity to set the rules of the game straight from start up, and local government officers get to express their views on how Darwin projects can help them achieve wider policy objectives.

Likewise, Darwin Initiative UK project leaders should sign a Memorandum of Understanding which takes IPR into consideration when developing new technology.

The ECP assignment is much more fruitful when project leaders are involved in the design of an itinerary and are committed to discuss findings and support the reviewer during the visit. The time and effort the project Leaders from Panama (12-021) devoted to the ECP visit was invaluable.

6. Lessons learned

- When funding is granted to well established, rooted, institutions there is much more fertile ground for outputs of projects of a discrete¹⁶ type to continue to be used and for projects of a contiguous¹⁶ type to continue sustainably post Darwin;
- Funding well established host country institutions with a remit for practical academic research is a good investment. Well financed host country institutions are not hampered by high overheads, thereby having flexibility to fund other project activities such as logistics, and complementary scientific research. Additionally, this type of institutions are likelier to continue to secure participation in Darwin projects, thereby increasing synergies between Darwin projects (i.e. such as up-scaling methodologies and use of baselines, 12-020) and contribution to partner institution's goals and objectives. INBio is a clear example of an institution that has been a partner in a suite of projects having participated in the following: 3-101, 12-020 (closed), and 15-027 (current);
- Funding projects for a longer timeframe increases possibilities of success for projects that have an ambitious purpose such as helping set up a protected area, because policy and regulatory timeframes impact on the delivery of their purpose.
- Closer scrutiny will have to be paid to projects which have a technology development scope primarily because the results can benefit the wider Darwin Initiative. For example, software developed with Darwin finance could be used at cost by other Darwin projects if the intellectual property rights are clear from start up. In the future, 'technology development' driven projects can clarify, at the application stage, what the outputs of their project will be and who the beneficiaries are. 'Technology and Innovation' workshops could be organized so projects with an element of technological transfer can disseminate outputs, exchange views and build synergies.

¹⁶ As described by PD Hardcastle, Darwin projects can be of different nature (PD Hardcastle, ECP 2006):

Discrete: completed, stable, good legacy potential as 'one off' contribution, may be developed further but probably as one element amongst others. An example is a computerised herbarium system. (PD Hardcastle, ECP 2006)

Stepwise: reaches a stable end point, great potential for further activities, these can be delayed for some time without major losses but note need to retain expertise.

Contiguous: need to have follow-on support immediately after the project ends to avoid catastrophic loss. Example is 12-021.

Annex 1 Terms of Reference

List of Closed Projects in Costa Rica and Panama

Evaluation	Evaluation of Closed Projects in Costa Rica and Panama				
	3-101	6-050 – CR	10-023	12-020	12-021
Country	Costa Rica	Costa Rica	Central America and Caribbean	Costa Rica and Nicaragua	Panama
UK Institution and Project Leader/Contact	NHM Ian Gauld	NHM Ian Gauld	NHM Alister Taylor	University of Wales, Bangor Dr Fergus Sinclair	Heriot-Watt University Dr James Mair
Partner Institution(s)/ Contact(s) per Project		University of Costa Rica UCR Prof J-C Briceño Dr P E Hanson	Central American Commission for Environment CCAD Bruno Busto Brol	National Institute of Biodiversity, Costa Rica Nelson Zamora	Smithsonian Tropical Research Institute, Panama. Hector Guzman
			IUCN Regional Office for MesoAmerica Alberto Salas	CATIE Dr Bryan Finegan	
Website		No longer active	No longer active	http://darwin.bangor.ac.uk	
Project Grant Values/project	£46,500	£142,894	£70,355	£173,661	£168,154
Project's Start / End Date:	1/11/93 - 1998	1/4/97 – 31/3/00	1/7/01 – 31/3/02	1/8/03 – 28/2/06	1/4/03 – 30/6/06
Reviewer	Anna Karp				

INTRODUCTION

The Darwin Initiative seeks to help the safeguard of the World's biodiversity by drawing on UK biodiversity expertise to work with local partners in countries that are rich in biodiversity but poor in financial resources. Particular emphasis is placed on:

- Conserving biological diversity within the context of the Convention on Biological Diversity, including sustainable use and the fair and equitable sharing of benefits arising out of the utilisation of genetic resources;
- Improving collaboration with host country/ies and strengthening their capacity to carry forward Darwin funded initiatives;
- Enhancing the overall legacy of Darwin projects.

The Darwin Initiative supports projects led by UK institutions, in partnership with host country institutions, which support biodiversity conservation over a range of ecosystems and locations. Five priority areas for Darwin funding include:

- Institutional capacity building.
- Training
- Research
- Work to implement the Convention on Biological Diversity
- Environmental education and awareness

In order to provide information on the impact and legacy of the Darwin Initiative, the Darwin ECTF Monitoring and Evaluation component is commissioning evaluations of projects that previously received funding from the Darwin Initiative (ie “closed” Darwin projects). Issues of sustainability are also integral components in the analysis of impact and legacy.

The approach applied by the Darwin Initiative M&E component is to select *clusters* of “closed” projects based on either a country, theme or eco-region. Such missions shall be undertaken in close consultation with UK based and host country institutions, and involve relevant in-country beneficiaries and stakeholders.

Objectives for the Evaluation of Closed Darwin Initiative Projects

The Evaluation of Closed Projects (ECP) is primarily intended to provide an external perspective on the legacy and impact of Darwin Projects, and to draw out innovations, lessons learned and best practices that account for positive legacy and impact.

Legacy and impact shall be accessed at different levels:

- At the **project level** – in terms of host country institutions and local partners and beneficiaries, and in terms of conservation achievements.
- At the **national & eco-region level** – in terms of host country policies and programmes, and if relevant at cross-boundary and eco-region level.
- At the **international level** – in terms of emerging best practices, and the CBD itself.
- At the **UK level** – in terms of legacy and impact within UK institutions.

Within the context of the above, the evaluation shall comment on how the clusters of projects evaluated have contributed towards achieving Darwin Initiative objectives. Comments shall include how later projects have built on earlier projects or been mutually supportive of each other.

Background of Projects to be evaluated

Costa Rica and Panama have been the focus of several Darwin projects. These completed projects present an opportunity to evaluate the long-term impact and legacy of Darwin projects in Costa Rica and Panama.

Project No.	Title	Purpose
3-101	Development of Human Resources to Participate in the Costa Rica National Biological Inventory, to Inventory Parasitic Wasps	Training of a Costa Rican biologist in techniques necessary for his participation in an inventory of Costa Rican fauna and in the production of field guides.
6-050	DAISY - Automating Insect Identification for Inventorying Costa Rican Biodiversity	To develop a computerised automated identification system for one group of common insects.
10-023	Enhanced biodiversity conservation through capacity building in Central America	To strengthen the capacity of Central American countries to implement the CBD by providing the National Focal Points of each country with the information management tools they need to evaluate the level at which they are implementing each article of the CBD.
12-020	Building Nicaraguan and Costa Rican capacity in biodiversity conservation	To build capacity in biodiversity assessment, conservation and management in Nicaragua and Costa Rica, through the facilitation of regional and international knowledge exchange and training.

Project No.	Title	Purpose
12-021	Marine biodiversity assessment and development in Perlas Archipelago, Panama	MAIN - To build up research expertise in a team dedicated to obtaining habitat information and to producing management plans for the marine and coastal environment of Las Perlas in the Gulf of Panama in order to enable the designation of a Marine National Park

Issues to be evaluated

The Evaluation of Closed Projects (ECP) shall review outcomes of Darwin Initiative funded projects against the original logical framework and Darwin proposal, Project reports and products, and through the following evaluation criteria:

Relevance: The extent to which the project outcomes correctly addressed identified problems and needs at the time of design, and whether these problems and needs were addressed as a result of the project. Guiding issues include:

- Appropriateness of the project design to the identified problems and towards supporting the implementation of the CBD.
- Complementarity and coherence with other related programmes and activities at national or local levels.
- Overall design strengths and weakness as reflected in the original logical framework.
- Extent of participation by host country institution and beneficiaries in initial consultations, and identification of problems and needs.

Efficiency: An assessment of how well the projects transformed their available resources into intended outputs in terms of quantity, quality and timeliness. Guiding issues include:

- Appropriateness and suitability of the technical methodology applied by the project and overall delivery of the technical assistance
- Review of project costs and value for money.
- Level of Partner country contributions in the project
- Extent of monitoring systems to assess progress and impact.
- Extent of the project's ability to adapt its programme and approach in response to changing assumptions and risks.

Effectiveness: To what extent the project outputs were achieved and to what extent they contributed to achieving the project purpose. In other words what difference the project has made in practice with the intended beneficiaries. Guiding issues include:

- Extent of the technical advances made by the project.
- Extent of institutional change within beneficiary institutions as a result of the project outputs and purpose.
- Validity of the assumptions and risks of the project at the purpose level, and how did these change during the course of the project
- Extent of the project's ability to adapt its programme and approach during the course of implementation in response to changing assumptions and risks.

Impact: To what extent the project purpose was achieved and thus contributed to the overall project goal (ie to work with local partners in countries rich in biodiversity but poor 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.). Guiding issues include:

- To what extent has conservation of biological diversity benefited (or expected to benefit) from the achievements of the projects.
- Have there been unplanned impact resulting from the projects and what have been their consequences.
- Have there been gender-related or poverty related impacts rising from the project.
- Have there been impacts on host country ability to implement the Convention on Biological Diversity.

Sustainability: Extent to which the outcomes of the projects, at either output or purpose level, have continued on after the end of the project. Guiding issues include:

- Extent of the ownership of the project purpose and achievements, and means for ensuring this ownership.
- Extent of the policy environment being in support of the project purpose and achievements.
- Extent of the institution capacity of host country and beneficiary institutions to carry forward project outcomes post project support, at the level of scientific, technological and financial considerations
- Extent of the socio-cultural factors being in support of project outcomes, and whether the project outcomes are well grounded.

Innovations, lessons learned and best practice:

- Report on any innovations developed by the project.
- What lessons do the project implementers report.
- Is the project implementing best practices, has it any indicators that it will do so?

Methodology

The ECP shall be undertaken in close collaboration with Darwin Project Leaders and host country institutions, and engage with project stakeholders and beneficiaries. Wherever possible, ECP consultants should consult with National CBD focal points.

The ECP consultant shall ensure that the ECP is informed through consultative and participatory work sessions and semi-structured interviews with project team members, project beneficiaries and other project stakeholders. Use of participatory assessment tools should be used where ever possible (eg timelines, mapping, stakeholder analysis)

Reporting and Feedback

No later than two weeks after the end of the field mission, the ECP consultant shall submit a **draft report** to the Project Leaders and the Darwin Programme Director. Thereafter, the Project Leader, host country institution(s) and the Darwin Programme Director shall have up to two weeks to submit comments to the ECP consultant. The ECP consultant shall finalise the ECP report no later than one week after receiving comments on the draft report, and Completion Summary, and will submit the report to the Darwin Programme Director, who will forward it to the PLs and Defra.

Please note that all reporting to the Darwin Programme Director should be sent to Darwin-Projects@ectf-ed.org.uk

As a guide, the ECP draft and final report should be no more than 15 pages (excluding annexes) and reflect the following outline.

- *Executive Summary:* A free-standing executive summary covering the key purpose and issues arising from the ECP; an outline of the main analytical points and the main conclusions, lessons learned, best practice and recommendations. It should be no more than two pages.

- *Main Text*: Should start with an introduction describing the projects being reviewed, collective context and the evaluation objectives. The body of the report should follow with a project by project description the review criteria described in the methodology describing the facts and interpreting them in accordance with key questions for the review.
- *Conclusions and Recommendations* according to partnerships, relevance, efficiency, effectiveness, impact and sustainability criteria.
- *Innovations, lessons learned and best practice* of the projects individually and collectively as well as the Darwin Initiative programme.
- *Advice on communications*: the ECP Consultant's views on how key messages about the project should be communicated and to which audience (eg press release in the UK or briefing to local FCO staff)

Annexes should include:

- the TORs for the ECP
- the Logical Framework of the project indicating original intended purpose and outputs, actual achievements by the end of the project, and outcomes at the time of the ECP
- A map of the project areas if relevant
- A list of persons/organisation consulted
- Documentation consulted (ie bibliography)
- Other relevant annexes as appropriate.

The *Completion Summary* should be a one page checklist of key issues from the ECP, pulling together the recommendations, lessons learned, best practice and the advice on communications. A template will be provided by the Darwin Programme Director.

Timetable for ECPs

June/July 07	Shortlist of clusters identified and sent to Defra for approval
+ 2 weeks from submission	Confirmation from Defra of ECPs to be undertaken. PLs contacted and initial arrangements made for ECP
+ 10+ weeks from confirmation	Field visit carried out
+ 2 weeks	Draft report sent out to PLs, host institutions and DPD
+ 2 weeks	Comments received from PLs, host institutions and DPD
+ 1 week	Final report and Completion Summary submitted to DPD
+ 1 week	Final report accepted by DPD and submitted to Defra for approval
+ 2 weeks	Final report accepted by Defra and circulated to PLs by DPD

Current Projects

While you are not required to review these projects, you should be aware that the following projects are currently active

Project Ref	Title	PL	Organisation	Partners	Dates
15-027	Baseline tools for Management of PN La Amistad	Alex Monro	NHM		1/7/06 – 30/6/09
14-001	Conservation and monitoring of Meso-American orchids	Vincent Savolainen	RBG Kew		1/6/05 – 31/5/08
EIDPO17	Conservation Management Zoning Implementation and Facilitation in Perlas Archipelago, Panama	Dr James Mair	Heriot-Watt University	Smithsonian Tropical Research Institute, Panama.	1/5/06 – 31/3/08

Annex 2 List of Peer reviewed Publications made available for review

3-101

Gauld I.D., Ugalde Gómez A. J., Hanson, P., Guía de los Pimplinae de Costa Rica, Revista Biológica Tropical – International Journal of tropical biology and conservation, 46-1, 1998

Ugalde-Gómez J.A., Gauld I.D., The Ichneumonidae of Costa Rica: subfamily Bancinae: tribu Atrophini, Memoirs of the Entomological Institute, 66, 1999, 306-366

Zuñiga Ramirez, R. J., The taxonomy and biology of the polycytrus species (*hymenoptera: ichneumonidae, cryptinae*) of Costa Rica, Contributions of the American Entomological Institute, 33-4, 2004

6-050

Alberch, 1993: Alberch P, 'Museums, Collections and Biodiversity Inventories', Trends in Ecology and Evolutions, 8, 372-375.

Gaston and May, 1992: Gaston K.J, and May R.M, 'Taxonomy of Taxonomists', Nature, 356:281-282.

Gauld 1986: Gauld I.D, 'Taxonomy - its limitations and its role in understanding parasitoid biology', in Wagge J, and Greathead D (eds), Insect parasitoids, Academic Press, London, pp:1-21.

Gauld 1988: Gauld I.D, 'A survey of the ophinae of Tropical Mesoamerica with a special reference to the fauna of Costa Rica', Bull. Brit. Mus. Nat. Hist, 57(1).

Gauld, I.D., O'Neill, M.A. & Gaston, K.J. 2000 'Driving Miss DAISY: the performance of an automated insect identification system: Hymenoptera: evolution, biodiversity and biological control' Eds. Austin, A.D. & Downton, M. CSIRO Publishing, Collingwood, pp. 303-312

O'Neill 2007: O'Neill M.A. 'DAISY: A Practical Computer Based Tool for Semi Automated Species Identification' In Automated Taxaon Identification in Systematics, Theory Approaches and Applications, N. MacLeod (Ed.) CRC Press, Ch.7, pp101-114.

PJD Weeks, ID Gauld, KJ Gaston and MA O'Neill, Automating the identification of insects: a new solution to an old problem, Bulletin of Entomological Research, 87, 1997, 203-211

Tilling 1987: Tilling S.M, 'Education and taxonomy: the role of the Field Studies Council and AIDGAP' in Berry R.J, and Crowthers J.H. (eds), Nature, Natural History and Ecology, Academic Press, London.

Weeks et al, 1997a: Weeks P.J.D, O'Neill M.A, Gaston K.J, and Gauld I.D, 'Automating the identification of insects: a new solution to an old problem', Bull. Ent. Res., 87, 203-211.

Watson et al, 2003: Watson A.T, O'Neill M.A, and Kitching I.J, 'A qualitative study investigating automated identification of living macrolepidoptera using the Digital Automated Identification System (DAISY)' Systematics and Biodiversity. 1:287-300

10-023

Peer reviewed publications were not in the scope of the project.

12-020

As included in the final report. No specific list of publications provided for the ECP.

12-021

Benfield S, Guzman H, Mair J M., “An assessment of mangrove forest structure and development after human reclamation in Panama City, Panama”. *Journal of Environmental Management*, 76, 2005, 263-276.

Defew L. H., Mair J. M., Guzman H. “An assessment of metal contamination in mangrove sediments and leaves from Punta Mala Bay, Pacific Panama”. *Marine Pollution Bulletin*, 50, 2005, 547-542.

Benfield S. Mapping marine habitats in Las Perlas Archipelago, Panama: an application of optical remote sensing, alternative image classifiers and a study of the community structure of reef associated fish. PhD Thesis, Heriot-Watt University, 2005, 395pp.

Medina B, Guzman H, , Mair J M. “Failed recovery of a collapsed scallop (*Argopecten ventricosus*) fishery in Las Perlas Archipelago, Panama”. *Journal of Shellfish Research*, 26, 2007, 9-15.

Benfield S, Guzman H, Mair J M, Young J. “Mapping the distribution of coral reefs and associated sublittoral habitats in Pacific Panama: a comparison of optical satellite sensors and classification methodologies”. *International Journal of Remote Sensing*, 28, 2007, 5047-5070.

Barrios L M. Taxonomy and general ecology of marine invertebrates from Las Perlas Archipelago, Panamanian Tropical Eastern Pacific. PhD Thesis, Heriot-Watt University, 2007, 236pp.

Agujetas, J., Mitchelson--Jacob G., The seasonal upwelling and primary production of the Gulf of Panama: ENSO implications. (in press) *Deep Sea Research I*.

Benfield S, Baxter L, Guzman H, Mair J “A comparison of coral reef and coral community fish assemblages in Pacific Panama and environmental factors governing their structure”. (under review) *Journal of the Marine Biological Association of the United Kingdom*.

Guzman H M, Benfield S L, Breedy O & Mair J M. “Revised distribution and diversity of coral reefs and coral communities in Las Perlas Archipelago, Panama”. (under review) *Environmental Conservation*.

Guzman H M, Cipriani, Vega A J, Lopez M & Mair J M. “Population assessment of the Pacific green spiny lobster *Panulirus gracilis* in Pacific Panama”. (Submitted September 28, 2007 to *Journal of Shellfish Research*)

Anderson , Guzman H M, Mair J M & Vega C. “The small-scale snapper fisheries (*Lutjanus peru* and *Lutjanus guttatus*) of Las Perlas, Pacific Panama”. (in revision for re-submission)

Annex 3 Itinerary and people consulted during the visit

Anna Karp

Itinerario Panamá y Costa Rica

5 – 14 de Noviembre 2007

Lunes 5

22.32 hrs: Llegada

Martes 6

7:30 hrs:	Sr. Hector Guzman 12-021	2-021 Coordinador
10:00hrs:	Lic. Georgie Novey	Vice-ministro – Autoridad Recursos Acuáticos Panamá
14:00 hrs:	Honorable Diputado Milciades Concepción y otros Diputados	Presidente Comisión Ambiente Congreso Nacional
16.00 hrs:	Alida Spadafora	Directora Ejecutiva ANCON Ex-PNUD –GEF
19.30 hrs:	David Andrews	Deputy Head of Mission Embajada Británica

Miércoles 7

07:30 hrs:	Nidia Esther Morales	Asesor, Alcaldesa de San Miguel, Las Perlas
10.00 hrs:	Darío Luque	Punto Focal Nacional ANAP
12: 00 hrs:	Inéz Campbell	Ex Darwin Fellow
17:00 hrs:	Salida a Perlas	

Jueves 8

07:00 hrs:	Alcaldesa Paula Mendieta González Corregidor Secundino Henríquez	Corregimiento de San Miguel Las Perlas
	Tour de Ballenas Jorobadas	

Viernes 9

09:20 hrs:	Salida Perlas – Panamá City
11:00 hrs:	Junta de Proyecto
16:20 hrs:	Salida a San Jo

Sábado 10

09:00 hrs: Salida a Campo 12-020
 Estación Biológica las Cruces Bryan Finnegan, Profesor CATIE
 CANCELADA
 Domingo 11

09:00 hrs: Viaje de Campo 12-020
 Estación Biológica las Cruces Bryan Finnegan, Profesor CATIE
 CANCELADA

Lunes 12

14:00 hrs: Dalia Sánchez 12-020
 Entrevista telefónica
 Ex Darwin Fellow

Martes 13

09:00 hrs: Prof. Paul Hanson 3/101 & 6-050
 Profesor Escuela de Biología UCR
 Visita – Colección de Insectos UCR

10:30 hrs: Juan Carlos Briceño 6-050
 Profesor UCR
 Colaborador de Darwin

14:00 hrs: Lesbia Sevilla 10/023
 Coordinadora Cooperación y
 Proyectos Sistema Nacional de Areas de
 Conservación (SINAC)

16:30 hrs: Sergio Musmanni Sobrado
 Revisión temática
 Consultor Estrategia Nacional de
 Cambio Climático, MINAE

Miércoles 14

09:00 hrs: Jesús Ugalde 3/101
 Director adjunto - Ciencias de la
 Biodiversidad INBio

11:00 hrs: Andrés Solís 12-020
 Departamento de Entomología INBio

13:00 hrs: H. Tom Kennedy Embajador Británico