

Darwin Initiative Annual Report

Important note:

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

Submission deadline 30 April 2008

Darwin Project Information

Project Ref Number	14-025
Project Title	Developing integrated assessment of biodiversity in secondary forest in Belize
Country(ies)	Belize
UK Contract Holder Institution	Centre for Ecology and Hydrology
UK Partner Institution(s)	Natural History Museum UK, Belize Audubon Society, Wildtracks
Host country Partner Institution(s)	Lindsay Maskell
Darwin Grant Value	£168291
Start/End dates of Project	May 2005-July 2008
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1 April 2007 to 31st March 2008
Project Leader Name	Lindsay Maskell
Project website	http://www.ceh.ac.uk/sections/eaf/EAFBiodiversityassessmentinBelize.html
Author(s), date	Lindsay Maskell April 24th 2008

1. Project Background

This project is located in Belize, Central America. It was developed in response to the recognition of absence of data on the relative biodiversity value of previously impacted forests, and their role and contribution within the national protected areas system. The project arises from a need to coordinate and collate information at larger geographic scales and to take an ecosystem level approach to understand the functioning of communities.

Whilst it builds on past and ongoing experience and studies of the UK and Belize project partners, the application of this experience to address the subject of the project is a new initiative. It is a collaboration between UK partners; the Centre for Ecology and Hydrology and the Natural History Museum and in Belize the Belize Audubon Society (BAS) which is the largest and leading national conservation NGO; BAS is the principal benefactor in the project, in terms of capacity-building, staffing and infrastructure; Wildtracks a smaller NGO, playing a lead role in national conservation management planning in Belize, coordinates and supervises the project.

2. Project Partnerships

The partnership between the UK lead partner and the coordinating agency in Belize has worked well with project visits and regular communication. The link with the other UK partner the Natural History museum has been slightly different than envisioned but the project has benefited greatly from the expertise of Dr. Sam Bridgewater from NHM.

Within Belize the partnership between Wildtracks and the Belize Audubon Society has been good, with Wildtracks using the structure and support of the Project to help build research capacity within BAS.

3. Project progress

3.1 Progress in carrying out project activities

Field collection of data

Vegetation plot sampling and general botanical sampling continued through the second quarter of 2007. By this stage all of the 3 study sites had been sampled to varying extent, with the number of survey plots in each site being dictated partly by logistics and weather conditions. In late May, sampling was undertaken in the more remote areas of Cockscomb in old-growth forest that will act as a control sample in the project design. In addition to completion of sample plots in this old growth forest, botanical surveys continued beyond the footprint of the plots and added considerably to the botanical knowledge of this species-rich area: several new plant records for Belize were recorded during this field trip.

Amphibian surveys were undertaken in Fireburn and Cockscomb. Bat surveying has continued with deployment of the Anabat equipment across the past land-use mosaics, primarily in the Fireburn Reserve and in the Cockscomb Basin Wildlife Sanctuary.

Data collection in the Fireburn Reserve was curtailed by the significant impacts of Hurricane Dean in August, with an estimated 90-95% tree-fall in some areas. Considerable time was required to retrieve the automated bat-recording equipment that was deployed at Fireburn at that time, and assessing the logistical obstacles to resuming sampling in the post-hurricane forest.

Avian assessments continued into March 2008, with one of the University of Belize student implementing the skills acquired through the Project's training under Dr. Lee Jones. Further soil work was undertaken in March 2008, but will be complemented in May with brief field visits to use a recently acquired soil penetrometer to accurately measure soil compaction across the land-use mosaic.

Identification of Botanical specimens

Once the botanical field sampling had been completed one set of botanical specimens were shipped back to the UK to allow formal identification. The botanist, Zoe Goodwin, spent 3 months working in the herbarium at the Museum of Natural History in London identifying species and updating species lists. Where identification was not possible at the Museum specimens were sent to the appropriate expert. This was excellent work, the field collection has been identified as far as possible. Several plants new to Belize have been found.

Data validation

The work at the Natural History Museum mentioned above is extremely important for validation of species identification. All historical information, plot and vegetation data has been entered into the database. Validation of the transcribed avian field records was completed in late April, and will be entered into the database in the second week of May – along with the amphibian data.

Data validation of the bat data, collected under the partnership with the Wildlife Conservation Society Terrestrial Programme resulted in the discovery of a very significant failing on the part of the relevant expert – resulting in very limited bat data being available. The outputs of this latter-day extension to the project have therefore largely been lost. This has only just become apparent and needs to be followed up.

Networking/links to other projects/activities.

Building on the collaborative relationships forged earlier in the project, work has largely focused on continued data collection and analysis. Networking has largely been at the level of maintaining liaison with partners, rather than forming new additional links. The Belize Audubon Society attended the 1st NRM Symposium hosted by the University of Belize on May 23-24. The Darwin Initiative Project funded the participation of the Belize Researcher at the XI Congress of the Mesoamerican Society for Biology & Conservation from Nov 25-29 in Oaxtepec, Mexico to present a poster.

3.2 Progress towards Project Outputs

Data analysis

A detailed analysis plan is in place and circulated to all project partners. Analysis of botanical data is ongoing, multi-variate analyses using species data and environmental variables (including Landuse) have been carried out for all sites. These will need to be repeated when soil data is available. Soil samples have been collected and are to be analysed in the US in May (via the links with the Belize Citrus Growers' Association). Additional data, on soil compaction, is to be collected across the mosaic of land-use histories – with a recently acquired professional-grade soil penetrometer. Results from both should be available by early June.

Students

Two Masters students have completed research dissertations in association with this project. One in botanical inventory of Cockscomb and one analysing patterns in botanical data. 17 students from the University of Belize have received basic training in field herpetology, and 2 in botanical, avian and herpetological sampling and/or assessment during this period of the project. Student response has been good, with a promising rate of uptake of ideas and likely continuation; one in particular has become a strong field technician and will continue using his acquired skills as part of the Wildtracks research team in partnership with the University of Belize. A seminar was recently presented at the University of Belize by Wildtracks – aiming to recruit additional UB undergraduates to continue the training initiated under the Darwin partnerships. Uptake was good, with the identification of the most committed applicants.

Training

Along with herpetological field sampling, training of additional personnel took place – with a total of 27 students and park staff receiving training.

In December staff from CEH visited Belize to carry out training in multi-variate analysis. CEH staff provided advice and guidance on spatial datasets and analysis. Simon Smart provided a day-long intensive session on multivariate analysis of species compositional data using the CANOCO package. This involved working through a checklist of analytical steps. The checklist was applied to the plant species and disturbance history data at Coxcomb to illustrate the complete analytical pathway from hypothesis generation through to final statistical testing of constrained ordination axes and the derivation of significant explanatory variables and indicator species. Two members of the Belize project team were present at this session and have since passed on these skills to the Belize researcher.

3.3 Standard Measures

Table 1 Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	TOTAL	Total planned from application
Established codes							
2	Masters theses achieved			2			
4A	Training in botany for UB students		28	2			
4B	Number of weeks		0.5	1			
4A	Training in herpetological techniques for UB students		15	2 + 17			
4B	Number of weeks		0.2	10 + 0.2			
6A	Review and planning workshop			3			
6B	Number of weeks		1	0.2			
6A	Training in fieldwork techniques for Darwin project team, workshops and on-the-job training,		15				
6B	Number of weeks		14				
6A	10 people (8 native to Belize, 2 resident for 20 years) received training course in GIS and database management	10					
6B	Number of weeks	1 week					
6A	Training for park personnel and community personnel in Herpetological techniques			18			
6B	Number of weeks			0.2 to 10			
6A	Training in multi-variate analytical techniques			3			
6B	Number of weeks			0.5			

8	Number of weeks spent by UK staff	5	5	3			
7	Field guide to plant families			1			
12A	Database established		1				
13A	Botanical species reference collections established, in Belize and at Botanical gardens Edinburgh		1	1			
14B	Attendance at conferences	3 days		4 days			
17B	Dissemination network enhanced/extended	1	1	1			
20	Vehicle, GIS computer,	11 179	1750				
22	Field plots		160	15			
23	Other funding	15 929					
New - Project specific measures							

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

Table 2 Publications

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

3.4 Progress towards the project purpose and outcomes

Progress towards the project purpose and outcomes has been good. Data collection has continued and validation of existing data by establishment of botanical reference collections and identification of species has been an important activity. Data analysis is well under way including transfer of skills in analytical techniques to host personnel. Data collected under the Project is already being used in conservation management decision-making, with the Belize Audubon Society benefiting from the adoption of a structured scientific approach to some issues. However, there have been some delays in the project which has resulted in a request for an extension until the end of July. The causes of the delay have been twofold, CEH staff have been heavily involved with an extremely large project for defra and other stakeholders, Countryside Survey, this survey takes place every 8 years and is an extreme event and unfortunately the skills that the CEH team bring to this project of large scale survey, informatics, data management and analysis are also needed for Countryside Survey. The main field and analytical period for CS is almost over so the delay requested to the project should be sufficient for analysis and report writing to be completed.

On the Belize side Hurricane Dean hit the Belize/Mexico border as a Category 5 hurricane on 21st August. This directly impacted our most northerly study site. It was extremely lucky that the hurricane had less effect than predicted on the property and infrastructure of our project partners in Belize, however there was substantial damage to the forest at the study site. Botanical fieldwork has finished at this site however there is some outstanding collection of data for other species groups. The main effect that this event has had on our study is that time has been spent clearing up from hurricane damage yet also assessing the damage to the forest by field visits and overflight and attempting to link previously identified plots to current impacts. Some planning will need to be incorporated to look at re-generation from hurricane impact.

The workshop on Analytical techniques was postponed from May to December. This is because the project was still in data collection phase, both primary data collection and subsequent identification of specimens the completed database was updated by species validations in November.

The project has made excellent progress towards objectives but it is recognised that a significant period of activity in analysis, report and paper writing is required. This is planned from May to August.

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

As recognised in the previous annual report enhanced conservation management, basing biodiversity assessment and conservation planning on reliable data is key to this, The data collected and research processes established are extremely important. The project has continued to make good progress at the site-level, and is optimistic that after the final stages of data collection and analysis this can be integrated into effective implementation of Belize's National Protected Areas Policy and System Plan. Capacity building for the Belize Audubon Society has been good – such that it is now better prepared to join Wildtracks' research team in ongoing and upcoming research initiatives targetted at filling significant data gaps for system-wide conservation action planning.

4. Monitoring, evaluation and lessons

Goals for this year have been the continued collection of data, validation, database maintenance and update and development of analytical processes and techniques. These have been fairly straightforward to monitor, validation of botanical specimens took place in the UK at the Natural History Museum and the project leader was able to visit several times to observe the process and check progress. The database was transferred between project partners whenever updates were made. The data has been used for analysis. Last summer a masters student from the University of Lancaster worked with the botanical data to carry out provisional analyses for his masters thesis. Subsequent to that the project team worked with the data to learn techniques in multi-variate analysis and then a series of analyses were carried out by the project leader for dissemination to the project team.

Monitoring on activities in Belize has been reliant on email contact with only one project visit in December. This visit involved training in multi-variate techniques, project planning and administration and site visits to one of the project study sites.

There has been some friction with the researcher employed by the project in Belize at the Belize Audubon society with concern over roles and responsibilities, this came to a head when planning analysis tasks. I hope that concerns have been allayed and that it is clear that all project participants will have a significant role in writing up results and receiving credit for their hard work. The researcher's contract has been extended with BAS beyond the end of the project so congratulations are due to her for that.

The Belize coordinator has again made an excellent job of coordinating activities in Belize and made a much greater contribution to the project than originally envisioned. All of the project team in Belize have worked hard to achieve success in progress on the project and should be congratulated.

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

There were some concerns raised by the reviewer of the previous annual report. These have hopefully been addressed in the responses provided with the half year report.

There was a concern that too much effort within the project was going towards capacity building and training to the detriment of the overall project aims. I don't believe this to be the case, I believe that the training and capacity building were always essential to the project, that any gaps in skills within personnel in country have been filled by bringing in botanical skills but that the contribution of those within the country has been considerable. They have brought their own skills to the project.

The reviewer raised concerns about tracking progress, having a detailed work plan for the year. A work plan was developed and activities have followed this. A detailed analysis plan was also developed for project participants and outlined activities, responsibilities along a timeline. As mentioned there has been slippage on the project and an extension has been granted by the Darwin secretariat.

6. Other comments on progress not covered elsewhere

7. Sustainability

The extended role of Wildtracks in project management has increased its capacity to implement and manage structured applied conservation research of this nature. Its lead role in several national conservation planning initiatives ensures that the project outputs and data resources are effectively integrated at both the site and national level. Capacity-building of Belize Audubon Society staff and University of Belize students has given them the skills to continue conservation-management research under the Wildtracks / CEPF Upper Elevation Amphibian Project – ensuring continued and sustained outputs towards enhanced biodiversity conservation.

8. Dissemination

Dissemination of project results has not yet taken place formally. However there have been a number of activities outlined above under networking which disseminate knowledge and experience to the wider community. Students from the University of Belize have continued to benefit by direct training on botanical and herpetological identification, by involvement of two students more closely through project work and through the interaction with Dr. Elma Kay a researcher at the university.

Networking has led to extending capacity by linking up to other projects and initiatives so broadening the impact of the work.

9. Project Expenditure

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

Item	Budget (please indicate which document you refer to if other than your project application)	Expenditure	Balance for 07/08	Balance for 08/09
Rent, rates, heating, overheads etc				
Office costs (eg postage, telephone, stationery)				
Travel and subsistence				
Printing				
Conferences, seminars, etc				
Capital items/equipment				
Others				
Salaries (specify)				
TOTAL				

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

This is not the original budget, it has been modified according to changes in project timetable agreed with Darwin secretariat.

Wildtracks has continued additional in-kind and actual co-financing, to the tune of approximately £6751.46 in third year.

CEH input £14 000 into this project from science budget.

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

We would prefer to highlight outstanding achievements when the final report comes out in 4 months time.

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

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

Project summary	Measurable Indicators	Progress and Achievements April 2007 - March 2008	Actions required/planned for next period
<p>Goal: <i>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve</i></p> <p><i>The conservation of biological diversity,</i></p> <p><i>The sustainable use of its components, and</i></p> <p><i>The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</i></p>			<p><i>(do not fill not applicable)</i></p>
<p>Purpose: To provide the tools for enhanced biodiversity assessment and gap analysis for more effective conservation planning at the local and ecoregional scale.</p>	<p>Establishment of database of species and habitat information.</p> <p>Collection of additional data from secondary forest regenerating from two different landuse scenarios.</p> <p>Increased understanding of relationship between landuse and biodiversity shown by results of analyses.</p> <p>Development of indicators of habitat quality and biodiversity conservation value.</p>	<p>The database has been updated with additional data and with validation results. It is a valuable resource for the country.</p> <p>Field data collection has taken place, Vegetation plot sampling has been completed with a total of 175 plots, botanical samples were collected, one set left in country and another exported to the Natural History museum for identification. A reference collection has been established by the botanist Zoe Goodwin at the Royal botanic gardens. Surveys on other taxa, birds, bats, herps have all been carried out and data entered into the database.</p> <p>Analytical plan developed with clearly outlined tasks and milestones. Analysis and interpretation are still ongoing.</p>	<p>There are still some outstanding tasks from the field collection of data, soil sampling has now been carried out and soils are being analysed, we are still awaiting results.</p> <p>Analysis will continue according to the detailed analysis plan.</p>

Output 1. Workshop/training on multi-variate analysis and Integrated assessment	Report of workshop, Understanding of techniques Further training of additional personnel by workshop participants	All of these measurable indicators have been achieved, the workshop was carried out, a report produced and subsequent to that these skills have been passed on to other project personnel.
Output 2. Integrated assessment of relationship between landuse and biodiversity. Identification of indicators of habitat quality.	Masters theses Final report Scientific papers	This output is progressing, results will be judged when the final reports are produced.
Activity 2.1. Dissemination of analysis results within project team		Results circulated, commented on by project team and input to final report and papers.
Activity 2.2. Production of Final report		Planned for after the end of July 2008 when the project finishes
Activity 2.3. Submission of scientific papers		Planned for after the end of July 2008 when the project finishes
Activity 2.4 Wider dissemination of results, Communication of project objectives and results to stakeholders		Abstract submitted to conference in Belize on conservation planning in June, Final workshop for project will take place after report completed. The contract specifies that the final workshop to present results and syntheses to Belize experts and others would be a maximum of 5 days in length. It was thought that a shorter workshop would probably suffice. However, the core results need to be finished in enough time for the team to reduce them down to simple messages that can be disseminated to the local communities on each site. Disseminating these messages might not need visits to each community by the whole team.
Output 3. Database of biotic and abiotic data	Functional Access database containing all species records, all associated plot information including previous landuse.	Database will continue to be updated where necessary and will be a valuable resource within Belize.
Output 4; permanent plots established	165 plots established and vegetation recorded	The Belize project team are very happy with the way the plots have been identified and their locations recorded and confident they could be revisited at any point in the future despite hurricane damage at Fireburn.
Output 5: Increased understanding of value of secondary forest and its role within the national protected areas system	Increased knowledge of distribution and habitat use of various species in Belize	This process has begun amongst project personnel and beneficiaries of training such as the students from University College Belize. However, the main phase for this is post analysis and scheduled for July.

Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Goal: 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 <ul style="list-style-type: none"> • the conservation of biological diversity, • the sustainable use of its components, and • the fair and equitable sharing of benefits arising out of the utilisation of genetic resources 			
Purpose To provide the tools for enhanced biodiversity assessment and gap analysis for more effective conservation planning at the local and ecoregional scale.	Establishment of database of species and habitat information. Collection of additional data from secondary forest regenerating from two different landuse scenarios. Increased understanding of relationship between landuse and biodiversity shown by results of analyses. Development of indicators of habitat quality and biodiversity conservation value.	Reports by host and partner countries Field survey reports by partner institutions Scientific papers Field-testing of resulting predictive modelling & data	That data is spatially compatible. That the project is supported by local experts in species identification and historical changes in landuse.
Outputs Technical workshop Workshops and seminars on integrated assessment and biodiversity Database of biotic and abiotic data Recommendations for management Increased understanding of value of secondary forest and its role within the national protected areas system	Host country personnel trained in database and GIS techniques At least 10 students from University College Belize and 15 'A' level students from Corozal to be involved in the project over the three years. Communication of project objectives and results to stakeholders Increased knowledge of distribution and habitat use of various species in Belize	Record of workshops and training Record of student involvement Copy of scientific papers, reports and management recommendations to Darwin Integration of resultant data sets into national and local site conservation planning	Staff to be trained remain in post and committed to the project That site conservation planners and protected areas managers continue to recognize the need to integrate this data within their work, to enhance biodiversity conservation in Belize

Reports Scientific papers			
<p>Activities</p> <p><i>Workshops and seminars</i></p> <p><i>Establishment of database</i></p> <p><i>Research programme</i></p> <p><i>Reports and Management recommendations</i></p>	<p><i>Yr 1: Project planning workshop with project team to establish priorities, methodologies and procedures (5 days); Project and biodiversity information seminar for local communities (1 day at 3 different locations); Technical workshop on databases and GIS (5 days). Yr 2, Yr 3: Research result workshops; Yr 3; Final workshop (5 days); Final project information seminar for local communities (3 days as above);</i></p> <p><i>Yr 1: Establishment of infrastructure for database and GIS. Staff in Belize trained to input data and carry out analyses. Identification of data gaps. Yr 2: Additional data added to database, Yr 3: Database maintained, staff identified to continue to maintain and develop after project lifetime.</i></p> <p><i>Yr 1: Gaps identified in data available for integrated assessment, collation of biotic and abiotic data from external sources where possible Yrs 2 and 3: Field collection of data, transects and plots established in natural and human regenerated areas; collection of land-use and historical information Yr 3: Integrated assessment of relationship between landuse and biodiversity. Identification of indicators of habitat quality.</i></p> <p><i>Yr 1: reports of workshops and seminars, summary of achievements in 01 identifying data gaps. Yr 3: Final report including data analyses and management recommendations.</i></p>		

Annex 3 onwards – supplementary material (optional)

Checklist for submission

	Check
Is the report less than 5MB? If so, please email to Darwin-Projects@ectf-ed.org.uk putting the project number in the Subject line.	
Is your report more than 5MB? If so, please advise Darwin-Projects@ectf-ed.org.uk that the report will be send by post on CD, putting the project number in the Subject line.	
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you completed the Project Expenditure table?	
Do not include claim forms or communications for Defra with this report.	