Darwin Initiative – Final Report

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

Darwin project information

Project Reference	14-025
Project Title	Developing integrated assessment of biodiversity in secondary forest in Belize
Host country(ies)	Belize
UK Contract Holder Institution	Centre for Ecology and Hydrology
UK Partner Institution(s)	Natural History Museum UK,
Host Country Partner Institution(s)	Belize Audubon Society, Wildtracks
Darwin Grant Value	£168 291
Start/End dates of Project	May 2005-March 2009
Project Leader Name	Lindsay Maskell
Project Website	
Report Author(s) and date	Lindsay Maskell April 6th 2009

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 support to the Convention on Biological Diversity (CBD)

- The project has set up a new database derived from ecological recording within a new baseline of fixed monitoring plots. The simultaneous recording of land-use history and soil measurements favours explaining differences in species occurrence and underpins the search for indicators of disturbance. This contributes to article 7 “identify processes and activities that have adverse effects; maintain and organise relevant data”.

- The primary contribution of the project has been in building scientific and taxonomic capacity in Belize. Training in GIS, multivariate analysis of species and environment data was carried out during the project, there has been taxonomic training on plants, reptiles, amphibians and bats and this leaves a legacy of increased competence in

analysing and collecting monitoring data. Host-country partners gained increased experience in taxonomic recording and data collection.

- Established fruitful links and networking among project partners. Very important collaborative links.

- Project has maintained ongoing communication and collaboration with the Forest Dept of Belize as the CBD focal point. It has also provided capacity building training courses in various areas for Forestry Dept staff. Outputs from project will contribute to article 6 national conservation planning through links with Forestry Department and other initiatives that partner organisations are involved with.

3 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 initial link was between the project manager and the Belize coordinator who had worked together previously. The need for the project arose from the Belize partners who have significant involvement with conservation planning in Belize and perceived a gap in knowledge regarding the conservation importance in terms of biodiversity of forest subject to disturbance. The partnership has expanded to include other members of staff from CEH in particular Dr. Simon Smart has played a significant role and been on many visits. Interaction between UK based staff and Belize based personnel has led to the fostering of new links and other initiatives (a NERC project proposal was submitted involving the Belizean partners). As discussed in previous reports the Belize co-ordinator has taken on a greater role in project management than previously planned, however, this has worked very well and has increased the capacity of Wildtracks 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.

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. Other institutions which have become involved are Edinburgh University, The University of South Carolina and the Royal Botanic Gardens, Edinburgh.

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. A memorandum of understanding was developed at the beginning of the project between the two Belizean organisations.

There has been a joint planning process between all parties which has worked well and co-operatively.

4 Project Achievements

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

The project is at an early stage in impacting on biodiversity. A combination of data gathering, analysis, interpretation, training, networking and skills transfer has enabled progress in identifying the impacts of human intervention on biodiversity in forest areas and making quantitative assessments on species composition and number. Institutional capacity in enabling biodiversity conservation has been improved for BAS and Wildtracks and some training of personnel from other conservation organisations. This information needs to be fed into conservation planning, this process has begun through the Belizean partner organisations involvement in current national initiatives to assess the efficacy of the protected area system in its primary mandate of biodiversity conservation.

4.2 Outcomes: achievement of the project purpose and outcomes

The project purposes as outlined in the proposal were as follows;

- *To determine the biodiversity value of secondary forest tracts within and surrounding three protected areas, that are regenerating from past natural and anthropogenic impacts*

This has been done by mapping and recording land use and locating vegetation plots within areas subject to different disturbance regimes. Birds, amphibians, reptiles and some mammals have also been recorded in association with these.

- *To create databases of habitats, plant and animal species within the three protected areas by collation of existing data and additional data collection*

An Access database has created to contain all of the data collected within the project. It is an extremely valuable resource for research and conservation planning in Belize.

- *To develop a basic GIS of habitat types, species and landuse within and surrounding the three areas to use as a tool for biodiversity assessment*

Spatial data has been collated from other sources and collected in the field. Data for all three of the study sites has been collected with maps of past landuse as well as any available data from other sources such as previous vegetation mapping, Geology, topography, etc. The data collected on plants and animals can be spatially referenced through the recording of GPS locations so is able to be repeated in the future.

- *To compare forest regeneration in naturally regenerated forests (e.g. post-hurricane) with that from anthropogenic landuse specifically post-agricultural*

Analysis has been carried out to compare the species composition of areas subject to hurricanes and natural disturbance with areas subject to anthropogenic landuse.

- *To relate past landuse and surrounding landuse to biodiversity and attempt to identify indicator species that could be used to demonstrate conservation status*

Past and present Land use has been related to biodiversity and species composition and indicators identified to demonstrate conservation status.

4.3 Outputs (and activities)

The project proposal outlined many outputs concerned with training and capacity building such as technical workshops (GIS and database construction), integrated assessment of diversity. These were all successful and outputs went beyond those outlined in the proposal. There were field workshops, assessing methods for field techniques, herpetological training for project personnel as well as other staff from partner organisations and students, training in other techniques such as recording bat species. There was also training in multi-variate analysis.

The database was also an output which is a very useful resource. The botanical data was of a very good quality and reference collections have been established in the UK and Belize. An increased understanding of the value of secondary forests is emerging but there is more work to do on this which is very exciting. The work has been disseminated at conferences and in a short paper to conference proceedings. There is a technical report attached to this report which summarises analysis to date. There is still work to do in submission of further scientific papers which has unfortunately not been possible during the project. This activity will take place soon as it is of importance to all partners to get the work peer reviewed and publicly available.

4.4 Project standard measures and publications

These can be seen in Appendix 4.

There were 2 masters students working on the project towards a thesis. There were many people involved in training activities, these have been explained elsewhere but involved students, project staff, staff from other NGO's and Forest Department in many different types of short term training. Two University of Belize students were more deeply involved with the project and working on their own undergraduate theses. Three core project staff received on the job training as well as attending any courses available. The training materials were made available subsequent to the courses. Two photographic botanical guides were produced which have been sent to Darwin previously. A database has been created, enhanced and handed over to the host country. Many conferences have been attended. Two botanical reference collections have been created one within the host country and one in the UK (for identification purposes). A dissemination network has been created and one enhanced. 175 field plots have been established. There should have been more outputs on research findings, a dissemination leaflet and scientific papers. The field collection and training effort was substantial and took up a lot of time in the first three years getting us to a position of strength from which to analyse and interpret. This last year not a lot of staff time has been put into the project (as can be seen from the staff costings), until December CEH staff were committed elsewhere. However there has been recent progress on analysis and writing up research findings, a technical report has been produced and paper writing is ongoing. Rather than extend this project any further we intend to work on publications as a research centre activity, it is important to CEH to publish in peer reviewed journals and important for the project for work to be recognised internationally. We intend to submit papers within the next few months.

4.5 Technical and Scientific achievements and co-operation

The project has addressed all of the aims and objectives outlined above. There was an ambitious scope to the project, having identified a gap in knowledge of the value of secondary forest to biodiversity it was decided to determine their value by looking at the distribution of different taxa. Plants were the primary focus as being extremely important as the basis of biodiversity, also more easily sampled, described and identified and disturbance type attributed, birds were also recorded by an expert ornithologist, bats were recorded, however this was unsuccessful due to failure of acoustic equipment and amphibians and reptiles also recorded. Other mammals were recorded where possible but it was beyond the scope of the project to make a full study of mammalian activity. Other initiatives looking at mammals within the study areas were ongoing outside of the project. As well as collection of new field data and collation of existing data the project was particularly concerned with establishing the principals of quantitative assessment, experimental design was discussed and the first phase of the project consisted of land use mapping, scoping site locations, collecting information on land use history and setting up a database for data entry. Recording of the vegetation plots involved collection of biotic and abiotic data and specimens were taken where necessary, two sets were taken, one left in Belize and the other shipped back to the UK and the project botanist spent time at the Natural History Museum in London and the Royal Botanic Garden, Edinburgh identifying and preparing the specimens. They now reside in the Royal Botanic Garden and information is available on them electronically. http://elmer.rbge.org.uk/bgbase/vherb/bgbasevherb.php.
The database has been updated and is a very good resource for future work in Belize. The plot location was recorded by GPS and the plots are able to be re-visited. This is particularly useful at Fireburn where Hurricane Dean in 2007 caused a great deal of damage. Subsequent work will be able to compare pre-hurricane plots with post-hurricane.
Subsequent analysis has related disturbance history to plant species composition and revealed interesting patterns in the data. Indicator species have been identified which can be associated with different types of landuse. The bird and herpetological data has also been assessed and potential indicators determined. This can be seen in the attached technical report.

4.6 Capacity building

There has been a great emphasis on capacity building within the project. The training run by the UK partners has been mentioned already and outlined in the outputs and technical report, this focused on data collation and management, GIS, databases, field skills, experimental design, statistical analysis and emphasised a scientific approach to data collection.
The Belizean partners had many skills and experience which they brought to the project, however, there were some gaps in knowledge notably botanical skills that were identified and addressed. Additional staff were employed through the project and training and knowledge dissemination has gone further through staff employed by BAS in the parks, students at the University of Belize and staff from other NGO's and the Forest Department. The project employed a researcher based at BAS to coordinate the research and fieldwork. She had good skills in GIS and data management but was not a botanist. During the project she received botanical training through a training course and worked alongside an experienced botanist to significantly improve skills. Other members of the project team also improved botanical knowledge, identification and methodologies. Training in identification of other taxa also took place during the project for the project team, herpetological training and the use of acoustic equipment to record bat calls were provided by experts. In addition there were many other training opportunities through networking, on the job experience, meeting up with people from other projects and conferences. The project also increased the organisational capacity of Belizean partners by formation of new collaborations and partnerships to promote and enhance project activities.
Enduring project achievements include the quantitative approach to field assessments based on hypothesis-led goals and analysis.
Capacity of the UK project team has also been improved through the project. Members of CEH staff now have an understanding of how well techniques used in assessment and monitoring of UK habitats can be applied to tropical systems. Knowledge and skills exchange is a two way process and team members have benefited enormously from working with the Belizean project partners carrying out training activities in different situations, experiencing new methods of working and being introduced to new habitats and species.

Equipment was provided as part of the project, there were numerous smaller items of field equipment to build capacity in botanical sampling and identification such as guide books, equipment for sampling canopy vegetation, presses, camera for photographing specimens. There was equipment for soil sampling and recording of abiotic components (e.g. lux meter). Two computers were provided along with GIS software. A vehicle was purchased which was essential for fieldwork and will be retained by the project partners.

The Wildtracks/Critical Ecosystem Partnership Fund (under Conservation International) supported amphibian project has also reviewed and built on methods and outputs from the project. This is significant because the outputs of that project will contribute to the Centro American Commission for Environment and Development (www.ccad.ws) responsible for implementation of the CBD.

4.7 Sustainability and Legacy

Some project staff have moved on since the end of the project (the practical data collection phase had finished by March 2008). The Belizean BAS researcher has gone onto do an MSc at Leeds University (started in October) building on skills that will come back to Belize. Wildtracks is integrating an increased skills base into ongoing national and regional conservation planning initiatives. The project botanist Zoe Goodwin has gone on to be involved in further project work. She is also returning to Belize to do further botanical work in 2009. The two primary University of Belize interns have graduated and used their acquired additional skills in securing positions at the University of Belize and in the Department of the Environment.
Further projects will be scoped. There has already been a submission of a NERC grant proposal which included Belize as a site to study the impact and relevance of organic contaminants in mountain ecosystems as a result of discussions between Wildtracks and a CEH member of staff Dr. Paul Schofield. Unfortunately the proposal was unsuccessful but may be able to be re-submitted in the future.

There are other ideas for future project work being discussed and it is hoped that these will be developed into successful proposals. One is that there will be field-testing and validation of indicator species.

5 Lessons learned, dissemination and communication

Key lessons to learn have been that securing a broad consensus on approach has been critical. Project experience certainly suggests that the loose rein allowed by DARWIN over tactical decisions was a key element in the success of the project.
There have been difficulties caused to the project by the conflict in demand on staff time between this project and a major CEH/defra project the Countryside Survey. The skills which CEH staff brought to this project of ability to carry out monitoring on large scales, research experience in relating Land use to biodiversity, analytical and GIS experience were also of key importance to Countryside Survey. When this project was proposed there was no agreement or planning on when the Countryside Survey would take place or who it would involve. There has also been the added problem of CEH re-structuring which resulted in staff losses and increased the pressure on scarce staff resources.

Dissemination of project achievements is underway at present and will continue after the project has officially finished. There have been a number of activities which disseminate knowledge and experience to the wider community. The Belize Audubon Society attended the 1st National Resource Management Symposium hosted by the University of Belize in May 2007. The Darwin Initiative Project funded the participation of the Belize Researcher at the XI Congress of the Mesoamerican Society for Biology & Conservation in Nov 2007 in Oaxtepec, Mexico to present a poster. A poster with results from the project was presented at the 2nd Natural Resources Management Symposium at the University of Belize in June 2008 organised by the Belize chapter of the Mesoamerican Society for Biology and Conservation. This work has subsequently been written up and submitted as a short paper for the Society's journal '*Mesoamericana*'.

5.1 Darwin identity

DARWIN is well known as a funding stream for conservation projects within Belize NGOs and government hence its profile was already high.

There was a good level of understanding and appreciation of the contribution and role in funding biodiversity and conservation research. This awareness extends to researchers and planners, professional ecologists and decision makers in NGO's and government.

6 Monitoring and evaluation

There were no major changes to the project log frame during the project. There was an extension of a year to completion but this did not require extra funding or project activity, it just meant that final analyses and writing up were put on hold because of staff time conflicts. It was in no way a reflection of this project as everything proceeded satisfactorily.

The indicators were all very straightforward e.g. measurable indicator 'Establishment of database of species and habitat information' and the verification was a copy of the database with all relevant information within. All of the indicators were quite simplistic and perhaps in future projects it would be best to break these down into smaller tasks. This would have been helpful for the project researcher in Belize who would have preferred tighter control over project activities and more guidance. The advantage of having fairly high level objectives and indicators was that it enabled the project to have a great deal of flexibility. Fieldwork could be scheduled but then adapted to changing circumstances and conditions, advantage could be taken of new opportunities such as attending other training courses or conferences, additional personnel could be brought into the project as and when required. There was ongoing review of progress within the Belize team and feedback of information to the UK partners. There was also regular reporting, every visit of the UK project team to Belize was reported, the researcher provided regular reports and the UK project manager and Belize co-ordinator were in frequent email contact.

An internal audit (within CEH) was undertaken for this project in January 2009 to ensure that it complied with the joint code of practice for research. This involved examination by experienced auditors of all documentation for the project, administration, personnel structure, competence of project personnel, workplanning, finance, methodologies, database documentation and reporting. They went through these in fine detail with the UK project manager to explain and interpret and it was a thorough process. The audit was very favourable and it was recognised that the project complied well with the joint code of practice. This is due in part to the reporting structure required by Darwin as regular 6 monthly reporting and evaluation of project activities against a timetable ensures that consideration is put into ensuring good quality outputs and documenting past achievements and future strategies.

6.1 Actions taken in response to annual report reviews

There were concerns raised in the annual report review 06/07, these were mainly a concern that too much effort within the project was going towards capacity building and training to the detriment of the overall project aims, this may have been due to a misunderstanding that the project partners were not sufficiently skilled. In fact after the project had begun and we had appointed a researcher it was realised that although the in country personnel had many varied and useful skills we were lacking in the area of botanical identification. To overcome this a botanist with skills in identification and taxonomy of tropical plants was brought in. The project put a major emphasis on training and capacity building, as well as collecting data the aim of the project was to establish a culture of quantitative assessment, to enable work to be published in peer reviewed journals, and to leave project staff with a greater skills complement than before the project began so we don't believe that too much focus has been put on this.

The reviewer also 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 developed for project participants and outlined activities, responsibilities along a timeline. This timeline was not strictly adhered to because of the problems mentioned with conflicts on the UK staff's time which is why the project was given an extension.

7 Finance and administration

7.1 Project expenditure

	2005/2006	2006/2007	2007/2008	2008/2009	TOTAL
Rents, rates, heating , cleaning, overheads					
• Darwin funding					
• Other funding					
Office costs e.g. postage, telephone, stationary					
• Darwin funding					
• Other funding					
Travel and subsistence					
• Darwin funding					
• Other					
Printing					
• Darwin funding					
• Other					
Conferences, seminars etc.					
• Darwin funding					
• Other funding					
Capital items/equipment (please break down)					
• Darwin funding Vehicle purchase 2 x GIS dedicated computer Field equipment Arc editor license					
• Other funding Field equipment Use of additional vehicle					
Other costs (including Audit costs to a maximum of £500) (Please specify and break down)					
• **Darwin funding** Vehicle ins.lic.maintenance Fuel					
• Other funding					
Salaries (from previous table)					
• Darwin funding					
• Other funding					
TOTAL PROJECT COSTS					
TOTAL COSTS FUNDED FROM OTHER SOURCES					
TOTAL DARWIN COSTS					

Project team member	2005/2006		2006/2007		2007/2008		2008/2009	
	Darwin	**Other**	**Darwin**	**Other**	**Darwin**	**Other**	**Darwin**	Other
Lindsay Maskell, CEH Rick Stuart, CEH Simon Smart, CEH Les Firbank, CEH Martin Rossall, CEH Claire Wood, CEH Paul Schofield, CEH **CEH total** Dr. Malcolm Penn, Nat.Hist.Mus. **NHM total** Paul Walker Normando Mora Wildtracks assistants x 3 Zoe Goodwin BAS researcher 2 x BAS Field assistant Elma Kaye 3 x Univer Belize undergraduates Lee Jones **Belize total**:								
TOTAL COST OF SALARIES								

7.2 Additional funds or in-kind contributions secured

The matched contribution promised in the original proposal has nearly been secured, we are slightly down on that promised but this is due in part to not adequately costing additional in-kind contributions such as those primarily associated with the increased role of the Belize Project Coordinator (increased time), and with the invaluable unpaid professional input of botanists Dr. Samuel Bridgewater and Dr. Steven Brewer. Although financial values of these three additional in-kind contributions have not been assessed, they are recognized as considerable.

7.3 Value of DI funding

The DI funding has been invaluable in enabling many activities that will enhance and protect biodiversity in secondary forest. Much of the forest in Belize has been subject to some sort of anthropogenic disturbance but there was insufficient understanding of exactly how human activities were impacting such forests, how species composition would be altered and how long recovery and regeneration would take. This project has created a really good baseline of diversity information and its relationship with different landuses which can be incorporated into conservation planning. Darwin funding has enabled simultaneous comparison of three sites across Belize, a project on this scale would never have been possible without it. Capacity has been built in all partner organisations including training of personnel and provision of vital equipment to enable future scientific habitat assessment and monitoring activities. By working on multiple scales across taxa this has enabled broad hypotheses to be tested which can feed directly into conservation planning.

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

Project summary	Measurable Indicators	Progress and Achievements	Actions required/planned for next period
Goal: *To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve* *The conservation of biological diversity,* *The sustainable use of its components, and* *The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources*			*(do not fill not applicable)*
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.	The database has been updated with additional data and with validation results. It is a valuable resource for the country. 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 at the Royal botanic gardens. Surveys on other taxa, birds, bats, herps have all been carried out and data entered into the database. Analysis and interpretation have been carried out and results can be seen in the attached technical report. Indicators have been identified to relate to different types of landuse.	Still not had soils results Paper writing Leaflet for dissemination in Belize

Output 1 Technical workshop on GIS and databases	Report of workshop with feedback Use of techniques	This was a useful training and capacity building exercise for the project team and for other conservation organisations in Belize. The skills learnt in this workshop have been built on since.	
Output 2. Workshop and field training including pilot testing of methods	Report of workshop Incorporation of results into methodology Use of field techniques	This activity led to training in use of field equipment and established the methodologies to be used in the project.	
Output 3; training of in-country personnel in Herpetological techniques	Report of training Application of techniques to field collection of data	Training was carried out by in-country personnel for Belizeans including members of the core project team, students from the university and other personnel from BAS.	
Output 4; training of in-country personnel in bat recording techniques	Report of training Application of techniques to field collection of data	Training was carried out successfully however, data collection relied on the use of electronic recording equipment which subsequently failed.	
Output 5. 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 6. Integrated assessment of relationship between landuse and biodiversity. Identification of indicators of habitat quality.	Masters theses Final report Scientific papers	Two Masters theses have been completed, two student project dissertations, a final technical report, a poster and short paper for a conference.	
Activity 6.1. Dissemination of analysis results within project team		Results circulated and discussed at project meeting, commented on by project team and input to final report and papers.	
Activity 6.2. Production of Final report		Technical report attached	
Activity 6.3. Submission of scientific papers			There is still ongoing work on publication of scientific papers.
Activity 6.4 Wider dissemination of results, Communication of project		Poster presented at conference in	Dissemination leaflet being

objectives and results to stakeholders		Belize on conservation planning in June 2008, paper written up and submitted to Mesoamericana.	prepared.
Output 7. Database of biotic and abiotic data	Functional Access database containing all species records, all associated plot information including previous landuse.	Database updated and will be a valuable resource within Belize.	
Activity 7.1 Collection of field data		Vegetation data collected in 10m x 10m plots. Birds surveys carried out in association with landuse types. Herpetological data collected	
Output 8. permanent plots established	175 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 9: 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. A project meeting in February 2009 consolidated analytical results and progressed on linking technical results such as identification of indicator species to conservation planning in Belize.	
Output 10: Report and recommendations for management	Technical report attached	The above mentioned linkage of scientific outputs to management recommendations can be seen in the attached report.	

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

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** • **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.	Email communication and project visits Reports by host and partner countries Field survey reports by partner institutions Workshops Technical report Scientific papers	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	Host country personnel trained in database and GIS techniques At least 10 students from University College Belize to be involved in the project over the three years.	Record of workshops and training Record of student involvement- the number of students from UCB was exceeded and 2 became more intimately associated	Staff to be trained remain in post and committed to the project. Staff did remain in post for life of project, have moved on to gain new skills but will return to Belize. That site conservation planners and protected areas managers continue to recognize the need to integrate this data within their work, to enhance 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 Reports Scientific papers	Communication of project objectives and results to stakeholders Increased knowledge of distribution and habitat use of various species in Belize	with the project. Database completed and regularly updated Technical outputs, reports and papers. Integration of resultant data sets into national and local site conservation planning	conservation in Belize
Activities *Workshops and seminars* *Establishment of database* *Research programme* *Reports and Management recommendations*		*Yr 1: Project planning workshop with project team to establish priorities, methodologies and procedures (5 days);; Technical workshop on databases and GIS (5 days).Yr 2, Workshop on experimental design and field skills Yr 3: Research result workshops; Yr 3; Final workshop (5 days);* *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.* *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.* *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.*	

Annex 3 Project contribution to Articles under the CBD

Project Contribution to Articles under the Convention on Biological Diversity

Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use	5	Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	40	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation	5	Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation		Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity	5	Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures		Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	30	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
13. Public Education and Awareness	5	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimizing Adverse Impacts		Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources		Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.

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

Annex 4 Standard Measures

Code	Description	Totals (plus additional detail as required)
Training Measures		
1a	Number of people to submit PhD thesis	
1b	Number of PhD qualifications obtained	
2	Number of Masters qualifications obtained	2
3	Number of other qualifications obtained	
4a	Number of undergraduate students receiving training Botanical training Herpetological training	 30 17 + 2
4b	Number of training weeks provided to undergraduate students Botanical training Herpetological training	 45 26.8
4c	Number of postgraduate students receiving training (not 1-3 above)	Zoe Goodwin 1
4d	Number of training weeks for postgraduate students	1
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(ie not categories 1-4 above)	3 Norman Morando Ivis Chan Emmerson Garcia
6a	Number of people receiving other forms of short-term education/training (ie not categories 1-5 above) Review and planning workshop Training in fieldwork techniques Training in GIS and database management Training in herpetological techniques Training in multi-variate techniques Training in bat recording	 3 15 10 18 3 5
6b	Number of training weeks not leading to formal qualification Review and planning workshop Training in fieldwork techniques Training in GIS and database management Training in herpetological techniques Training in multi-variate techniques Training in bat recording	 3.6 15 10 18 1.5 2.5
7	Number of types of training materials produced for use by host country(s) Field guide to plant families GIS and databases- training materials	 2 1

Code	Description	Totals (plus additional detail as required)
	Training materials on multi-variate analysis	1
Research Measures		
8	Number of weeks spent by UK project staff on project work in host country(s)	15
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	
10	Number of formal documents produced to assist work related to species identification, classification and recording.	2
11a	Number of papers published or accepted for publication in peer reviewed journals	
11b	Number of papers published or accepted for publication elsewhere	1
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	1
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	
13a	Number of species reference collections established and handed over to host country(s) Botanical species reference collections in Belize and Royal botanic garden, Edinburgh	2
13b	Number of species reference collections enhanced and handed over to host country(s)	
Dissemination Measures		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	2
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	4
15a	Number of national press releases or publicity articles in host country(s)	
15b	Number of local press releases or publicity articles in host country(s)	
15c	Number of national press releases or publicity articles in UK	
15d	Number of local press releases or publicity articles in UK	
16a	Number of issues of newsletters produced in the host country(s)	
16b	Estimated circulation of each newsletter in the host country(s)	

Code	Description	Totals (plus additional detail as required)
16c	Estimated circulation of each newsletter in the UK	
17a	Number of dissemination networks established	1
17b	Number of dissemination networks enhanced or extended	1
18a	Number of national TV programmes/features in host country(s)	
18b	Number of national TV programme/features in the UK	
18c	Number of local TV programme/features in host country	
18d	Number of local TV programme features in the UK	
19a	Number of national radio interviews/features in host country(s)	
19b	Number of national radio interviews/features in the UK	
19c	Number of local radio interviews/features in host country (s)	
19d	Number of local radio interviews/features in the UK	
Physical Measures		
20	Estimated value (£s) of physical assets handed over to host country(s)	
21	Number of permanent educational/training/research facilities or organisation established	
22	Number of permanent field plots established	175
23	Value of additional resources raised for project	
Other Measures used by the project and not currently including in DI standard measures		

Annex 5 Publications

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

Annex 6 Darwin Contacts

Ref No	404
Project Title	Developing an Integrated assessment of Biodiversity in secondary forests, Belize
UK Leader Details	
Name	Lindsay Maskell
Role within Darwin Project	Project manager
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Other UK Contact (if relevant)	
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Partner 1	
Name	Paul Walker
Organisation	Wildtracks
Role within Darwin Project	Belize co-ordinator
Address	Sarteneja, Belize
Fax	
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Partner 2 (if relevant)	
Name	
Organisation	
Role within Darwin Project	
Address	
Fax	
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