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 – Submission deadline 30 April 2007

Darwin Project Information

Project Ref Number	14-022
Project Title	Predictive tools for targeting conservation effort
Country(ies)	Malaysia
UK Contract Holder Institution	University of York
UK Partner Institution(s)	University of Leeds, Natural History Museum,
Host country Partner Institution(s)	Universiti Malaysia Sabah, (Malaysia), Forest Research Centre (Sabah, Malaysia)
Darwin Grant Value	£128,560
Start/End dates of Project	1 June 05 / 31 May 08
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1st April 2006 to 31 March 2007 Annual report 2
Project Leader Name	Dr Jane K. Hill
Project website	http://www.york.ac.uk/depts/biol/staff/jkh.htm
Author(s), date	Jane Hill, April 2007

Project Background

Over the past few decades, many researchers have worked on analytical tools for mapping tropical biodiversity and for designing reserve networks. However, lack of available distribution data for species means that these analyses are generally limited to only a few well-studied taxa analysed at coarse spatial scales. Moreover, climate change has not been considered in this context and conservationists generally have assumed that species ranges are static and have not taken account of how climate change may interact with land-use changes to affect species distributions. Such information will be crucial for describing the distribution of biodiversity both now and in the future.

The State of Sabah (Malaysian Borneo) is exceptionally biologically diverse yet one of the poorest financially in Malaysia and the vast majority of its income is generated though conversion of rainforest into oil palm plantation and other forms of silviculture. Thus existing areas of forest are under increasing pressure from land-use changes but resources for protection are highly limited. The choice of forest areas to preserve is largely arbitrary because local researchers and forest managers lack the analytical tools required to identify sites which have the greatest conservation value. This project will develop tools for identifying existing reserves of high conservation value, and will determine how their value may change in the future as a consequence of changes in the size, number or quality of other reserves.

Project Partnerships

Collaboration between UK and host country partners over the last year continues to be excellent. The successful collaboration built up over this and past projects continues to be productive and has ensured that the project's outputs for this year have been achieved on time. In particular, the host country partners have been instrumental in helping us gain access to Museums and collections. They have also assisted with field work campaigns and have advised us on which sites to study, and provided permission for sampling.

Darwin Research Fellow Noel Tawatao is now working with the research group in York during his 12 month fellowship. This has further strengthened collaboration with our partner, Universiti Malaysia Sabah. Noel's research has the potential to add value to this project by including information on conservation value of protected areas in terms of ant species richness and diversity. During this year, we have also made links with WWF Malaysia. This is proving useful for getting advice on obtaining remotely-sensed Landcover data for Borneo. Collaboration with WWF will also ensure that our future findings feed back to local stakeholders and conservation organisations.

Project progress

The two Darwin Fellows Dr Suzan Benedick (SB, senior fellow) and Mr Mazidi Abd. Ghani (MAG, junior fellow) are continuing to work very effectively on the project. The Project Leader (Jane Hill) and Database Manager (Keith Hamer) visited Sabah for 6 weeks in August-September 2006. During this trip we visited our Malaysian collaborators at Universiti Malaysia Sabah (Prof Dr Maryati) and at the Forest Research Centre Sepilok (Dr Chey Vun Khen). The main aims of the visit were to i) discuss progress on the project to date; ii) discuss training of Darwin Fellows, iii) review current research outputs. These aims were achieved. David Lees also visited Sabah (July 06) and liaised with project partners and spent time with SB and MAG at Universiti Malaysia Sabah providing training and giving advice on data entry. Dr Chey Vun Khen visited the UK, primarily to pursue his on-going research on Lepidoptera at the Natural History Museum.

SB has been based primarily in Sabah, and from April 06 – March 07 has collected data from Museums and collections on Borneo (Borneensis collection at UMS, Sabah Parks collections at Kinabalu Park and Sabah Museum, Forest Research Centre collection at Sepilok, Sarawak Museum, Brunei Museum, and one collection of Borneo material housed on the Malaysian Peninsula in Kuala Lumpur (Bangi)).

MAG has spent most of his time from April 06- March 07 based in the UK. He has visited Museums in Europe that hold Borneo material (Natural History Museum, National Museum of Scotland, Amsterdam Museum). MAG has also collated information from published sources (journals and books). MAG returned to Malaysia in July-October 06 to liaise with SB, agree protocols for data entry into spreadsheets, and to explore sources of information for geo-referencing material.

There have been no changes to the logframe.

Progress in carrying out project activities

Progress over the last year is in agreement with the timetable. All the activities have been carried out in the manner and time planned. We have made excellent overall progress towards the project outputs and thus we are confident that the project will achieve them by its close. Our measuring of output indicators (e.g. completion of the data base) show that our progress is on-track, and we have no reason to change our belief at this stage that our output level assumptions hold true.

1) **Collection of data**. This has now been completed and all data have been inputted. A data base has been constructed comprising ~20,000 butterfly records.

2) **Development of distribution models**. This is on-going. MAG is currently geo-referencing material and carrying out quality control procedures on the data base prior to constructing the

distribution models. Modeeling has been completed for all data from the Borneensis collection (i.e. most of the Sabah records). MAG has received training in spatial modelling and GIS at York, and has also received training in species distribution modelling (in particular in using the model MAXENT) by attending a specialist course at the University of Arizona (run by Alison Cameron, project member). MAG has collated climate and remotely-sensed Landcover data for Borneo, and incorporated this into the distribution modelling. The distributions of ~ 100 butterfly species have been modelled successfully to date.

3) **Testing model predictions**. This is on-going. New field data have been collected by SB from 3 previously unstudied forest sites in Sabah.

Standard Output Measures.

Table below shows standard output measures up to April 07.

Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	TOTAL
6	Sabah collaborator visits the UK		1			
8	UK staff spend time in Sabah training personnel in the field and liaising with overseas partners	12 person weeks	12 person weeks			

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.

Publications

Type * (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Journal	Benedick *et al*. 2006. Impacts of forest fragmentation on butterflies	Journal of Applied Ecology	Project leader	£0
Journal	Benedick *et al*. In press. Declines in butterfly genetic diversity following forest fragmentation	Journal of Tropical Ecology	Not yet published	£0
Journal	Benedick *et al*. In preparation. Impacts of habitat disturbance on moths		Not yet published	£0

Progress towards the project purpose and outcomes

We consider that our progress made towards the project purpose this year has been good. Evidence for this is the extensive database we have compiled and our ability to successfully model distributions of butterflies in Sabah. All project partners have liaised successfully and continue to collaborate fruitfully. We are confident that the training of SB and MAG will leave a lasting legacy of trained personnel in Sabah. To this end, SB has been involved in the training of under-graduate students in Sabah, using skills and experience she has obtained during the project. Our modelling of species distributions is ongoing and this needs to be completed before we can assign conservation status to existing protected areas. Once we achieve this, we will be able to assess whether our protocols are likely to adopted by local Institutes and Conservation bodies. We consider that the purpose level assumptions still hold true and we think that our indicators are sufficient for measuring outcomes.

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

It is too early in the project to assess this. The main aim of our project is to assess current conservation status of protected areas. How this status may change with future land-use and climate changes will clearly have a major impact on the promotion of biodiversity and have positive biodiversity impacts.

Monitoring, evaluation and lessons

The two Darwin Research Fellows have been successfully trained and this is evident from the successful construction of a data base. We have been monitoring the amount of data obtained, and our success is evident in our ability to model species distributions in relation to climate variables across Sabah.

It was clear from an early stage that there is an enormous amount of information available for use by the project, and that not all data could be collected within the time frame of the project. Therefore we have focussed on selected families of butterflies (Nymphalidae, Pieridae and Papilionidae). To ensure maximum coverage of distribution data across Borneo, we prioritised visits to collections that included specimens from sites encompassing as large an area as possible across Borneo. This has resulted in us completing the initial data collection on time.

We have been pleased with the amount of data held in collections and published sources, and the relative ease with which it has been possible to extract information. We have been disappointed that is has been difficult to get permission to visit collections in Kalimantan – it is clear that research that crosses political boundaries is difficult to carry out. We have relied on our overseas project partners to build links with curators, and our excellent collaborative links have been crucial in this respect.

Actions taken in response to previous reviews (if applicable)

Our previous review was generally positive and our partners were pleased to see that the good progress of the project was appreciated.

Points raised:

Other comments on progress not covered elsewhere

There have been no changes to the project. We have not encountered any significant difficulties, although the failure to gain permission to visit the Bogor Museum in Jakata has reduced our ability to gain butterfly data for Kalimantan. Discussions to gain permission are still on-going. The project does not face any particular risks.

Sustainability

Preliminary findings from the project have been presented at local conferences (Sabah and UK) as well as international conferences (1st European Conservation Conference, Hungary, August 06; Association for Tropical Biology, India, February 07). We are confident that our DRFs will be employed by local Universities or Institutes on completion of the project, thus leaving a lasting legacy resulting in the impacts of the project being sustained.

Findings from the project are disseminated by the Universiti Malaysia Sabah through local conferences. These are funded and organised by the University, and will continue in future.

Project Expenditure

Please expand and complete Table 3.

Project expenditure <u>during the reporting period</u> (Defra Financial Year 01 April to 31 March)

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

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

Some of the findings from the project (and from our previous Darwin projects) will be presented at the Royal Society Summer exhibition in London (July 2007).

Report of progress and achievements against Logical Framework for Financial Year: 2006/07

Project summary	Measurable Indicators	Progress and Achievements April 2006 - March 2007	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*			
Purpose To prioritise the biological importance of forest reserves for maximising biodiversity, and to provide clear practical advice on biodiversity consequences of changes in climate and land-use. To enable effective long-term conservation planning	Practical advice given to stakeholders (May 2008). Computer modelling tools used to predict species distributions (May 2007), current patterns of biodiversity (Dec 2007), and potential changes in distribution of biodiversity (Feb 2008)	Training of DRFs in computer modelling. Distributions of ~ 120 butterfly species modelled successfully	Complete modelling of distributions for all species, and quantify conservation status of protected areas.
Quantitative assessment of conservation value of forest reserves based on a range of integrated biodiversity criteria.	Research papers written up. Completion of training of DRFs	Training of DRFs is on-track. The publication of findings will provide an excellent indicator of the success of their training.	
Activity 1.1 Collection of distribution data		Completed	
Activity 1.2, Development of models		On-going	
Activity 1.3 Determination of conservation status of existing areas		To be completed next year	
Activity 1.4 Workshop to disseminate findings		To be held in 2008	

PROJECT LOGICAL FRAMEWORK

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 prioritise the biological importance of forest reserves for maximising biodiversity, and to provide clear practical advice on biodiversity consequences of changes in climate and land-use. To enable effective long-term conservation planning.	Practical advice given to stakeholders (May 2008). Computer modelling tools used to predict species distributions (May 2007), current patterns of biodiversity (Dec 2007), and potential changes in distribution of biodiversity (Feb 2008)	Conservation guidelines written and reserves prioritised to assist in effective conservation planning and promotion of biodiversity. Production of species' distribution maps and database.	Forest managers and conservation organisations have an effective input into economic planning. This is guaranteed by State legislature.
Outputs Quantitative assessment of conservation value of forest reserves based on a range of integrated biodiversity criteria. Training of 2 Darwin Fellows in ecological and modelling techniques	Research papers written up. Successful completion of training courses by Darwin Research Fellows	Research papers published in peer-review journals. Darwin Fellows successfully apply the techniques they have developed.	Darwin Fellows take up conservation posts in Sabah and use their knowledge and skills to inform decision makers. Our close links with local collaborators will facilitate this: our previous Darwin Fellows now have permanent posts at UMS and FRC. Research leads to clear recommendations

for reserve design and assessment and for predicting potential biodiversity changes in the future.			and guidelines for stakeholders.
Activities Collection of data on distribution of species in Borneo from existing sources, including Museum collections and published information (Jun 05 - Sep 06). Development of models to predict species' distributions across Borneo in relation to climate, elevation and habitat and testing model predictions with new field data (Oct 06 – Sep 07). Using distribution data to determine conservation value of existing forest areas in Sabah and to quantify biodiversity changes under a range of climate and land-use scenarios (Oct 07 – May 08). Invite local scientists and stakeholders to a 3-day workshop in Sabah to discuss implications of project findings (May 08).		**Activity Milestones (Summary of Project Implementation Timetable)** Protocols for data collection developed, production of relational database and maps of species' distributions. Appointment of two Darwin Fellows who travel to the UK for training in database design and testing, development of techniques for predicting species' distributions and prioritising forest reserves. Organisation of workshop in Sabah for disseminating project findings.	

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.	Yes
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.	No
Have you completed the Project Expenditure table?	Yes
Do not include claim forms or communications for Defra with this report.	