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Taxonomic Initiative for Southeast Asian bat studies (Vietnam, Thailand, Cambodia and Lao PDR)

Darwin Final Report: April 2005-March, 2008

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	14-011
Project Title	Taxonomic initiative for Southeast Asian bat studies
Host country(ies)	Thailand, Vietnam, Cambodia, Lao PDR
UK Contract Holder Institution	Harrison Institute
UK Partner Institution(s)	-
Host Country Partner Institution(s)	Prince of Songkla University, Thailand; IEBR, Vietnam; National University of Laos; Royal University of Phnom Penh, Cambodia
Darwin Grant Value	£47,580 for 2005/06; £47,500 for 2006/07 and £44,720 for 2007/08
Start/End dates of Project	April, 2005 – March, 2008
Project Leader Name	Dr Paul Bates
Project Website	www.harrison-institute.org/Darwin2/TISABS.htm
Report Author(s) and date	Dr Paul Bates, Dr Chutamas Satasook, Mr Vu Dinh Thong, Neil Furey, Dr Sara Bumrungsri - 25 June, 2008

To save space, the following acronyms will be used in this report: **HI** for Harrison Institute; **IEBR** for Institute of Ecology and Biological Resources, Hanoi; **NUL** for National University of Laos; **PSU** for Prince of Songkla University, Thailand; **RUPP** for Royal University of Phnom Penh.

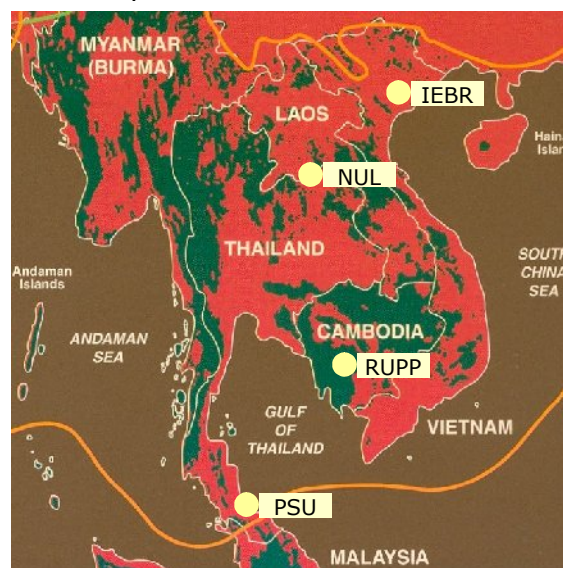
1 Project Background

The project is based in four institutions in Thailand, Lao PDR, Cambodia and Vietnam, with additional training in UK and Germany. It seeks to address a taxonomic impediment by increasing capacity in bat taxonomy and developing a network of taxonomists in mainland Southeast Asia in order to promote the conservation of bat biodiversity. Outstanding achievements include the training of eleven students in bat taxonomy and ecology (BSc/MSc/PhD); hosting the First International Southeast Asian Bat Conference; the writing of a comprehensive bat website and eleven scientific papers (six already published); participation in six TV documentaries; and the discovery of at least two bat species new to science.

2 Project support to the Convention on Biological Diversity (CBD)

In order to meet CBD commitments, the project increased capacity in four host country academic institutions and collaborated with governmental and non-governmental conservation organisations. Host country CBD focal points were not directly involved. The project was most relevant to 5 Articles (7, 12, 13, 17, and 18) and one cross-cutting theme, the Global Taxonomy Initiative, of the CBD.

Article 7 – identification and monitoring: the project identified components of the SE Asian bat fauna, which are important for conservation (including a number of new and putative new





Titania's woolly bat (Kerivoula titania) is one of two new bat species described during the Darwin project (see Bates et al., 2007 in Annex 5)

species). Through the studies of the Darwin students, endemic and conservation dependent species were monitored and threats assessed. Outputs supporting Article 7 include:

- eleven students trained in a range of taxonomic methods
- the submission of eleven scientific papers (six already published)
- a bat website
- enhanced zoological reference collections in PSU, IEBR, RUPP and HI

Article 12 – research and training: the project promoted and encouraged taxonomic and ecological training and research that will facilitate conservation. Outputs supporting Article 12 include:

- eleven students trained in taxonomic and ecological methods of research, of which at least eight have permanent positions within academic institutions, post Darwin
- on-going research and training programmes reinforced in all four institutions

Article 13 – public education and awareness: the project encouraged public understanding of the importance of bat conservation by contributing to:

- six TV documentaries in Vietnam and Thailand
- a number of radio interviews, articles in newspapers, leaflets, posters, T-shirts, and other items
- a range of exhibits on bats and the Darwin bat project within the PSU University Museum (recently opened by Princess Maha Chakri Sirindhorn of the Thai Royal Family)

Article 17 – exchange of information: the project promoted the exchange and repatriation of information on SE Asian bat taxonomy and conservation. Outputs relevant to this include:

- building a regional taxonomic network involving the participation of staff and students in workshops and field studies, student exchanges, and the loan of specimens for study
- building an international bat taxonomy network by encouraging collaboration between host country staff and students and overseas experts from Australia, Canada, Hungary, Ireland, South Africa, UK and USA
- hosting the first Southeast Asian International Bat Conference with 120 delegates from 25 countries
- compiling a bat website

Article 18 – technical and scientific co-operation (see Section 4.5)

Global Taxonomy Initiative – the project supported this cross-cutting theme by addressing issues of the taxonomic impediment by:

- increasing the number of trained taxonomists
- training students in zoological collections management and curation
- repatriating taxonomic information in the form of literature and specimen information
- publishing a series of taxonomic scientific papers and synthesising existing taxonomic information to be published on the website



One of a number of bat exhibits in the PSU Natural History Museum. It includes information about the Darwin project (and logo)

The project contributed to 2010 Biodiversity Commitments, especially in respect of the conservation of species and genetic diversity and by highlighting the importance of particular ecosystems, habitats and biomes. It was less relevant to CMS and CITES (except for large fruit bats).

3 Project Partnerships

The Harrison Institute developed partnerships with four institutions in the host

countries. In all four cases the demand stemmed from the host country and the project was tailored to the needs of the institutions and the particular students.



Darwin student Bounsavane Dounangboubpha from NUL discusses his research with other delegates at the First Southeast Asian International Bat Conference, Phuket (May, 2007)

Prince of Songkla University (PSU), Thailand: the Harrison Institute started collaboration in February 2005 and signed an MoU in July, 2005. From the start, this was a productive relationship, which has manifested itself in a range of outputs during the life of the project (see below). The relationship involves a two way exchange of information and is on-going. There are new, post-Darwin, collaborative projects already activated (see below).

The success of the project was based on the encouragement and support of the Dean of Science, Associate Professor Chutamas Satasook (see Section 4.7) and the academic input of the lead member of the PSU Research Unit, Dr Sara Bumrungsri, who was subsequently awarded 'Outstanding Young Scientist of the Prince of Songkla University, 2007' (also Section 4.7). We look forward to a long and positive collaboration.

Darwin project:

- Through its international MSc programme in Animal Ecology, PSU jointly co-supervised with the Harrison Institute, 2 Thai PSU students and 3 Lao students from NUL. It also helped with the training of two Cambodian students from RUPP.
- PSU collaborated with the Harrison Institute (and other international institutions) on the enhancement of its voucher specimen collection. Associated with this, the Harrison Institute collaborated with PSU on the development and official opening of the University's natural history museum (Princess Maha Chakri Sirindhorn Natural History Museum) in January, 2008.



The SABD website, www.sc.psu.ac.th/batdb, is hosted by PSU. It includes data on the 155 bat species known from mainland SE Asia. Currently, it is being edited and over 160 photographs are being added to the species profiles

- PSU collaborated with the Harrison Institute on the writing and hosting of the bat website.
- PSU co-hosted with the Harrison Institute (and Texas Tech University, USA) the First International Southeast Asian Bat Conference in Phuket, May, 2007. This included 120

delegates from 25 countries and sponsorship was raised for 37 of the 50 participating students (Section 7.2) <http://www.sc.psu.ac.th/bats/> . PSU also collaborated on a series of international workshops.

- PSU collaborated with the Harrison Institute and other colleagues on the submission of six scientific papers (three already published).
- PSU collaborated with the Harrison Institute and IEBR Vietnam on a number of radio interviews and five of the six TV documentaries on bats.

Post Darwin project:

- PSU together with Bristol University and the Harrison Institute was awarded in April, 2008 a PMI2 (Prime Minister's Initiative) Connect Project from the British Council on computer models for predicting bat distributions.



In order to promote further, post Darwin, studies, the Harrison Institute, PSU and Bristol University recently successfully applied for a collaborative project through the British Council Connect programme

- PSU together with Yangon University (Myanmar), University of Dublin and the Harrison Institute are continuing their joint research and conservation programme on the bumble-bee bat (*Craseonycteris thonglongyai*) funded by the Science Foundation Ireland (RFP GEN0056), the Royal Irish Academy and The Royal Society, London. A joint research paper was recently submitted to Endangered Species Research (see Puechmaile *et al.* in Annex 5)
- PSU is currently jointly applying with the Harrison Institute and other regional institutions to the Leverhulme Trust under their 'International Networks' scheme.
- Pipat Soisook, one of the Thai Darwin MSc students, has been offered a permanent post as a curator and researcher at the PSU Natural History Museum, ensuring continuity in on-going collaborative research projects, including the describing of new bat species.



Darwin student Pipat Soisook in the bat voucher specimen collection of the PSU Natural History Museum

- The Harrison Institute has facilitated collaboration between PSU and the Hungarian Natural History Museum to develop further research and student training in different groups of vertebrates and invertebrates (meetings taking place in Budapest in June, 2008).

National University of Laos (NUL): the Harrison Institute started collaboration in April, 2005. Although full co-operation from NUL was received from the start, the relationship with senior members of the Science Faculty was limited until recently. This was a result of the decision to train the three NUL Darwin students at PSU as part of their International MSc programme. This ensured that the Lao students had more international exposure and academic support than would have been possible if they

had remained at NUL. The quality of the resulting MSc theses and publications (one submitted and three in prep.) suggest that a correct decision was made. In the latter stages of the project, a good relationship has been developed with the Heads of both the Biology and Forestry Departments and with the Dean of Science. This has resulted in joint grant applications for further research and conservation projects (see below) and a commitment to sign an MoU. We look forward to a long and fruitful collaboration with NUL.

. Darwin project:

- Three NUL MSc students were jointly supervised by PSU and the Harrison Institute.
- The three students presented their research at the First International Southeast Asian bat conference in Phuket – one, Phouthone Kingsada was awarded a prize for best student poster.



Professor Bounthob Praxaysombath, Head of Biology, Faculty of Science, NUL addressing delegates at the Darwin bat workshop held in his department in March, 2008. The audience included staff and students of NUL, and representatives of PSU, WCS, WWF and the Harrison Institute

- NUL co-hosted with the Harrison Institute, a workshop on bat taxonomy in March, 2008.
- One NUL Darwin student has already submitted a joint paper with the Harrison Institute and other international colleagues to an international journal.
- NUL collaborated with the Harrison Institute on a newspaper article on bat research published in the Vientiane Times (18 April, 2008).

Post Darwin:

- NUL is collaborating with the Harrison Institute and the Wildlife Conservation Society on a grant application to the Rufford Foundation for a joint project on the taxonomy and conservation status of endangered and endemic rodents and bats in central Lao PDR.
- NUL, through the Dean of Science, Assoc. Prof. Somkiat Phasy, has invited the Harrison Institute to help develop its role as a centre of biodiversity expertise in Lao PDR.
- NUL is currently jointly applying with the Harrison Institute and other regional institutions to the Leverhulme Trust under their 'International Networks' scheme.
- The Harrison Institute is co-supervising with NUL and WCS a new MSc student of the Biology Department on an aspect of Lao endemic small mammals.

Royal University of Phnom Penh (RUPP), Cambodia: the Harrison Institute started collaborating in April, 2005 and the relationship with RUPP has developed over the course of the project. Both parties are closely integrated with another, concurrent, Darwin project (14037 – *Building university capacity to train future Cambodian conservationists*). Since February, 2007, the relationship has developed strongly through the training of two RUPP MSc students in bat research and through discussions with senior members of the Biology Department concerning further workshops. After an initial delay in being able to access suitable students (ie until they had completed their formal training with Darwin project 14037), there have been no problems or challenges. We look forward to a long-term collaboration with RUPP.

Darwin project:

- Two RUPP MSc students were supervised by FFI (Callum McCulloch), PSU (in Thailand and Cambodia) and the Harrison Institute.
- The Harrison Institute arranged for the two students to receive further training in the field from Dr Gabor Csorba of the Hungarian Natural History Museum.



In November, 2007, RUPP Darwin students Ith Saveng and Vuthy Vu received additional training in field study techniques in western Cambodia from Dr Gabor Csorba of the Hungarian Natural History Museum

- field from Dr Gabor Csorba of the Hungarian Natural History Museum.
- Two RUPP students took part in the First International Southeast Asian Bat Conference in Phuket.
- RUPP hosted a bat workshop and subsequent field study with PSU and Harrison Institute staff and students.
- The RUPP reference collection of zoological specimens was upgraded.

Post Darwin:

- RUPP is collaborating with the Harrison Institute, PSU and the Hungarian Natural History Museum in applying for funds from the Critical Ecosystem Partnership Fund, (once these

become available). Project activities will include an international workshop in RUPP and further field work.

- RUPP has appointed one of the Darwin students (Ith Saveng) as part time curator of the Natural History Museum.
- RUPP is currently jointly applying with the Harrison Institute and other regional institutions to the Leverhulme Trust under their 'International Networks' scheme.



Mr Vu Dinh Thong of IEBR working with Christian Dietz at Tübingen University, Germany

Institute of Ecology and Biological Resources, Hanoi (IEBR), Vietnam: the Harrison Institute has had a good working relationship with IEBR since August, 2004 and this has

been maintained throughout, with no problems or challenges. Informal discussions with senior members of the Institute took place concerning the setting up of an MoU. However it was mutually agreed that this will not be activated until the completion of the Vu Dinh Thong's PhD.

Darwin project:

- IEBR and the Vietnamese and German governments jointly fund the training of Darwin PhD student Vu Dinh Thong at Tübingen University, Germany and the Harrison Institute.
- IEBR collaborated with Neil Furey (Programme Manager

One of a number of leaflets and posters produced by Neil Furey and his team promoting bat conservation (in Vietnamese)

of Ba Be Ecological Research Station and Aberdeen University PhD student), the Harrison Institute, and Hanoi National University in the training of three students (Mr Vuong Tan Tu, Mr Nguyen Xuan Hung and Mr Dao Nhan Loi). Neil Furey also co-wrote and published a series of leaflets and posters promoting bat conservation (see below).



Darwin students Ms Ariya Dejtaradol (PSU), Phouthone Kingsada and Ms Phansamai Phommexay (NUL) with Neil Furey during the international field workshop in Cat Ba, Vietnam in August, 2006

- IEBR co-organised with the Harrison Institute and hosted an international bat field workshop which took place in Cat Ba Island in August 2006. Co-funded by BP Conservation, it included students from five Asian countries.
- IEBR collaborated with colleagues on the writing of seven papers (Annex 5)
- IEBR collaborated with PSU and the Harrison Institute on four TV documentaries on bats made in Vietnam.

Post Darwin project:

- IEBR is currently jointly applying with the Harrison Institute and other regional institutions to the Leverhulme Trust under their 'International Networks' scheme.
- Mr Vu Dinh Thong and Mr Vuong Tan Tu have permanent staff positions with IEBR, ensuring continuity in on-going collaborative research projects.
- The Harrison Institute has facilitated collaboration between IEBR and the Hungarian Natural History Museum to develop further research and training programmes and the publication of joint papers.

4 Project Achievements

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

The project has had both specific and more general impacts relating to biodiversity conservation and closely follows ideas and themes included in the Global Taxonomy Initiative.

General Impacts:

- Following the success of the Darwin project, PSU, NUL and RUPP have all expressed the desire to be the national centres of biodiversity expertise within their respective countries; IEBR is already fulfilling this role within Vietnam. In addition, PSU also wishes to develop its role as a regional centre of expertise within mainland SE Asia.
- PSU, NUL and RUPP all wish to broaden the scope of their researches to include other taxa, using the Darwin bat project as a role model. This is currently being facilitated by the Harrison Institute with respect to mutual collaboration between PSU and the



Thanks in part to the impetus given by the Darwin project, the PSU Natural History Museum wishes to develop a role as a regional centre of biodiversity expertise. During its formal opening by Princess Maha Chakri Sirindhorn in January, 2008, the Darwin students and staff (PSU, NUL, and Harrison Institute) had an opportunity to explain their project work to Her Royal Highness

Hungarian Natural History Museum, with meetings scheduled for Budapest in June, 2008, relating to other vertebrate [amphibians and reptiles] and invertebrates groups.

- The project has acted as a catalyst for other staff and students within the host institutions in taxonomy and biodiversity studies. The project has also acted as a point of contact for international zoologists (eg. Bristol University, Hungarian Natural History Museum, University of Dublin) who are seeking to develop future collaborative projects.



Sébastien Puechmaille and Dr Emma Teeling of the University of Dublin joined a Darwin Initiative workshop as guest speakers in March, 2006. Subsequently, they developed a collaborative project with PSU, Yangon University and the Harrison Institute funded by the Science Foundation of Ireland

Specific impacts:

- Our knowledge of the taxonomy, population status, distribution, and ecology of a number of bat species, including endemic and endangered species has been greatly increased. This information will be incorporated into future conservation initiatives such as updated versions of the SAMD (SE Asian Mammal Database). Interaction with local conservation NGOs and government ministries is already ensuring that the conservation of bats becomes a more mainstream issue.
- There is greatly increased in-country scientific capacity to monitor changes in bat diversity and to carry out future research projects relating to bat conservation issues.



A DVD of one of five TV documentaries about aspects of the Darwin project. This film was shot in Vietnam and appeared in the Nature Explorer series of Thai TV

- There has been a general raising of the profile of bats within the local population and decision makers through a series of newspaper articles, and radio and TV programmes.
- The importance of bats in the ecosystem (and to man) was highlighted (in TV, radio and newspaper articles and broadcasts). This benefit includes pollination (both wild

and commercial plant species), forest regeneration through seed dispersal, the control of insect pests for agriculture, and the provision of natural fertilisers (guano). Bat conservation will have positive benefits for local communities.

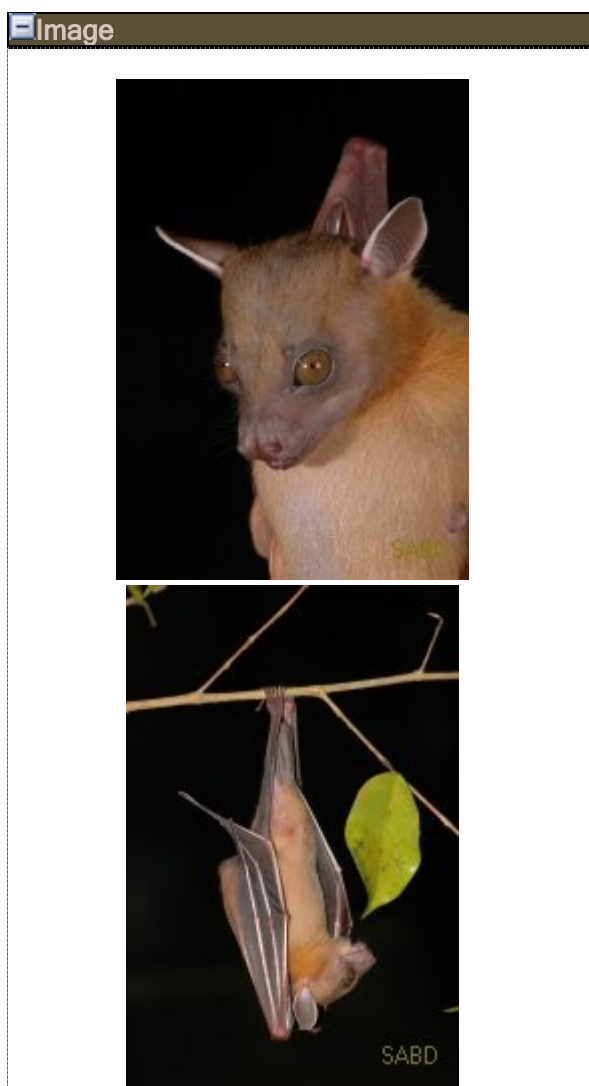
4.2 Outcomes: achievement of the project purpose and outcomes

The project achieved its purpose. It increased capacity in bat taxonomy in mainland SE Asia and developed a series of active, collaborative research links. In fact, the outcomes far exceeded our initial expectations. Not only has it had a significant impact in terms of interest and knowledge in bat taxonomy but also a disproportional impact, in terms of the investment of time and money, in promoting a desire amongst the institutions to position themselves as national and international centres of biodiversity excellence. We are happy to report that there appears to be a strong momentum within the four host countries to carry on and develop further studies. We will support them in this through future projects. In addition, we have put together a broad international team of potential collaborators to help maintain this momentum.

Cynopterus horsfieldi	
Species No	4
Date last modified	08/11/2007
Suborder	Megachiroptera
Family	Pteropodidae
Genus	<i>Cynopterus</i>
Common name	Horsfield's Fruit Bat.
Synonymy	<i>Cynopterus horsfieldii</i> Gray, 1843: 38. C. (<i>Niadius</i>) <i>harpax</i> Thomas and Wroughton, 1909a: 439; Semangko Pass, Malaya, 3000 ft.

Key characters:

Forearm, 64-89.5 mm
Tail short
Ears, 18.6-20.4 mm
Skull length, condylobasal (CBL) 29-37 mm
Two pairs of upper and lower incisors
Premolars, broad, especially the upper and lower second (P^3 , P_3) and third (P^4 , P_4)
Third lower premolar (P_4) and first lower molar (M_1) with a well developed central cusp
Dental formula: $i^{2/2} c^{1/1} p^{3/3} m^{1/2} \times 2 = 30$



Part of one of the species pages on the Bat Database website – in addition, there are sections on 'Similar species', 'Taxonomic remarks', 'Description', 'Distribution', 'Ecology and behaviour' and 'Measurements' for each of the 155 species

4.3 Outputs (and activities)

The project achieved, or is in the process of achieving, all its outputs as laid out in the framework.

Output 1: the bat website <http://www.sc.psu.ac.th/batdb/> has been compiled. It is hosted by PSU, which ensures its long term viability. Its format is loosely based on the SAMD (Southeast Asian Mammal Databank) <http://www.ieaitaly.org/samd> website and it is anticipated that the two will complement each other. More comprehensive than originally planned, it is currently being revised, with the text being edited and over 160 additional photographs being included.

Output 2: the four institutions in the four countries all have extensive international experience of taxonomic research. Bat voucher specimen collections have been developed and upgraded at 3 of the 4 institutions. In Lao, there is a need to develop first a facility for the storage of specimens prior to the collection of further voucher material. This is already under discussion with senior NUL staff. Eleven students were involved in the study of aspects of bat taxonomy and ecology. Eight undertook MSc research, one BSc research and one PhD research. One student was trained to MSc level but did not formally undertake an MSc in bat studies. All have participated in national workshops and all but two in at least one international conference, including the First International Southeast Asian Bat Conference (for further details see Section 4.7).

Output 3: eleven papers for scientific journals have already been written - six have been published, two are in press, and three have been submitted - others will follow. In addition, nine abstracts of presentations (for the First International SE Asian Bat Conference) have been published. Two reports and one manual were written. Six documentaries were made for TV in Thailand and Vietnam.

4.4 Project standard measures and publications

(See Annexes 4 and 5)

4.5 Technical and Scientific achievements and co-operation

The project strengthened in-country capacity in taxonomic (and ecological) research and developed institutional capacity in each of the four host countries. The taxonomic research was



Rhinolophus microglobosus was originally described as a race of *R. stheno*. Now, following the MSc study of Darwin student Pipat Soisook, it is recognised as a distinct species with a range restricted to northern Thailand (see Appendix 5)

primarily whole organism alpha taxonomy (morphometrics). It also included acoustic data (echolocation) and some genetic data, where available, based on the studies of colleagues. Students learnt, amongst other things, a range of techniques including:

- field studies – netting, trapping, acoustic monitoring
- accurate scientific measurement
- observation, description, drawing and photography of morphological characters
- analysis of echolocation calls
- statistical skills, including uni- and multi-variate analysis
- aspects of zoogeography, phylogeny, and evolution
- the ability to write and think creatively
- presentational skills – at workshops and conferences
- an ability to apply for grants (local and international)
- an ability to liaise and work with colleagues from other countries in SE Asia and worldwide

Outputs from the above include eleven collaborative publications in peer reviewed journals on aspects of SE Asian bat taxonomy and ecology, including the naming of two new species (*Kerivoula titania* and *Murina tiensa*), and the upgrading of one subspecies to species level (*Rhinolophus microglobosus*). Much new data are also available on endemic and or conservation-dependent bat species. International workshops were hosted by IEBR, PSU, NUL and RUPP and one international conference took place in Phuket. On-going new research projects and joint grant applications for future collaborative projects are listed in Section 3 and an outline of staff in Section 4.7.

4.6 Capacity building

Capacity has been increased by

- The training of eleven students, and in some cases associated staff, from four institutions in four countries to BSc/MSc level or above. At least eight of these students are employed or have now secured employment within their respective universities/ research institutes.

- The project has raised the profile of the host country institutions as national centres of biodiversity expertise,
 - by promoting interaction between their staff and students and international experts in taxonomy and biodiversity and thereby ensuring that the students/staff and institutions are part of a wider regional/ international network of taxonomists rather than working as isolated and unsupported individuals
 - through the active authorship (sometimes lead authors) of the staff and students in a series of scientific papers in national and international journals
 - through the hosting of workshops and conferences
 - by enhancing existing reference collections of bat voucher specimens
 - by ensuring that there are a range of on-going projects either already in progress or in the planning stage

The Harrison Institute has developed its own capacity by

- becoming one of the main facilitators of scientific network development in SE Asia. It has promoted cross border research between institutions that have not previously adopted such an approach
- raising the profile of the Harrison Institute through collaboration on a range of exciting research projects resulting in significant publications in international journals
- enhancing its reference collections



Tigger Kingston of Texas Tech University co-hosted the International Conference. She is the director of SEABCRU and runs a training course in bat ecology in Malaysia.

4.7 Sustainability and Legacy

The project achievements most likely to endure include:

1: Taxonomic and ecological bat research conducted by the PSU Natural History Museum and associated Department of Biology. In the short term, this is ensured by on-going collaboration between PSU, the Harrison Institute and Bristol University in a PM12 project (see Section 3) – both UK institutions have signed MoUs with PSU. In the long term, it is also reinforced by the development of new linkages between PSU and a range of international collaborators including Dr Gabor Csorba of the Hungarian Natural History Museum and Assoc Prof Tigger Kingston of Texas Tech University, who was a co-host of the International Conference and is now promoting SEABCRU (Southeast Asian Bat Conservation and Research Unit). This Unit includes a section by the Darwin project aimed at bat taxonomists <http://www.seabcru.org/?q=node/5> within the region. Tigger also runs an ecology training course, sponsored by SEABCRU, in Malaysia.

2: The on-going research of bat taxonomy and ecology by IEBR is also ensured. Two of the Darwin trainees are full-time members of staff and have the freedom to develop their own research topics in the future. They have developed strong international linkages not only with the Harrison Institute but also regionally (ie PSU, RUPP and NUL) and with colleagues Tübingen University, the Hungarian Natural History Museum, Texas Tech University, SEABCRU (one of the Darwin students, Vuong Van Tu, will receive training in Malaysia later this year), Russian Academy of Sciences and Aberdeen Univ.

3: It is anticipated that advances made in bat taxonomy at RUPP and NUL will also endure. However, they will require external support in the short term to maximise their potential. The Harrison Institute,



The Thai Darwin students successfully applied for support from BRT (Biodiversity Research and Training Programme) for aspects of their bat researches

together with other international colleagues are committed to providing this support through a series of planned, post Darwin projects (see Section 3).

As outlined above, it is anticipated that there will be a close and on-going relationship between the Harrison Institute and all four host-country institutions. A number of projects, which include all four of these institutions are currently in the planning/ application stage (see Sections 3 and 6.1). All students have had experience of successfully applying for a range of small grants to help fund their research projects. These have included BP Conservation International, BRT (Biodiversity Research and Training Programme, Thailand), BES (British Ecological Society for conference attendance) and BCI (Bat Conservation International, USA).

Project staff/students

Dr Paul Bates is Director of the Harrison Institute, Kent, UK and the co-ordinator of the project. During the last three years, he has helped train the students in all four host countries and in the UK; promoted and jointly hosted a number of workshops and one international conference; contributed to newspaper articles and radio and TV broadcasts outlining the aims, objectives and outputs of the project; conducted joint studies with the students and staff; contributed to nine scientific papers (six

already published, Annex 5), with others to follow; helped establish a network of taxonomists both regionally and

internationally; encouraged the development of the academic institutions to become centres of biodiversity expertise; assisted in the development of the PSU Natural History Museum in its aim to become a regional centre of expertise. He has already worked for the last sixteen years on bat projects in southern and Southeast Asia, including the naming of five new species and is committed to the future development of bat and small mammal research within mainland SE Asia. Currently he is involved in revising the website; working with all the students to complete their tasks; and with a range of post Darwin studies and grant applications with the Darwin students and associated staff.



Paul Bates of the Harrison Institute working with Sara Bumrungsri of PSU and Darwin student Phouthone Kingsada (NUL)

Mr Neil Furey is registered for his PhD at Aberdeen University. His thesis, which is currently being written as a series of papers, concerns the conservation biology of bat assemblages in Vietnamese karst ecosystems. In addition, he has contributed to two international publications describing new species and recently completed a manuscript describing a third new species, all based on research supported by the Darwin project. As part of his studies, he trained and supervised on behalf of the Darwin project three Vietnamese students – Dao Nhan Loi, Nguyen Xuan Hung and Vuong Tan Tu (see below). Together with the students he undertook intensive field studies (>1 year) at two karst protected areas in north Vietnam and shorter term evaluations at other northern sites. At these protected areas, he led a series of capacity-building, awareness-raising and management planning initiatives to strengthen local conservation management, and activities to raise wider awareness. The latter included presentations at the annual conferences of the Southeast Asian Regional Network for Indigenous Peoples and the Vietnam Ecological Society in Vietnam (2007), a presentation at the First International Southeast Asian Bat Conference in Phuket (2007), and a natural history documentary on bats for Vietnamese television and articles in mainstream media

Thai project staff and students

Associate Professor Dr Chutamas Satasook is the Dean of Science of PSU. She took great interest in the Darwin project and promoted the regional network by providing training scholarships for the Lao students and facilitated extra tuition for the Cambodian students. She

participated in some of the field work, contributed to the workshops, and actively managed the highly successful international conference in Phuket. She is the driving force behind the development of the PSU Natural History Museum and is currently developing an international network to promote its role as a regional centre of biodiversity expertise. She is a joint author of five of the Darwin papers (published and submitted, see Annex 5).



Assoc Prof Dr Chutamas Satasook (centre) with Assistant Prof. Dr Medhi Sanbhanich (left) and Dr Sara Bumrungsri (right) on the opening day of the international conference in Phuket

Dr Sara Bumrungsri is leader of the Bat Group of PSU and co-supervised five of the Darwin trainees (2 Thai/3 Lao) and helped with the training of the two Cambodians from RUPP. He was awarded 'Outstanding Young Scientist of the Prince of Songkla University, 2007'. As part of the Darwin project, he undertook a ten week study visit to the Harrison Institute, where he compiled data for an international publication, which *inter alia*, included a history of bat research in Thailand. In addition, he has co-authored five other

papers (published and submitted) based on research conducted by Darwin students (Annex 5). As part of the Darwin project, he made a presentation and participated in the 9th International Mammalogical Congress in Hokkaido, Japan (2005) and in the First International Southeast Asian Bat Conference in Phuket (2007). He is currently employing two of the Darwin trainees on new, separately funded projects has an interesting range of topics for new postgraduate students. He is collaborating with the Harrison Institute, Bristol University, Aberdeen University and a range of other international institutions on a variety of new research and training programmes.

Mr Pipat Soisook was registered and trained at PSU under their International Ecology MSc course. He undertook a three month study visit to the Harrison Institute in the UK; conducted field work and took part in workshops in Thailand, Cambodia and Vietnam; and made a poster presentation and participated in the International bat conference in Phuket (2007). He was awarded his MSc in May, 2008. His results are shortly to be published in an international journal (pdf of page proofs available July, 2008) and he is lead author of an international paper published in 2007 and joint author of one recently submitted. His outstanding performance means that he has been offered a permanent position as Curator of Vertebrate Zoology at the PSU Natural History Museum. Currently, he is conducting a range of bat surveys in peninsular Thailand for PSU funded by BRT. He is also a member of the PMI2 project (2008-2010, involving PSU, Harrison Institute, Bristol University).

Ms Ariya Dejtaradol is registered and has been trained at PSU under their International Ecology MSc course, where she is currently completing her MSc thesis (draft version of individual chapters available as Word files). As part of her study, she undertook a two month study visit to the Harrison Institute; conducted field work and took part in workshops in Thailand, Lao PDR and Vietnam; and made a poster presentation and participated in the International bat conference in Phuket (2007). She is joint author of a paper recently submitted to Endangered Species Research and is writing a collaborative paper with regional and international colleagues on a putative new species of bat discovered during her studies in Thailand. In the short term, she is a PSU Natural History Museum volunteer and a member of the PMI2



Ariya Dejtaradol on a study visit to the Harrison Institute

project (2008-2010, involving PSU, Harrison Institute, Bristol University). She is looking to develop her taxonomic research capabilities and is particularly interested in aspects of molecular systematics. During her studies she successfully applied for grants from BRT (Biodiversity Research and Training Projects, Thailand).



Darwin students Ith Saveng and Vuthy Vu in the RUPP Natural History Museum

Cambodian project staff and students

Mr Ith Saveng is registered at RUPP as part of Darwin project 14037 – *Building university capacity to train future Cambodian conservationists* and is currently completing his MSc as part of this project (draft version of all chapters available as a pdf). He undertook training visits (for bat taxonomy and ecology) to PSU. In Cambodia, he has received additional training in the field and laboratory from staff of the Harrison Institute, PSU and the Hungarian Natural History Museum (HNHM). His thesis includes evidence of a new taxon of bats from mainland SE Asia. He has recently been appointed part-time curator of the RUPP Natural History Museum and is an integral part of a forthcoming joint (RUPP, HI and HNHM) application for funds to the Critical Ecosystem Partnership Fund.

Mr Vuthy Vu is registered at RUPP as part of Darwin

project 14037 – *Building university capacity to train future Cambodian conservationists* and is currently completing

his MSc as part of this project (draft version of all chapters available as a Word file). He undertook training visits (for bat taxonomy and ecology) to PSU, attended the international conference at Phuket (2007). In Cambodia, he has received additional training in the field and laboratory from staff of the Harrison Institute, PSU and HNHM. He will participate in a joint application for funds to the Critical Ecosystem Partnership Fund.

Lao project staff and students

Ms Phansamai Phommexay is registered and has been trained at PSU under their International Ecology MSc course. She conducted field work and took part in workshops in Thailand, Lao PDR and Vietnam. She is currently completing her MSc (first draft expected August, 2008). The results will be included in a joint paper with Dr Sara Bumrungsri. She has a permanent position as a lecturer in the Ecotourism Department of the Faculty of Forestry, NUL. At meetings with her Head of Department, also attended by PSU and the Harrison Institute, it was announced that she had the freedom to choose any bat research project that interested her, as the Department is keen to develop its research capabilities and develop further links with international experts. During her studies she successfully applied for an additional grant from BCI (Bat Conservation International).

Mr Phouthone Kingsada is registered at PSU as part of the International Ecology MSc course. As part of this study, he undertook a three month study visit to the Harrison Institute in the UK and conducted field work and took part in workshops in Thailand, Lao PDR and Vietnam. He is currently completing his MSc (draft version, less one chapter available). He has a permanent position as a lecturer at in the Biology Department of the Faculty of Science, NUL. Together with Phansamai (above), he is charged with the responsibility of developing a research collection facility at

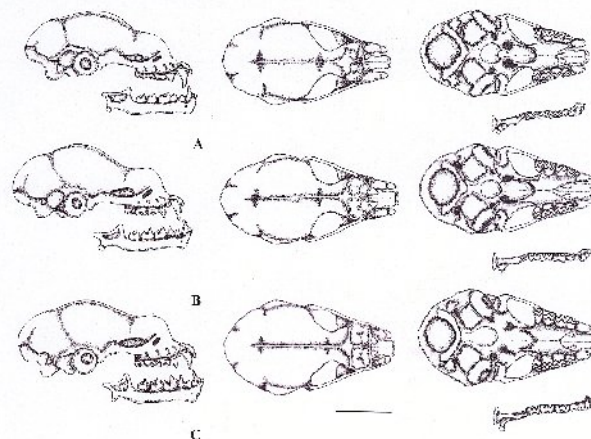
the University. In addition to his academic responsibilities, he also has considerable experience of working with the private sector in a range of consultancies assessing the



Phouthone Kingsada, with Bounsavane Dounangboubpha behind, studying at the Harrison Institute

impact of development projects, such as dams and mining, on the biodiversity of Lao.

Mr Bounsavane Dounangboubpha was registered and trained at PSU under their International Ecology MSc course. He also undertook a three month study visit to the Harrison Institute; conducted field work and took part in workshops in Thailand, Lao PDR and Vietnam; and made a poster presentation and participated in the International bat conference in Phuket (2007). He was awarded his MSc in May, 2008 (subject to his final English exam). His first paper of results has been submitted for review to an international journal. He has a full time post as a lecturer in the Centre for Environmental and Developmental Studies, NUL and is currently part of the team (NUL/WCS/Harrison Institute) applying to the Rufford Foundation for a research grant for studies of endemic bats and rodents in Central Lao PDR. He is also working with colleagues from the National Wildlife Research Centre, Canada on aspects of the molecular systematics of bats.



Technical drawings of bat skulls made by Darwin student Bounsavane Dounangboubpha and included in his thesis and paper, which was recently submitted to an international journal (see Appendix 5)

Vietnamese project staff and students



Mr Vu Dinh Thong at the 9th International Mammalogical Congress, Japan, 2005

Mr Vu Dinh Thong is registered at Tübingen University, Germany for his PhD, which is scheduled for completion in 2010 and is supported by a scholarship from the Vietnamese and German governments. He is co-supervised by the Harrison Institute. As part of the Darwin project, he made a presentation and participated in the 9th International Mammalogical Congress in Hokkaido, Japan (2005) and in the First International Southeast Asian Bat Conference in Phuket (2007) and conducted field work and took part in workshops in Thailand, Lao PDR and Vietnam. His first paper, based on a ten week study visit to the Harrison Institute, was published in 2006. He is principal author of two other papers, and co-author of four others including the naming of two new bat species. He has a full time post as a researcher in IEBR and is working closely with colleagues from the Harrison Institute, Tübingen University, Hungarian Natural History Museum, Aberdeen University, and the Joint Russian-Vietnamese Science and Technological Tropical Centre on a range of additional projects. He has a successful track record of applying for grants, including the BP Conservation Leadership Programme.

Mr Dao Nhan Loi was registered for his MSc thesis at Xuan Mai Forestry University. Under the supervision of Neil Furey, his dissertation, which was written in Vietnamese and completed in October 2007, achieved the highest score of the academic year. The thesis focused on the taxonomy and echolocation behaviour of Vietnamese bats. Loi, who has extensive experience of working with protected area and forest department officials, currently teaches at Son La Forestry University in north-west Vietnam. Following completion of his MSc, he



Mr Dao Nhan Loi (right) with a member of the Forestry Department discussing bat conservation

introduced bat biology into the university curriculum and has begun encouraging students to undertake dissertations on various aspects of bat taxonomy and ecology. To date, he has three BSc students working on bat projects.

Mr Nguyen Xuan Hung was registered at Hanoi National University, where under the supervision of Vu Dinh Thong and Neil Furey, he completed his BSc dissertation (in Vietnamese) on bat diversity in Ba Be National Park in north Vietnam. Following graduation in 2007, Hung participated in a number of field studies undertaken by the Basic Research Programme in Natural Sciences (Vietnamese Ministry of Science and Technology) and is presently working for a state training organisation.



Mr Vuong Tan Tu with Neil Furey at the international conference in Phuket

Mr Vuong Tan Tu was already registered as a part time MSc student on soil biodiversity before he was co-opted into the Darwin project. However, following training by Neil Furey, Tu grew interested in bat research and subsequently became a key member of the projects research team in northern Vietnam. Through this, he participated in and presented his bat research at the annual conference of the Institute of Ecology and Biological Resources (IEBR) in Vietnam (2007) and the international bat conference in Phuket (2007), and recently completed a joint paper (in Vietnamese) on bat echolocation. He is a joint author on two other

papers. Now employed by the IEBR, Tu has successfully applied for further training on bat research techniques in Malaysia (2008) and is currently undertaking preliminary activities to establish an urban bat research and conservation project in Hanoi City.

5 Lessons learned, dissemination and communication

The key lesson is that with a relatively small budget and a lot of energy, it is possible to create a big impact within the academic institutions of mainland SE Asia. All four of our host institutions, their staff and students were open to collaboration. Without exception, they were



Paul Bates, Tigga Kingston, Charles Francis, Neil Furey, Sara Bumrungsri and Gabor Csorba at the SAMD workshop in Bogor. All these scientists (and others at the SAMD) also played a role (training and research) in the Darwin project

enthusiastic, helpful, interested and informed. The students and staff learnt quickly and have developed an extremely impressive set of skills. In addition, their institutions have a common vision in becoming national centres of biodiversity expertise and a common mission in wishing to help conserve the diverse bat faunas (and other biota) of their respective countries.

If future project leaders approach these institutions with an open policy of wishing

to collaborate for mutual advantage and if they wish to develop open networks full of optimistic and enthusiastic staff and students who are unaffected by past

historical differences between nations, then there is no better or more efficient place to work in the world.

Data generated by this project have been disseminated in a variety of forms to a variety of audiences:

Academic audience: the information has been disseminated to fellow zoologists in the form of

- scientific papers (eleven currently written, six already published, with others to follow)
- academic theses (one BSc completed, three MSc completed, five MSc currently being completed, one PhD to be completed in 2010)
- presentations at conferences and workshops, including three at the 9th International Mammalogical Congress in Japan, two at the Systematics Association meeting in Cardiff, nine at the First International SE Asian Bat Conference, one at the 2nd National Scientific Conference on Ecology and Biological Resources, Hanoi (see Annex 5)
- through collaboration on new projects – eg data from the Darwin project is being incorporated into a PM12 project (PSU, HI and Bristol University)

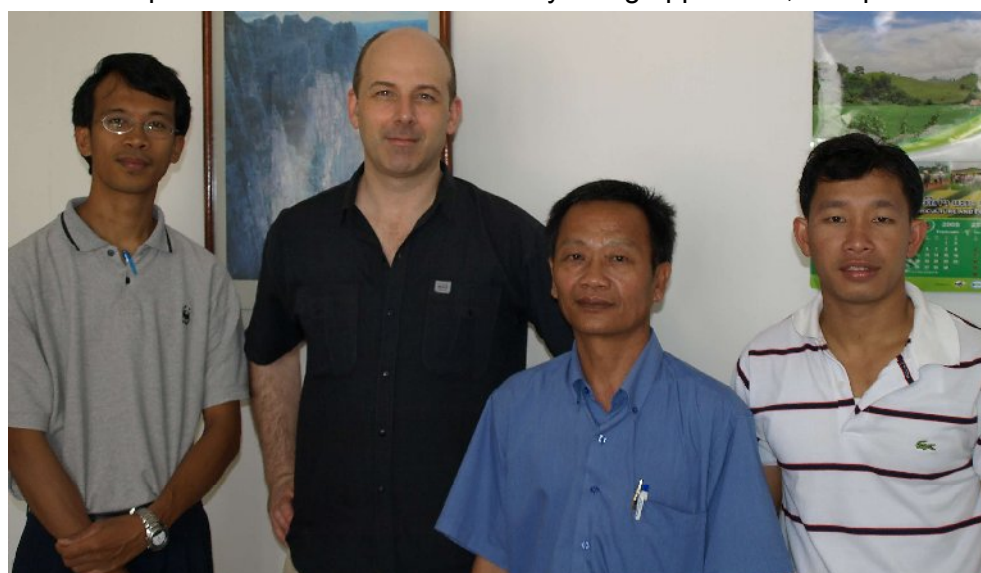
Conservation audience: the information has been disseminated to the conservation audience:

- Through participation of Paul Bates, Vu Dinh Thong and Sara Bumrungsri in the SAMD (Southeast Asian Mammal Databank) workshop in Bogor in May 2006.
- Through involvement with non-governmental and governmental organisations in host countries, for example with:
 - WCS (Wildlife Conservation Society), FFI (Fauna and Flora International) and CI (Conservation International) in Cambodia. Field studies were conducted in conjunction with WCS and with the help of FFI in a number of locations. Provisional results have been discussed with representatives of all three NGOs and a number of future projects are planned, linking in with their ideas and priorities – eg with the Critical Ecosystem Partnership Fund of CI and training programmes of FFI.
 - WCS and WWF in Lao PDR. WCS and WWF



Arlyne Johnson of WCS asking a question during the recent bat workshop in Lao PDR

staff attended a workshop in NUL in March 2008, where the Thai and Lao students presented the results of their Darwin studies. On the basis of this, future collaborative projects have been planned and funds are currently being applied for, with particular



Dr Sara Bumrungsri (PSU), Paul Bates (HI) and Phouthone Kingsada (NUL) (right) with Mr Bouaphanh Phanthavong, the Director of the Division of Forest Resource Conservation, Department of Forestry, Lao PDR

reference to drawing up priorities for bat conservation and assessment of threats to endemic small mammal taxa in central Lao. The Darwin team also held discussions concerning bat conservation with the Division of Forest Resource Conservation, Department of Forestry.

- BRT (Biodiversity Research and Training, Thailand). On the basis of data presented to BRT by the Darwin team in Thailand, the students have been commissioned by BRT to undertake further research work to support conservation initiatives in peninsular Thailand. BRT provides a link between the academic world and the relevant conservation departments of the Thai government.
- FFI and BP Conservation International in Vietnam. The Darwin team worked closely with FFI and with the Forest Department. For example, a joint workshop entitled 'Vietnamese Bat Conservation and Communication Skills' was run in Nov-Dec, 2006 which was focused on 12 staff of Kim Hy Nature Reserve belonging to the technical, legal and forest protection teams. Subsequent courses were run in Ha Giang (Jan. 2007) and Ba Be (Feb. 2007). In addition, a series of colourful posters and illustrated brochures, in Vietnamese, were produced by Neil Furey and the Darwin students including 'The Caves



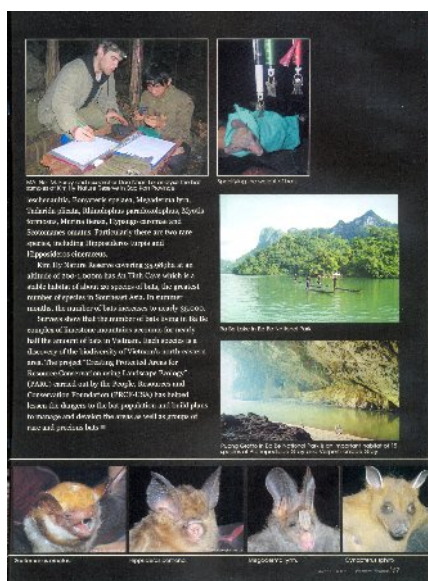
An illustrated brochure promoting bat conservation in Kim Hy Nature Reserve

and Bats of Ba Be National Park'; 'An illustrated guide to the caves and bats of Ba Be National Park'; and 'The Bats of Kim Hy Nature Reserve: An introduction'. These publications were sponsored by the Rufford Foundation.

General audience: information about the project and about bats, their diversity, conservation and role of in the ecosystem have been disseminated to a general audience in a variety of forms including:

- Six TV documentaries
 - one documentary was filmed by Channel 9 during a Darwin workshop and field study in Songkla Province (March, 2006)
 - one documentary was made by 'Sea Air Land Production Co, Ltd, Thailand' on a Darwin field survey in Kanchanaburi Province in March/April, 2006. The 30 minute programme was shown as part of the 'Nature Explorer' series
 - three documentaries were filmed by 'Sea Air Land Production Co, Ltd' in Cat Ba Island, Vietnam in August, 2006 during a Darwin workshop and field survey. They were all subsequently shown as part of the 'Nature Explorer' series in Thailand. It is not certain whether they will also be released in Vietnam
 - one documentary was filmed by VTV (Vietnamese TV) in Ba Be National Park and will be shown on VTV2 and VTV4

- Radio interviews: a variety of radio interviews were given over the course of the project by Sara Bumrungsri, Neil Furey, Vu Dinh Thong and Paul Bates.
- Newspaper articles: a variety of articles were published in the UK, Thailand, Vietnam and Lao PDR. The most recent were two articles – one in the Vientiane Times of 18 April, 2008 entitled 'Researchers help protect bats' and the other in a magazine Vietnam Pictorial, issue 594, entitled 'Conserving bats in Bac Can (Preserving endemic animals)
- Exhibits in the PSU Natural History Museum
- Websites: information about the project and its outputs are available on the Harrison Institute website www.harrison-institute.org/Darwin2/TISABS.htm , and on a variety of other websites eg. <http://vietnamnet.vn/khoahoc/trongnuoc/2006/10/628210/> (in Vietnamese) and <http://english.vietnamnet.vn/tech/2006/10/628562/> (in



Article in Vietnam Pictorial (issue 594) entitled 'Conserving bats in Bac Can'

English) and in Thai at http://www.sc.psu.ac.th/th/Main/honor/T_SC50_Sara.html .

- Presentations to general audiences – for example to the Scientific Exploration Society (March, 2008)

Although the project per se has been completed, it is now part of a fast moving and expanding programme, so that dissemination is part of an on-going process. For details of on-going projects see Section 3.



Two of the bat exhibits in the PSU Natural History Museum. Written in Thai, they seek to educate school children and other interested public visitors about the diversity of bats and the role they play in the ecosystem. The Darwin logo is included

5.1 Darwin identity

Considerable efforts have been made to ensure that the Darwin Initiative is recognised as the principal supporter of this project. As such

- it is acknowledged in all publications
- it is acknowledged and the logo included in all presentations (poster and oral)
- its logo was prominently displayed at the First International SE Asian Bat Conference – both during the conference and in all literature and websites relating to the conference
- where possible it is mentioned and/or acknowledged in all media interviews
- it is included on the Harrison Institute website
- it is included in all relevant brochures, manuals, posters and museum exhibits



T-shirt promoting bat conservation in Vietnam. The Darwin logo is included

This project had a clear identity. It had a beginning (training workshops, integration of the team, and enrolment in courses); a well defined middle (field surveys and the gathering of data) and an on-going end (dissemination of information at the international bat conference in Phuket, the completion of theses and the writing of scientific papers). It has now become the catalyst for future programmes of collaborative studies within the host institutions.

The Darwin Initiative has a high profile within the academic and conservation communities (especially NGOs) within the host countries. However, the brand is not so familiar to the general public, either in the UK or abroad.

6 Monitoring and evaluation

Project design - There were no major changes to the Purpose, Outputs or Activities of the project. Therefore the final logframe (Annex 1) is essentially similar to the initial logframe (in the Application).

The measurable indicators included in the initial logframe were clear and easy to understand. This allowed for an ongoing assessment of the project and its progress towards achieving its goal, purpose and outputs.

Activities – the activities (academic, training, data dissemination) have been discussed in detail throughout this report and are also included in the final logframe. The logframe M&E indicators were devised prior to the commencement of the study and were not altered during its implementation.

M&E process - The monitoring and evaluation system was useful as it provided clarity to all stakeholders concerning the objectives of the project. It ensured that the project remained focused and did not deviate from a clearly defined strategy. This ensured that the project had maximum impact for its investment of time and money.

Evaluation - There has been considerable external evaluation of the work. At an academic level, all publications have been peer-reviewed. The three MSc dissertations (and one BSc dissertation) completed so far have been assessed by both internal and external university examiners and the candidates have had to undergo a *viva voce*. Additional funding was only obtained by the submission of applications to highly competitive funding bodies, who critically assessed the methods and objectives of the current project. Offers of future employment, for example to Pipat Soisook by the PSU Natural History Museum and Ith Saveng by the RUPP Museum, reflect the authorities high regard of the standard of work conducted by these individuals during the lifetime of the Darwin project. The willingness of conservation NGOs to become involved in workshops and with the students and staff in future, post-Darwin, projects is an indirect assessment of the quality of the project. The effectiveness of the project in attracting media interest, particularly the making of six TV documentaries, reflects the interest of the general public in the work. As such, it is a positive evaluation from a non-academic audience.

6.1 Actions taken in response to annual report reviews

The previous reviewer was concerned about the adequacy of the exit strategy. Much time and energy has been invested to strengthen this aspect of the project in the final year.

Student Research Scholarships

Current Bat Conservation International 2007-08 Student Research Scholarships

We congratulate the winners of the current BCI Student Research Scholarships and gratefully recognize the generous donors whose support made them possible.

Phansamai Phommexay (Prince of Songkla University)

Bat diversity and activity level in intact forest and rubber plantation revealed by acoustic technique (Thailand)

Lao Darwin student Phansamai Phommexay, studying at PSU, was awarded a student scholarship by BCI. For further details of the awards see <http://www.batcon.org/bcigrants/scholarintro.asp>

1: Staff have been trained in applying for external grants. During the lifetime of the project, additional funds have been obtained by the students from BRT (Biodiversity research and training projects, Thailand), BCI (Bat Conservation International), BES (British Ecological Society – for attending a conference) and BP Conservation. Students and staff are currently applying for further funds for post-Darwin projects.

2: Much time has been devoted in the last 12 months to ensuring the continued progress of the project.

- In November, 2007, an application for 44,961 euros entitled 'Southeast Asia Bat Diversity Dataset' was made to 'GBIF Seed Money For Content Development'. It involved all four institutions. Unfortunately, although it was shortlisted, it was not successful.
- In December, 2007, an application for £39,951 entitled 'Testing models that predict the distribution and ecological requirements of threatened bat species in Thailand' was submitted to the PMI2 Fund of the British Council. In May, 2008, it was successful and the project involving PSU, Harrison Institute and Bristol University (with further inputs from the University of Dublin) has already commenced.

As mentioned above in Section 3, further funds have been identified and applications are in the process of being submitted, including:

- Critical Ecosystem Partnership Fund [\$20,000] – for workshops and field surveys in Cambodia,
- Rufford Foundation [£5,000] – for research on endangered endemic small mammal fauna in central Laos
- Leverhulme Trust [£125,000] under their International Networks Scheme.

3: Collaborative links have been established with national and international conservation NGOs. Namely:

- CI – Cambodia – application to Critical Ecosystem Partnership Fund
- FFI – Vietnam and Cambodia – support for field work
- WCS – Cambodia and Lao PDR – joint application in Lao for a new project on endemic and endangered small mammals
- WWF – Lao PDR – participation in workshop and potential collaboration in the future

Additional issues

Stronger links were established with NUL. This was achieved through NUL hosting the last Darwin workshop in March, 2008. At this meeting, the outcomes of the Darwin project were presented to students and senior staff of the Science Faculty by the 3 NUL students. In addition, presentations were made by Paul Bates of HI and Sara Bumrungsri and Darwin student Ariya Dejaradol of PSU. Discussions were held with Dr Bounthob Praxaysombath (Head of Biology), Mr Hounpheth Chanthavong (Vice Dean, Faculty of Forestry) and with Assoc. Prof. Dr Somkiat Phasy (Dean of the Faculty of Science) on future co-operation. Help was sought by NUL for a joint project which involves the Harrison Institute and WCS co-supervising two additional students from NUL on a study of endemic endangered small mammal species. This study would also involve current Darwin students from NUL and PSU. NUL also asked for help in setting up a reference collection to international standards and in promoting the university as a national centre for biodiversity research. Additionally, discussions were held on the signing of an MoU between NUL and HI.

Discussions were held with senior department members of RUPP, including Rath Sethik, the Biodiversity Conservation Co-ordinator of RUPP/FFI during two recent visits to Cambodia. It is proposed to jointly host a workshop and field studies in November, 2008 as part of the Critical Ecosystem Partnership Fund (providing the grant application is successful). A joint paper with Darwin student Ith Saveng describing a new taxon of bat is planned for later this year.

Collaborative studies to an international standard have already resulted in 9 papers (submitted or published) see Annex 5. External partners (co-authors that are not part of the initial Darwin project) were drawn from:

- Australia – South Australian Museum
- Canada – National Wildlife Research Centre
- Hungary – Hungarian Natural History Museum

- Ireland - University College Dublin
- Myanmar – Yangon University
- UK – Aberdeen University, London University

MoUs were signed between a number of the institutions. Their progress is outlined briefly below:

- PSU-Harrison Institute – this has provided a strong foundation for the current Darwin project and for a series of on-going projects
- PSU-Yangon University – this has facilitated joint field work (YU, PSU, and University College Dublin) in Myanmar with particular reference to the endangered bumble-bee bat, (*Craseonycteris thonglongyai*), and three collaborative publications (see Annex 5).
- PSU-NUL – PSU trained three Lao Darwin students on its international MSc course and waived the tuition fees
- PSU-Bristol University – both parties together with the Harrison Institute have already started a new post Darwin project sponsored by the British Council (see Section 3)
- Harrison Institute-Chiang Mai University – this is a new MoU that has yet to be activated. It is anticipated that in addition to mammal studies, it will also involve bird research.

Although bat voucher specimen collections were enhanced in Cambodia, primarily through collaboration with the concurrent Darwin project (14037 – *Building university capacity to train future Cambodian conservationists*), it was not feasible to establish a collection in Lao during the course of the project. Considerable time and resources (more that were available to Darwin staff in the current project) are essential to develop an active and well-founded research collection that will have a long-term future. It was considered more important to train the Lao students in collections management and voucher preparation at PSU and promote the establishment of a voucher specimen collection in NUL as part of a future project. This has already been discussed with senior academics at the university, who are enthusiastic about the idea.

The bat database website is more comprehensive than originally planned and although usable by the Darwin team at the moment, it requires further editing and the input of more photographs before it is open to general access (this work is on-going at the moment). In terms of priorities, it was thought to be more important to devote Harrison Institute (and most particularly Paul Bates's) time to a range of issues within the project, rather than concentrating exclusively on completing the website. Other issues included: helping students bring their theses towards completion; help with the writing of papers for international publications; apply for follow up grants to ensure continuity of studies for Darwin students; host a range of workshops and conferences (including a large international one) to ensure the widest dissemination of Darwin data; meet senior staff in the SE Asian institutions and further develop regional and international links. Completing the website, assisting the remaining students complete their studies, and applying for new funds are the current priorities.

7 Finance and administration

7.1 Project expenditure

	Budget	Expenditure	Balance	Variation +/-
Totals	139800.00	139800.00	0.00	

Note 1

Underspend

The underspend of 10.3% on the Rents, rates, heating, lighting, cleaning, & overheads A/c was occasioned by (1) robust cost control and (2) a greater percentage of these costs being borne by the Harrison Institute than anticipated originally.

Note 2

Underspend and inter-account budget change

The sum of £1173.90 was transferred from 2006-07 (Capital items & equipment A/c) to 2005-06 (Travel & subsistence A/c). This change was agreed by D.E.F.R.A. on 21.03.06. Ignoring this transfer, the underspend on the Capital items & equipment A/c at the conclusion of the project would have been 1.4% (£97.34). There was no change to the overall budget after the Stage 2 application.

Note 3

Breakdown of capital items

The following capital items were purchased for the project: fax machine; binocular magnifier; computers (2) including wireless cards, wireless modem, and memory upgrades; bat detectors (2); minidisc player; digital calipers; colour laser printer, projector.

Note 4

Breakdown of "other costs"

Apart from audit fees, other costs included computer services (database creation), ancillary field equipment, laboratory materials (chemicals and containers), travel visas for Darwin students, and costs incurred in the publication of scientific papers.

7.2 Additional funds or in-kind contributions secured

During the course of the project, additional funds of some £76000 were raised. These include both direct contributions or in-kind contributions. They were raised from

- BAT (British American Tobacco), British Ecological Society, Lube Foundation, Organisation for Bat Conservation, PSU, private donations – sponsorship of the 1st SE Asian International Bat Conference
- BCI – sponsorship of aspects of the field research of Phansamai Phommexay (NUL student)
- BP Conservation Award – for Vu Dinh Thong's (IEBR) international bat research in Cat Ba Island (with PSU, NUL and others)

- BRT – sponsorship of aspects of the field research of two Darwin students
- Harrison Institute – salary of Dr Paul Bates (only 1/3 of time covered by Darwin), plus all overruns in costs
- PSU – waiving of tuition fees for 3 NUL students and extra costs associated with 2 RUPP students; costs associated with hosting international workshops; flight for Paul Bates to PSU
- Rufford Foundation – additional sponsorship for bat research and dissemination materials in Vietnam
- The Royal Society – for additional taxonomic work with PSU and University College Dublin
- Vietnamese/German governments – sponsorship (academic supervision and living costs) of Vu Dinh Thong's (IEBR) PhD study in Tübingen University and Vietnam



Additional funding from six external sources, worth \$17375 was raised for the First International Southeast Asian Bat Conference. Thirty-seven students, amongst the 120 delegates, received support

7.3 Value of DI funding

The Darwin funding had a general impact as well as one specific to bat research. In general terms, it has had an effect on the culture of how research and training is conducted in SE Asia. Without the Darwin, it is certain that it would not have been possible to develop such a broad project that involved so many students and staff. It would also not have been possible to bring such a diverse group of students together in a three year 'melting pot of ideas'. It can be said that the Darwin:

- enabled a scientific network of biologists to be established in mainland SE Asia. This is an important concept as prior to the Darwin the vast majority of staff and students within their respective institutions and countries would not have considered the possibility of regional collaboration – ie collaborating with neighbouring countries (most international collaboration was undertaken within Western nations or large Asian countries such as Japan and China). This is a cultural as well as a scientific development which has implications far beyond the study of bat taxonomy
- promoted a desire to conduct whole organism taxonomy within the four institutions in SE Asia. Taxonomy is now seen as more 'fashionable' and something important. If further encouragement is given in different taxa (and we are already trying to promote this), it bodes well for helping to overcome the 'taxonomic impediment' within the region
- promoted a greater interaction between the academic and conservation communities within the host countries
- engendered a feeling amongst the host institutions that they wish to be seen as national centres of biodiversity expertise

- facilitated the study of bat taxonomy through the transfer of UK expertise to the host countries. It also allowed the Darwin students and staff to interact and collaborate with
 - the very best international global experts from a range of countries in this particular field of study
 - other students from throughout southern, southeastern and eastern Asian and to share ideas and experiences (at workshops and at the international conference in Phuket)
- greatly increased our knowledge of the bat faunas of mainland SE Asia. There is a far greater understanding of the diversity, distribution and ecology of many species, including some that are endemic and/or endangered. It has also led to the description of two new species, with more to come.
- provided a platform for future studies of bats and other small mammals in SE Asia. A post-Darwin, second phase of projects has already started with a growing network of active collaborators.

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

Project summary	Measurable Indicators	Progress and Achievements April 2007 - March 2008	Actions required/planned for next period
<p>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</p> <ul style="list-style-type: none"> • 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 		Throughout the year we have drawn on UK expertise and worked extensively with local partners in SE Asia. We have increased in-country capacity and disseminated data to a range of end users in order to actively promote the conservation of bats within the study region	(do not fill not applicable)
<p>Purpose To increase capacity in bat taxonomy amongst in-country scientists in research institutions in mainland SE Asia and to develop a network of collaborative research links between taxonomists in different SE Asian countries</p>	<p>Studies of bat taxonomy to an international standard were conducted by in-country scientists within institutions of SE Asia</p> <p>Collaborative studies were conducted</p>	Collaboration in writing papers, field work, exchanging data, international conference and workshops. A further 7 scientific papers submitted.	Several post Darwin projects either in progress or planned
<p>Output 1. A Darwin bat website hosted by PSU</p>	Website dedicated to the identification, taxonomy and ecology of SE Asian bats	All data compiled and edited by a technician and entered into database www.sc.psu.ac.th/batdb	
Activity 1.1 Over 160 additional photographs are currently being added to the site and most of the species profiles need a final on-line editing		The website needs final checking and editing by Paul Bates	
<p>Output 2. Four institutions in four SE Asian countries with international experience of taxonomic research and with an associated collection of bat voucher specimens</p>	Eleven Darwin students from four SE Asian institutions trained in taxonomic techniques and collections management to an international standard	Students either completed or currently completing their studies. One PhD student scheduled to finish in 2010.	
Activity 2.1. Students completing the writing up of theses		Three MSc and one BSc student completed with additional papers submitted to scientific journals, the remainder are currently completing their studies.	

Activity 2.2. Voucher specimen collections upgraded	Collections upgraded in Thailand, Vietnam and Cambodia. Owing to lack of existing infrastructure, no collection is currently available in Lao. This will form the basis of a future dedicated project.	
Output 3. A series of international publications and presentations on aspects of SE Asian bat taxonomy	Radio and TV broadcasts, information on websites and papers published in scientific journals	Eleven scientific papers submitted to international journals; radio interviews and 6 TV documentaries broadcast; newspaper articles written in UK and in the host countries
Further scientific papers, based on the Darwin research, currently being written		

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

Project summary	Measurable Indicators	Means of verification	Important assumptions
<p>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</p> <ul style="list-style-type: none"> • 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 		<p>During the project we drew on UK expertise and worked extensively with local partners in SE Asia. We have increased in-country capacity and disseminated data to a range of end users in order to actively promote the conservation of bats within the study region</p>	<p>(do not fill not applicable)</p>
<p>Purpose The project increased capacity in bat taxonomy amongst in-country scientists in research institutions in mainland SE Asia.</p> <p>It also successfully developed a network of collaborative research links between taxonomists in different SE Asian countries and internationally</p>	<p>Studies of bat taxonomy to an international standard were conducted by in-country staff and students within four institutions in SE Asia</p> <p>All studies were collaborative</p>	<p>Eleven collaborative scientific papers have been submitted (six published so far) by Darwin team members (Annex 5).</p> <p>Information was submitted in 2006 and more is available for the next upgrade of the SAMD (Southeast Asian Mammal Database).</p> <p>There has been extensive collaboration in writing papers, field work, exchanging data, and workshops.</p> <p>An informal regional and international network based on research and training collaboration has been set up. In some cases this has been supported or will be supported by MoUs. There is a website for those interested in SE Asian bat taxonomy at http://www.seabcru.org/?q=node/5</p> <p>An international conference was hosted.</p>	<p>The SE Asian scientific community has seen and continues to see the need for taxonomic expertise to increase its understanding of its rich biodiversity. Evidence for this includes the fact that several post Darwin projects are already either in progress or planned – eg</p> <p>PMI2 project (Thai/UK – already funded for 2008-2010)</p> <p>Rufford Foundation project (Lao/Thai/UK) – application in progress</p> <p>Critical Ecosystem Fund Application (Cambodia/Thai/Lao/Hungary/UK) – formulated but awaiting availability of funds</p>

<p>Output 1. A Darwin bat website hosted by PSU</p>	<p>Website dedicated to the identification and taxonomy of SE Asian bats. All data compiled entered into database www.sc.psu.ac.th/batdb . Over 160 photographs currently being added and finally editing taking place. Contacts and Links sections to be completed.</p>	<p>Website is already used by Darwin team. On completion it will be available to all on the internet.</p>	<p>Data on the website is of a high, international standard</p>
<p>Output 2. Four institutions in four SE Asian countries with international experience of taxonomic research and three (not NUL) with an associated collection of bat voucher specimens</p>	<p>Eleven Darwin students trained in aspects of bat taxonomy and ecology and techniques of collections management to an international standard.</p>	<p>Students either completed or are currently completing their MSc studies (one BSc) or conducting (in the case of one PhDs) their study.</p> <p>Staff and students took part in a range of regional and international workshops and conferences.</p> <p>Staff and students wrote or are writing scientific papers and have provided input into the website.</p> <p>Voucher specimen collections enhanced in PSU, RUPP, IEBR, and Harrison Institute.</p>	<p>The Darwin team members all remained committed to the project.</p> <p>Eight already have employment which will ensure that they will either continue active research and training in bat studies or will promote their conservation (for details see Section 4.7)</p>
<p>Output 3. A series of international publications and presentations on aspects of SE Asian bat taxonomy</p>	<p>Six TV documentaries were made in Thailand and Vietnam. Radio and newspaper interviews were given. Information was provided on websites and five papers published in scientific journals, with a further four submitted and more currently being written</p>	<p>All publications and much of the media output are freely available to the Darwin Initiative and the public.</p>	<p>Much data worthy of publication was discovered during the project. Two new bat species were named; one bat subspecies was upgraded to species and several putative species are awaiting description. Information on the taxonomy, ecology, conservation status and threats to a number of bat species was compiled, including an endemic and endangered species. This provides much needed scientific data for the conservation community. This information has been or is in the process of being</p>

			disseminated to the academic/conservation and general communities.
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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		Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	25	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		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		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	40	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	10	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		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	25	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	1 Viet (plus one additional Thai student who is indirectly working with, but is not a core member of, the Darwin team)
1b	Number of PhD qualifications obtained	
2	Number of Masters qualifications obtained	3 to date, a further 5 currently completing their theses
3	Number of other qualifications obtained	
4a	Number of undergraduate students receiving training	Intensive training for 1 BSc (dissertation on Viet bats) – additional training for a number of others but not an integral part of their studies
4b	Number of training weeks provided to undergraduate students	30 weeks
4c	Number of postgraduate students receiving training (not 1-3 above)	1
4d	Number of training weeks for postgraduate students	Many hundreds - All eleven students have been on two year or more training courses as part of their MSc/PhD projects – at PSU, Tubingen University, RUPP, Harrison Institute and in conjunction with Aberdeen Univ.
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(ie not categories 1-4 above)	
6a	Number of people receiving other forms of short-term education/training (ie not categories 1-5 above)	
6b	Number of training weeks not leading to formal qualification	One student was trained to MSc level over a two year period but was already registered for an MSc for soil sciences from Hanoi University
7	Number of types of training materials produced for use by host country(s)	1 manual – <i>Voucher specimen preparation</i>
Research Measures		
8	Number of weeks spent by UK project staff on project work in host country(s)	24.5
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	

Code	Description	Totals (plus additional detail as required)
10	Number of formal documents produced to assist work related to species identification, classification and recording.	
11a	Number of papers published or accepted for publication in peer reviewed journals	7 (6 published, one accepted) and 4 submitted
11b	Number of papers published or accepted for publication elsewhere	
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	1 bat website www.sc.psu.ac.th/batdb
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)	
13b	Number of species reference collections enhanced and handed over to host country(s)	3 (PSU, RUPP and IEBR)
Dissemination Measures		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	9 international workshops (in Thai, Viet, Lao and Cambodia) and one international conference with 120 delegates from 25 countries and full support (registration and accommodation) for 37 students
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	3 (in Japan, UK and Indonesia)
15a	Number of national press releases or publicity articles in host country(s)	2 (in Thailand and Lao)
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	1 (Sevenoaks local newspaper)
16a	Number of issues of newsletters (websites) produced in the host country(s)	1 Harrison Institute website available in host country + other websites in Thailand and Viet
16b	Estimated circulation of each newsletter in the host country(s)	
16c	Estimated circulation of each newsletter in the UK	
17a	Number of dissemination networks established	2 - The project is a dissemination network; also working with SEABRCRU
17b	Number of dissemination networks enhanced or	

Code	Description	Totals (plus additional detail as required)
	extended	
18a	Number of national TV programmes/features in host country(s)	6 TV documentaries
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)	5 (Viet and Thail)
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)	£2000
21	Number of permanent educational/training/research facilities or organisation established	
22	Number of permanent field plots established	
23	Value of additional resources raised for project	£72,000
Other Measures used by the project and not currently including in DI standard measures		
	Number of weeks host country Darwin staff and students spent in Harrison Institute (research and training)	60 weeks (1 staff and 2 students from PSU; 1 student from IEBR; 2 students from NUL)
	Number of weeks host country students spent studying in each others countries	3 NUL students spent 2 years at PSU; 2 RUPP students spent 8 weeks in PSU; 3 NUL and 2 PSU students spent one week in Vietnam; 1 PSU student spent one week in RUPP
	Number of leaflets produced	2 leaflets promoting bat conservation in Vietnam

Annex 5: Publications

Type *	Detail	Publishers	Available from	Cost
(eg journals, manual, CDs)	(title, author, year) The papers coloured in blue are good examples of the type of work we have undertaken during this Darwin. However, all the papers are of importance within their fields.	(name, city)	(eg contact address, website)	£
Website	Bats of Southeast Asia (needs final editing)	Prince of Songkla University/Harrison Institute	http://www.sc.psu.ac.th/batddb	free
Journal/ Paper	Sébastien Puechmaille, Pipat Soisook , Medhi Yokubol, Piyathip Piyapan, Meriadeg Ar Gouilh, Khin Mie Mie, Iain Mackie, Sara Bumrungsri , Ariya Dejtardol , Tin Nwe, Si Si Hla Bu, Chutamas Satasook , Paul Bates and Emma C. Teeling. Population size, distribution, threats and conservation status of two endangered bat species: <i>Craseonycteris thonglongyai</i> and <i>Hipposideros turpis</i> .	Submitted to Endangered Species Research	http://www.int-res.com/journals/esr/esr-home/	free
Journal/ Paper	Bounsavane Douangboubpha , Sara Bumrungsri , Chutamas Satasook , Si Si Hla Bu, David Harrison and Paul Bates . A taxonomic review of <i>Hipposideros halophyllus</i> , <i>H. ater</i> , and <i>H. cineraceus</i> (Chiroptera: Hipposideridae) in Thailand and Myanmar.	Submitted to Acta Chiropterologica		free
Journal/ Paper	Vuong Tan Tu , Neil Furey , and Vu Dinh Thong . Vietnamese bat echolocation: a tool for conservation research and management.	Submitted to Vietnamese Journal of Biology		free
Journal/ Paper	Pipat Soisook , Sara Bumrungsri , Chutamas Satasook , Vu Dinh Thong , Si Si Hla Bu, David Harrison and Paul Bates . A taxonomic review of <i>Rhinolophus steno</i> and <i>R. malayanus</i> (Chiroptera: Rhinolophidae) from continental South-East Asia: an evaluation of echolocation call frequency in discriminating between cryptic species.	In press: Acta Chiropterologica – Proof available in July and expected publication in October, 2008		free
Journal/ Paper	Vu Dinh Thong , Pham Duc Tien, Vuong Tan Tu , and Neil Furey The bat fauna of Cat Ba Biosphere Reserve (in Vietnamese)	In press: Vietnamese Journal of Biology		free
Journal/ Paper	Vu Dinh Thong , Vuong Tan Tu , Pham Duc Tien, Chiao-Wen Chu, Juliana, Paul Bates , and Neil Furey . Echolocation call frequency of Marshall's Horseshoe Bat <i>Rhinolophus marshalli</i> from Cat Ba National Park and its current status in Vietnam. 2007	Proceedings of the 2nd National Scientific Conference on Ecology and Biological Resources, Hanoi, 26 October 2007: pp. 274-277.		free
Journal/ Paper	Paul Bates , Matt Struebig, Ben Hayes, Neil Furey , Khin Mya Mya, Vu Dinh Thong , Phan Duc Tien, Charles Francis and Gabor Csorba. A new species of <i>Kerivoula</i> (Chiroptera: Vespertilionidae) from Southeast Asia. 2007	Acta Chiropterologica, 9(2): 323-337.		free
Journal/ Paper	Pipat Soisook , Sara Bumrungsri , Ariya Dejtardol , Charles Francis, Gabor Csorba, Antonio Guillen-Servent and Paul Bates . First records of <i>Kerivoula kachinensis</i> (Chiroptera: Vespertilionidae) from Cambodia, Lao PDR, and Thailand. 2007	Acta Chiropterologica, 9(2): 339-345.		free
Journal/ Paper	Gabor Csorba, Vu Dinh Thong , Paul Bates and Neil Furey . 2007. Description of a new species of <i>Murina</i> from Vietnam (Chiroptera: Vespertilionidae: Murinae).	Occasional Papers, Museum of Texas Tech, 268: 1-10		free
Journal/ Paper	Sara Bumrungsri , David Harrison , Chutamas Satasook , A. Prajukijtr, S. Thong-Aree and Paul	Acta Chiropterologica,		free

Paper	Bates. A review of bat research in Thailand with eight new species record for the country. 2006	8(2): 325-359.		
Journal/ Paper	Vu Dinh Thong, Sara Bumrungsri, David Harrison, Malcolm Pearch, Kristopher Helgen, and Paul Bates. New records of Microchiroptera (Rhinolophidae and Kerivoulinae) from Vietnam and Thailand. 2006	Acta Chiropterologica, 8(1): 83-93.		free
Journal/ Abstract	Paul Bates. Taxonomic studies of Southeast Asian bats. 2007	Bat Research News. 48(3): 120		free
Journal/ Abstract	Pipat Soisook, Sara Bumrungsri and Paul Bates. A taxonomic review of <i>Rhinolophus malayanus</i> and <i>R. stheno</i> (Chiroptera: Rhinolophidae) in Thailand. 2007	Bat Research News. 48(3): 125		free
Journal/ Abstract	Ariya Dejtaradol, Sara Bumrungsri and Paul Bates. A taxonomic review of <i>Rhinolophus pusillus</i> and <i>Rhinolophus lepidus</i> (Chiroptera: Rhinolophidae). 2007	Bat Research News. 48(3): 125-126		free
Journal/ Abstract	Bounsavane Douangboubpha, Sara Bumrungsri, Paul Bates, and Chutamas Satasook. A taxonomic review of <i>Hipposideros ater</i> , <i>H. cineraceus</i> , and <i>H. halophyllus</i> (Chiroptera: Hipposideridae) in Thailand and Lao PDR. 2007.	Bat Research News. 48(3): 126		free
Journal/ Abstract	Phouthone Kingsada, Sara Bumrungsri and Paul Bates. The preliminary study of geographic variation in echolocation call and morphology of <i>Rhinolophus affinis</i> (Chiroptera: Rhinolophidae) in Thailand. 2007	Bat Research News. 48(3): 127		free
Journal/ Abstract	Kwan Nualcharoen, Chutamas Satasook, Paul Bates, and Emma Teeling. Echolocation of <i>Rhinolophus malayanus</i> in Thailand: a genetic relationship approach. 2007	Bat Research News. 48(3): 127		free
Journal/ Abstract	Vu Dinh Thong, Annette Denzinger, Christian Dietz, Hans-Ulrich Schnitzler and Paul Bates. Intra- and Interspecific variation in morphology and echolocation in <i>Hipposideros larvatus</i> (Horsfield, 1823) in Vietnam. 2007.	Bat Research News. 48(3): 128		free
Journal/ Abstract	Vuong Tan Tu, Paul Bates and Neil Furey. Relationships between echolocation frequency and body size in five species of Vietnamese bats. 2007.	Bat Research News. 48(3): 136-137		free
Journal/ Abstract	Phansamai Phommexay, Sara Bumrungsri and Paul Bates. Acoustic study of bat species diversity and feeding intensity in intact forest and rubber plantations. 2007.	Bat Research News. 48(3): 137		free
MSc thesis	Dao Nhan Loi. An identification guide to the bats of Kim Hy Nature Reserve, based on external, craniodental and acoustic criteria. 2007. (in Vietnamese). 2007.	Xuan Mai Forestry University	Xuan Mai Forestry University	-
MSc thesis	Bounsavanh Douangboubpha. A taxonomic review of <i>Hipposideros halophyllus</i> Hill and Yenbutra, 1984, <i>Hipposideros ater</i> Templeton, 1848, and <i>Hipposideros cineraceus</i> Blyth, 1853 and (Chiroptera: Hipposideridae) in Thailand and Myanmar. 2007.	Prince of Songkla University, Thailand	Prince of Songkla University	-
MSc thesis	Pipat Soisook. A taxonomic review of <i>Rhinolophus malayanus</i> Bonhote, 1903 and <i>Rhinolophus stheno</i> Andersen, 1905 (Chiroptera: Rhinolophidae) in Thailand. 2007	Prince of Songkla University, Thailand	Prince of Songkla University	-
Manual	Paul Bates, Vu Dinh Thong, and Sara Bumrungsri. Voucher specimen preparation: bats. 2006	Harrison Institute		£5
Report	Neil Furey and Vuong Tan Tu. The bat fauna of the Khau Ca area, Vi Xuyen and Bac Me Districts, Ha Giang Province, northern Vietnam. 2006	Fauna & Flora International (Vietnam)		free
Report	Neil Furey and Vuong Tan Tu. Report on a rapid	Fauna & Flora		free

	conservation assessment of caves within the Vi Xuyen district, Ha Giang Province and a two day training event at Ha Giang Forest Protection Department Headquarters. 2007	International (Vietnam)		
TV documentaries (on CD)	ITV Thailand, 2006. The Bats of Cat Ba, Vietnam – 3, half hour documentaries	ITV, Thailand		-
TV documentary	Channel 9 (Thai TV). Bats in Thailand	Channel 9, Thailand		-
TV documentary	Sea Air Land Production Company Ltd. Bats of Kanchanburi Province	Sea Air Land Production Company Ltd	Sea Air Land Production Company Ltd	-

Annex 6: Darwin Contacts

Ref No	14-011
Project Title	Taxonomic initiative for Southeast Asian bat studies: Thailand, Vietnam, Cambodia, Lao PDR
UK Leader Details	
Name	Dr Paul Bates
Roles within Darwin Project	Co-ordinator, researcher and trainer
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Phone	
Fax	
Email	
Partner 1	
Name	Neil Furey
Role within Darwin Project	Joint co-ordinator with Mr Vu Dinh Thong in Vietnam
Organisation	Aberdeen University
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Phone	
Email	
Partner 2	
Name	Mr Vu Dinh Thong
Organisation	Institute of Ecology and Biological Resources (IEBR)
Role within Darwin Project	Co-ordinator in Vietnam
Address	Vietnamese Academy of Science and Technology, 18 Hoang Quoc Viet Road, Cau Giay District, Hanoi, Vietnam
Mobile	
Fax	
Email	
Partner 3	
Name	Dr Sara Bumrungsri
Organisation	Prince of Songkla University (PSU)
Role within Darwin Project	Co-ordinator in Thailand (with further responsibilities for Lao and Cambodia)
Address	Department of Biology, Prince of Songkla University, Hat Yai, Songkhla, Thailand, 90112
Phone	
Fax	
Email	

Partner 4	
Name	Mr Phouthone Kingsada
Organisation	National University of Laos
Role within Darwin Project	Co-ordinator for National University of Laos
Address	Department of Biology, Faculty of Science, P.O. Box 7322, Dongdok, Vientiane, Lao PDR
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Email	
Partner 5	
Name	Callum McCulloch
Organisation	Fauna and Flora International/Royal University of Phnom Penh
Role within Darwin Project	Co-ordinator of RUPP MSc students
Address	FFI, P.O. Box 1380, #8B, Street 398, Boeung Keng Kang I, Charmkamorn, Phnom Penh, Cambodia.
Mobile	
Tel/Fax	
Email	
Partner 6	
Name	Ith Saveng
Organisation	Royal University of Phnom Penh (RUPP)
Role within Darwin Project	Curator of RUPP Nat Hist Mus and student contact point
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