



Darwin Initiative – Final Report



Department
for Environment
Food & Rural Affairs

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

Darwin project information

Project Reference	18002
Project Title	Enhancing taxonomic capacity to underpin tropical biodiversity conservation (SE Asia)
Host country(ies)	Thailand, Cambodia and Lao PDR
Contract Holder Institution	Harrison Institute
Partner Institution(s)	Prince of Songkla University, Thailand; Royal University of Phnom Penh, Cambodia; National University of Laos, Lao PDR
Darwin Grant Value	£ XXX
Start/End dates of Project	April, 2010-October, 2013
Project Leader Name	Paul Bates
Project Website	http://www.harrison-institute.org/research/CRM_R3_Darwin_taxonomic%20network.html
Report Author(s) and date	Paul Bates, Dr Chutamas Satasook, Malcolm Pearch, Dr Nikky Thomas, Dr Pipat Soisook and all additional Darwin students and staff; 30 January, 2014.

1 Project Rationale

Mainland SE Asia is a 'hotspot' for rare and endemic biodiversity. Unfortunately, one third of its terrestrial vertebrates are threatened with extinction (IUCN Red List). National governments, through the CBD, are committed to biodiversity conservation and seek to deliver relevant initiatives. However, excepting certain larger mammals and other charismatic groups, there are few individuals who can identify and provide authoritative data on species composition, distribution, ecology, and status of these diverse and threatened taxa.

Taxonomists (with their field guides, keys, databases, and molecular expertise) are uniquely qualified to:

- identify, describe and document the biodiversity of ecosystems
- support the work of ecologists, conservationists, and molecular biologists
- advise on priorities for species and site-based conservation initiatives
- monitor biodiversity loss from the impacts of
 - climate change
 - habitat fragmentation
 - the spread of invasive alien species
 - the spread of disease within biodiversity
- assist with the enforcement of CITES
- assist agronomists with the study of agricultural pest species
- assist medical research teams with the study of animals that are vectors of disease for man
- assist local/national governments to determine the impact of economic development projects on biodiversity
- support environmental impact assessments.

However, as the requirement for taxonomic expertise grows in the biodiversity-rich tropics, the availability of taxonomists in Europe, North America and Japan is declining substantially (Systematics and Taxonomy Report, House of Lords-2007-2008).

Following the success of DI project-14011, PSU Thailand requested assistance from the Harrison Institute to enhance taxonomic capacity in SE Asia by co-developing a regional centre for taxonomic research and training to be based in the Prince of Songkla University (PSU) Natural History Museum; training to be initially focused on small mammal and bird taxonomy (as a role model) but with a future commitment to include a range of regional/international partners working on different vertebrate/invertebrate taxa.

Two supporting institutions in Cambodia and Lao PDR requested assistance to develop their own taxonomic capacity and to be part of a larger SE Asian taxonomic network. Together this would:

- counteract the decline in Western taxonomists
- reduce the impediment of working in isolation by promoting regional and international collaboration
- provide focal points for SE Asian governments to access locally generated biodiversity information relevant to the CBD (especially Articles 7,10,12,13,17 and Global Taxonomy Initiative) and support CITES
- provide a training centre at PSU for taxonomists studying Old World biodiversity with affordable fees (£1500/annum) and accommodation (£70/month) (compared to £15,800/annum fees for MSc course, NHM, London)
- provide taxonomic libraries and regionally-based depositories for voucher specimens.

The three universities are the:

- Prince of Songkla University (PSU), Thailand (7° 00'N, 100° 28'E)
- Royal University of Phnom Penh (RUPP), Cambodia (11 35'N 104 55'E)
- National University of Laos (NUoL) in Lao PDR (17° 59'N 102° 38'E).

2 Project Achievements

2.1 Purpose/Outcome

The project achieved its intended purpose of enhancing taxonomic capacity in SE Asia.

It helped the Prince of Songkla University to develop as an international centre of excellence for taxonomic research and training. It enhanced the taxonomic capacities of the National University of Laos and the Royal University of Phnom Penh as collaborating institutions.

Evidence for this includes:

- training of 4 PhD and 5 MSc students from the Old World tropics in taxonomy (mammals, birds, and amphibians). Information on all 9 students (progress, publications, publications in progress, highlights of research, outreach and employment) is summarised in <http://www.harrison-institute.org/research/Student%20reports%20-%20Darwin%2018002.pdf>
- publication of 28 scientific papers, one book chapter, 2 reports and one editorial with a further 24 papers in preparation, submitted or in revision. All references are listed at <http://www.harrison-institute.org/research/List%20of%20publications%20-%20Darwin%2018002.pdf>

- the discovery, description and publication by Darwin students of four mammal species and one subspecies new to science (pdfs of all publications available on request)
 - *Biswamoyopterus laoensis* (Laotian giant flying squirrel) Sanamxay *et al.* 2013 [publication no: 21, <http://www.harrison-institute.org/research/List%20of%20publications%20-%20Darwin%2018002.pdf>]
 - *Murina balaensis* (Bala tube-nosed bat) Soisook *et al.* 2013a [pub. no: 23]
 - *Murina guilleni* (Guillen's tube-nosed bat) Soisook *et al.* 2013b [pub. no: 24]
 - *Hipposideros einnaythu* (House-dwelling leaf-nosed bat) Douangboubpha *et al.* 2011 [pub. no. 6]

one new subspecies

- *Murina guilleni nicobarensis* (Guillen's Nicobar tube-nosed bat) Soisook *et al.* 2013b [pub. no: 24]
- hosting an international bird conference <http://www.harrison-institute.org/www/IOCSEA/>
- hosting an international bat workshop <http://www.seabcru.org/meetings/seabcru-workshops-2012>, (sponsored by Texas Tech University and the National Science Foundation, USA) and many other training workshops – eg. statistics workshop, see <http://www.harrison-institute.org/Harrison%20Insitute%2018002%20-%20Annual,%202011-12%20report.pdf> page 7; bird workshop, see <http://www.harrison-institute.org/Annual%20Report%20April%202011%20Ref%20No%2018002%20Harriso n%20Insitute.pdf> page 12
- enhancing taxonomic collections in the three universities – Prince of Songkla University, Thailand; National University of Laos; and Royal University of Phnom Penh, Cambodia, (see <http://www.harrison-institute.org/Harrison%20Insitute%2018002%20-%20Annual,%202011-12%20report.pdf> page 5)
- developing an Afro-Asia Network of taxonomists/biodiversity scientists http://www.harrison-institute.org/afro_asian/
- developing MoUs with institutions elsewhere in Asia (Indonesia and China), Europe (France), and USA (pdfs available on request)
- participation of Darwin students in biodiversity field work in Cambodia, India, Indonesia, Lao PDR, Thailand (for example see <http://www.harrison-institute.org/Harrison%20Insitute%2018002%20Annual%20Report,%202012-13.pdf> page 5)
- students using their taxonomic knowledge in a range of supporting projects, which included:
 - training National Park staff in the study of amphibians <http://harrison-institute.org/research/Building%20capacity%20in%20amphibian%20research%20in%20Thailand2.pdf> and also rodents
 - assessing the impact of tourism within protected areas/ limestone karst areas
 - participation in workshops on rodents and human health http://www.ceropath.org/about/events/news/15_18_05_2012_training_workshop_rodent_survey ; participation in surveys of rodents as part of rodents and human health programmes, ie CERoPath <http://www.ceropath.org/> and BiodivHealthSEA <http://www.biodivhealthsea.org/> and in hosting research collections from such surveys <http://www.harrison-institute.org/research/Rodents%20and%20disease.pdf>
 - surveys of bats as part of bats and human health programmes
 - assessing the spread of amphibian diseases – scientific paper, report and manual published online <http://harrison-institute.org/research/Building%20capacity%20in%20amphibian%20research%20in%20Thailand2.pdf> .

2.2 Goal/ Impact: achievement of positive impact on biodiversity and poverty alleviation

The original Goal (as laid down by Darwin Initiative) was to support the objectives of the CBD, CITES and CMS.

The project contributed primarily to the CBD, especially the Global Taxonomy Initiative and Articles 7, 10, 12, 13, and 17.

Global Taxonomy Initiative <https://www.cbd.int/gti/> - the project responded to the impediments to taxonomy in Asia as outlined in the 'First Global Taxonomy Initiative Workshop in Asia' <http://www.cbd.int/doc/meetings/sbstta/sbstta-09/information/sbstta-09-inf-17-en.pdf> .

These impediments included:

- i. a shortage of trained taxonomists in the region
- ii. an aging population of taxonomists in the region
- iii. inadequate literature resources
- iv. inadequate zoological collections
- v. shortage of funding/ shortage of experience in applying for international funding
- vi. shortage of equipment and technical know-how
- vii. international isolation

To meet impediments i and ii, the project trained 9 young taxonomists (details available at <http://www.harrison-institute.org/research/Student%20reports%20-%20Darwin%2018002.pdf>). The students have conducted numerous field studies, participated in many workshops and conferences and have undertaken applied research relating to conservation, disease and pest management.

To meet impediment iii, the project compiled and provided a digital literature library with over 3697 pdfs relevant to taxonomic research in SE Asia/Old World tropics (available on usb) http://www.harrison-institute.org/afro_asian/taxonomic_library.html.

To meet impediment iv, the project enhanced collections in the Prince of Songkla University, the National University of Laos and the Royal University of Phnom Penh. Together, these institutions now hold many new specimens, including the holotypes and paratypes of species new to science discovered during the Darwin project (see list above).

To meet impediment v, students and staff have been trained to apply for external, international grants including from Rufford, the Systematics Association, and the British Ecological Society as well as locally sourced grants. They also work as part of internationally funded programmes.

To meet impediment vi, the project donated equipment and built networks with other international scientists who, in turn, have also donated specialist equipment. Grants for equipment were also received from the Systematics Association and Rufford Small Grants.

To meet impediment vii, the students and staff took part in numerous international conferences and workshops (eg International bat conference in Prague <http://www.harrison-institute.org/Annual%20Report%20April%202011%20Ref%20No%2018002%20Harrison%20Institute.pdf> page 6), including two hosted by PSU, international study visits (eg in Malaysia, see <http://www.harrison-institute.org/Annual%20Report%20April%202011%20Ref%20No%2018002%20Harrison%20Institute.pdf> page 4), and joint field studies and are also part of the Harrison Institute's Afro Asian Taxonomic Network (links to all these are included above).

Article 7 of the CBD: identification and monitoring

the 9 postgraduate students were taught how to identify components of biological diversity important for conservation and have published extensively on this as well as participating in workshops and conferences dedicated to this issue.

Article 10: sustainable use of the components of biological diversity

the students and staff, using their taxonomic knowledge have worked with:

- Khao Ro Council in Nakhon Sri Thammarat, Thailand to develop sustainable policies for tourism in relation to bats and limestone caves
- Pha Ngan Council to assist with the sustainable development for tourism of Pha Ngan Island, Surat Thani.

Article 12: research and training

as outlined above, the project is dedicated to

- establishing and maintaining programmes for scientific and technical education and training in identification, conservation and sustainable use of biological diversity
- promoting and encouraging research which contributes to the conservation of biological diversity – see publications list at <http://www.harrison-institute.org/research/List%20of%20publications%20-%20Darwin%2018002.pdf> .

Article 13: public education and awareness

- PSU Museum hosted visits of Her Royal Highness Princess Maha Chakri Sirindhorn and other important local and national dignitaries as well as numerous school children and members of the general public. All are able to see the importance of taxonomy and biodiversity in a number of exhibits dedicated to the subject.
- In addition, students and staff (as outlined above) have worked with local councils, National Park staff, representatives of the media, and Ministry of Natural Resources and Environment to ensure that ideas relating to biodiversity and its conservation are widely understood.

Article 17: exchange of information

Information on the taxonomy of mammals, birds and amphibians held in Western research collections and libraries was repatriated to SE Asia (pdfs, photos, and study visits by students to UK, Germany and Hungary). Training was provided by Western experts in the field of biodiversity research at training workshops. Information was exchanged at workshops and conferences.

Human Development (poverty alleviation) and welfare

This project has enhanced scientific capacity in SE Asia (and Bhutan and Zambia) to:

- identify rodent species that are vectors of disease. These diseases include hantavirus, leishmania infection, leptospirosis, scrub typhus, toxoplasmosis and viral haemorrhagic fevers and participating in a workshop related to this http://www.ceropath.org/about/events/news/15_18_05_2012_training_workshop_rodent_survey
- Darwin student, Ms Uraiporn Pimsai has already undertaken a survey of rodents in Thailand with Dr Serge Morand (CNRS, Montpellier) under the CERoPath <http://www.ceropath.org/> and BiodivHealthSEA <http://www.biodivhealthsea.org/> programme.
- the Prince of Songkla University Natural History Museum has been selected as one of the SE Asian depositories of reference material collected by CNRS as part of their rodent-human disease research programme <http://www.harrison-institute.org/research/Rodents%20and%20disease.pdf> .
- students studying murid taxonomy have been trained to identify rodents that are a major source of economic loss to agriculture.
- students studying bat taxonomy have been trained to identify bats that are potential vectors of human disease and have worked with colleagues looking at the interaction between man and bat diseases in peninsular Thailand.

2.3 Outputs

Output 1: To develop a centre of taxonomic training and research based at the Natural History Museum and Department of Biology, Prince of Songkla University (PSU).

During the 3 year Darwin project,

- PSU achieved its ambition of becoming a centre of excellence in training students in taxonomy from the Old World tropics by training 4 PhD and 5 MSc Darwin students from SE Asia, the Himalayan region and Africa (initial target 4 PhD students and no MSc students)
- the Darwin students at PSU, researched, collaborated on, and published 20 papers in international scientific journals, with a further 12 publications by Darwin project staff (initial target 4 publications) (see listing at <http://www.harrison-institute.org/research/List%20of%20publications%20-%20Darwin%2018002.pdf>)
- the Darwin students at PSU, described 4 new species and one new subspecies of mammal (see above for details).
- PSU hosted one international conference – First International Ornithological Congress of SE Asia <http://www.harrison-institute.org/www/IOCSEA/>
- PSU hosted one prestigious international workshop (over 80 delegates from Europe, USA, Asia) <http://www.seabcru.org/meetings/seabcru-workshops-2012> and numerous smaller workshops, and field studies (further details above).
- a digital library with over 3697 taxonomic pdfs (available on a usb on request) was developed by Darwin staff and students http://www.harrison-institute.org/afro_asian/taxonomic_library.html
- research collections in Thailand, Cambodia, Lao PDR and UK were enhanced, with numerous new and important voucher specimens, including holotypes and paratypes of new taxa (see listing of specimens in the many publications).

Output 2: A SE Asian Taxonomic Network including PSU in Thailand, RUPP in Cambodia and NUoL in Lao PDR (to be subsequently expanded throughout the region).

- Students exchanges took place with training of Lao and Cambodian students in PSU Thailand; field studies and study visits by students of different nationalities in Cambodia, Lao, Thailand, Indonesia and India – details and photographs included in Annual Reports – available at http://harrison-institute.org/research/CRM_R3_Darwin_taxonomic%20network.html.
- Numerous loans of specimens were made between institutions – see Material and Methods sections of publications (pdfs of all publications are available on request).
- MoUs signed with the Research Centre for Biology-LIPI (RCB-LIPI), Indonesia; Texas Tech University, USA; Montpellier 2 University, France; and Guangdong Entomological Institute, People's Republic of China (MoUs available as pdfs on request).
- Website for the Afro-Asian taxonomic network - http://www.harrison-institute.org/afro_asian/

Output 3: A preliminary outreach programme which includes: designing Museum exhibits that explain the role of taxonomy and training staff from National Parks and conservation NGOs in workshops and field studies.

- three exhibits on the role of taxonomy, taxonomic discoveries and aspects of biodiversity were developed and hosted within PSU Museum. Darwin students, Pipat Soisook and Uraiporn Pimsai, who are also museum staff regularly explain the exhibits to a range of visitors, including school children.

- staff of Tarutao National Park and Hala-Bala Wildlife Sanctuary were trained by Darwin students in aspects of field research, identification and conservation of rodents, bats and amphibians – for example see <http://www.harrison-institute.org/research/Building%20capacity%20in%20amphibian%20research%20in%20Thailand2.pdf>
- five staff of Wildlife Sanctuaries and National Parks in peninsular Thailand attended the First International Ornithological Congress of SE Asia <http://www.harrison-institute.org/www/IOCSEA/>

We are closely monitoring the progress of the three outstanding PhD students and one MSc student to ensure that they finish in a timely fashion in early 2014 (for details of target dates see <http://www.harrison-institute.org/research/Student%20reports%20-%20Darwin%2018002.pdf>).

We are in regular contact and are working with all the students on the 24 outstanding publications. These are being completed and published on a regular basis, with two [nos. 23 and 24, <http://www.harrison-institute.org/research/List%20of%20publications%20-%20Darwin%2018002.pdf>] published in the last month. Several have been submitted recently [nos. 40, 42, 47, 51] and others are in final revision [nos. 36, 38, 41, 49, 51, 55, 56].

All the outstanding students are currently being supported financially by scholarships from their host institutions and we envisage no financial problems relating to their completion.

3 Project support to the Conventions (CBD, CMS and/or CITES)

The contribution of the project in assisting host countries meet obligations to the CBD is outlined in 2.2 (above).

The students were not specifically trained to assist with CITES. However, as qualified and increasingly experienced taxonomists, they are equipped to work with police and customs officials to identify rare and endangered taxa and thereby help enforce the convention.

The students were not specifically trained to work with CMS. However, as taxonomists, they can provide detailed information, within their own knowledge-base, on migratory species and will do so, as and when relevant.

Research conducted by the Darwin students has already been contributed to the Office of Natural Resources and Environmental Policy and Planning, Thailand. This Office prepares information on Biodiversity at provincial level to include in their database for further implementation <http://www.harrison-institute.org/research/Reports%20to%20the%20Office%20of%20Natural%20Resources%20and%20Environmental%20Policy%20and%20Planning%20Thailand2.pdf>

In June, 2012, the senior representative of the Darwin project in PSU, Thailand, Associate Professor and Dean of Science, Dr Chutamas Satasook was invited by the Office of Natural Resources and Environmental Policy and Planning to join a round table discussion on the policy of Material Transfer Agreement preparation. The outcome of this meeting was a Material Transfer Agreement Form for natural history museums (and herbaria) which facilitate the exchange and loan of specimens.

4. Project Partnerships

The Harrison Institute has maintained and enhanced its close relationship with the Prince of Songkla University. It has:

- an on-going MoU (pdf available on request)
- close links with the Vice President (former Dean of Science) of the University. Dr Chutamas Satasook is Associate Professor and Director of the Natural History Museum. She facilitated the project at all levels in the University and tirelessly worked to ensure it achieved maximum impact. As well as numerous visits by Harrison Institute staff to PSU, Dr Chutamas Satasook also visited the Institute in Kent <http://www.harrison->

[institute.org/Annual%20Report%20April%202011%20Ref%20No%2018002%20Harrison%20Insitute.pdf](http://www.harrison-institute.org/Annual%20Report%20April%202011%20Ref%20No%2018002%20Harrison%20Insitute.pdf) page 3

- close links at senior level with the University, including the President – PSU awarded an honorary doctorate to Dr Paul Bates <http://www.harrison-institute.org/images/Paul%20graduation2.jpg>
- close links at academic level with the co-supervision of the 9 postgraduate students, including 3 staff members of PSU (Pipat Soisook, Ariya Dejaradol, Uraiporn Pimsai)
- hosted visits from two PSU Darwin students to the Harrison Institute in UK
- co-authored 13 publications with 21 more in preparation
- co-hosted one international conference, one prestigious international workshop and numerous smaller workshops

The Harrison Institute has enhanced its links with the Royal University of Phnom Penh (RUPP) through:

- training one staff member at PhD level (Ith Saveng)
- informal training of one staff member in bird studies (Chinn Sophea)
- publishing 5 joint papers with 3 more in preparation
- participation in field studies
- developing strong links with Dr Neil Furey of FFI Cambodia/RUPP.

The Harrison Institute has enhanced its links with NUoL through:

- training of two staff members at PhD and MSc level (Bounsavane Douangboubpha and Daosavanh Sanaxmay)
- publishing 6 joint papers with 8 more in preparation.

In addition, it developed strong links with the Copperbelt University, Kitwe, Zambia and with the Royal University of Bhutan through:

- training of 3 staff at MSc level
- the preparation of 3 joint papers.

As outlined in the original application, the partnerships were all based on demand stemming from the host countries. This also applied to the institutions from Bhutan and Zambia.

Close links will be maintained with all the participatory Institutions, primarily through the Darwin students who have full-time teaching positions within their respective organisations (see <http://www.harrison-institute.org/research/Student%20reports%20-%20Darwin%2018002.pdf> for details). The bond with PSU is particularly strong at all levels.

5 Contribution to Darwin Initiative Programme Outputs

Since the design of the project was to transfer taxonomic knowledge and build capacity in taxonomy, many of the details below have already been outlined in Section 2.

5.1 Technical and Scientific achievements and co-operation

The project undertook research in Thailand, Cambodia and Lao PDR. This research was focused on the diversity of small mammals (rodents and bats), birds, and amphibians.

- It published a series of papers in peer-reviewed, international journals, which included:
 - describing 5 taxa of small mammal new to science, 4 species and one subspecies (see above) –
 - describing as co-authors on additional new species *Hipposideros griffini* (Griffin's leaf-nosed bat) Thong *et al.* 2011 (see publication list <http://www.harrison-institute.org/research/List%20of%20publications%20-%20Darwin%2018002.pdf>) and one new subspecies *Hipposideros turpis sungi* (Sungi's leaf-nosed bat) Thong *et al.* 2013
 - describing one fossil bat species new to science *Eptesicus chutamasae* (Chutamas's Serotine) Pearch *et al.* 2013
 - promoting 2 bat synonyms to species status
 - *Hipposideros atrox* (Lesser bicoloured leaf-nosed bat) Douangboubpha *et al.* 2011
 - *Hipposideros nicobarulae* (Nicobar leaf-nosed bat) Douangboubpha *et al.* 2011
 - a baseline study of bat faunas in Lao PDR (Thomas *et al.* 2013) and Cambodia (Kingsada *et al.* 2011; Ith *et al.* 2011; Furey *et al.* 2012)
 - new country records and distribution data of bats from Thailand (Soisook *et al.* 2010); Thailand and Myanmar (Douangboubpha *et al.* 2010); Cambodia (Ith *et al.* 2011); Lao PDR (Douangboubpha *et al.* 2012)
 - a study of bat echolocation (Hughes *et al.* 2010 and 2011)
 - genetic studies of bats (Puechmaille *et al.* 2011)
 - impact of habitat fragmentation on bat diversity (Phommexay *et al.* 2011)
 - zoogeography of the Thai-Malay peninsula (Hughes *et al.* 2011)
 - disease in Thai amphibians (Voros *et al.* 2012)
- It is preparing/ has submitted further publications on aspects of rodent, bat, bird and amphibian diversity
- It has contributed to applied research to the study of rodents and human disease CERoPath <http://www.ceropath.org/> and BiodivHealthSEA <http://www.biodivhealthsea.org/>
- It has contributed to training of staff and students in new techniques and new skills.

5.2 Transfer of knowledge

There has been a transfer of knowledge at a number of levels:

Prince of Songkla staff and students involved in the Darwin project took part in:

- biodiversity surveys (including mammals, birds and amphibians) for the **Ministry of Natural Resources and Environment**, Thailand.
 - these surveys were in 18 villages in Surattani, Nakornsrihammarat, Chumporn Provinces in Southern Thailand. The Ministry keeps the information on the flora and fauna in a database for policy decisions on natural resources. The leaders of the local villages have access to the data for their tourist planning and conservation policies.
 - local villagers were trained in survey methodology and easy identification with the hope the community will monitor and protect their local biodiversity.

- the project is part of the Ministry of Natural Resources and Environment's programme entitled "Biodiversity Database for Thailand". The Ministry chooses 'hot spots' all over the country and then groups them according to region - i.e. Biodiversity database of Northern, Southern, Eastern, north-eastern Thailand and invites relevant universities to join the project, including the Prince of Songkla <http://www.harrison-institute.org/research/Reports%20to%20the%20Office%20of%20Natural%20Resources%20and%20Environmental%20Policy%20and%20Planning%20Thailand2.pdf> .
- compiling a list of species occurring in Songkhla Province. This was prepared for the **Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment**, who are responsible for the Clearing House Mechanism in Thailand. They store the information on Biodiversity at Provincial level to include in their database for future policy planning and implementation. *Inter alia*, the national clearing-house mechanisms provide effective information services to facilitate the implementation of the national biodiversity strategies and action plans.
- a senior member of the Prince of Songkla University, Dr Chutamas Satasook, who was the principal coordinator of the Darwin project in Thailand was invited by the **Office of Natural Resources and Environmental Policy and Planning (Thailand)** to join a round table discussion on the policy of Material Transfer Agreement preparation. The outcome is a Material Transfer Agreement Form for the museum which facilitates the exchange and loan of specimens.
- Darwin students, together with Prince of Songkla University staff, worked with **Khao Ro Council** in Nakhon Sri Thammarat Province and **Pha Ngan Council** in Surat Thani Province to assist with the sustainable development of tourism in relation to biodiversity and local environment
- exchange of information between Darwin student Uraiporn Pimsai (and supervisor, Dr Sara Bumrungsri) with staff of **CERoPath** <http://www.ceropath.org/> and **BiodivHealthSEA** <http://www.biodivhealthsea.org/> on rodents and human health during a field study of rodents and at a workshop http://www.ceropath.org/about/events/news/15_18_05_2012_training_workshop_rodent_survey

5.3 Capacity building

Please see Section 2.2 to see how the project has assisted the host countries implement the CBD.

The project has strengthened institutional capacity by

- training postgraduate students who are permanent staff members of their respective universities (see above and <http://www.harrison-institute.org/research/Student%20reports%20-%20Darwin%2018002.pdf> for details of all the students)
- by raising institutional profile internationally and promoting a network of biodiversity scientists, primarily in Thailand, Cambodia and Lao PDR but including Bhutan and Zambia and with active collaboration with colleagues worldwide.
 - this is seen in the co-authorship of papers listed in <http://www.harrison-institute.org/research/List%20of%20publications%20-%20Darwin%2018002.pdf>
 - Canada – publication No 27
 - China – No 17
 - France – Nos 20, 30, 31
 - Germany Nos - 30, 34, 35, 36, 55
 - Hungary – Nos 5, 10, 16, 24, 30, 31, 32, 45
 - India - Nos 6, 8, 24
 - Indonesia - Nos. 24, 45
 - Ireland – No 20

- Japan – No 53
- Malaysia - Nos 24, 38, 45
- Myanmar - Nos 6, 15, 20
- Poland – No 52
- Russia – No 56
- UK (numerous)
- USA – Nos 8,15
- Vietnam – Nos 5, 16, 17, 24, 28, 31, 41, 45, 54, 55
- acoustic workshop in India (acoustic workshop) <http://www.harrison-institute.org/research/South%20Asian%20Acoustics%20Workshop.html>
- promoting a network with scientists working on applied projects such as a survey of rodents as part of rodents and human health programmes - CERoPath <http://www.ceropath.org/> and BiodivHealthSEA <http://www.biodivhealthsea.org/>
- further strengthening institutions, by
 - raising technical and academic standards, including the use of molecular systematics to complement alpha taxonomy in published papers (see Nos. 17, 20, 23, 24, 30) and pending papers (Nos. 36, 37, 38, 41, 43, 45, 46, 52)
- enhanced technical capacity, for example for bat acoustics – numerous publications
- raising profile by describing 5 new species of mammal (for details see above)
- raising profile by hosting an international conference and workshop and numerous smaller workshops (for details, see above)
- raising profile through overseas study visits to Europe, elsewhere in SE Asia (eg. Indonesia) and India (for details, see above)

5.4 Sustainability and Legacy

Sustainability is an integral part of the project design. Taxonomy now has a high profile within the Department of Biology and Natural History Museum of the Prince of Songkla University and, in addition, the students:

- have permanent positions in universities or education departments in their host countries (for details, see <http://www.harrison-institute.org/research/Student%20reports%20-%20Darwin%2018002.pdf> .The one exception is Daosavanh Sanaxmay, who is currently applying for a permanent position at the National University of Laos.
- have experience of applying for international grants
- have extensive experience of writing papers for international peer-reviewed journals
- have experience of hosting and participating in workshops
- are familiar with the advantages of working in a collaborative and multi-national context and are supported by active and very productive multi-institutional and multi-national networks.

It should also be noted that scholarships from PSU and host institutions are covering the living costs of the remaining students who have yet to fulfil their PhDs and one MSc.

6 Lessons learned

The structure worked well. It was a considerable advantage having all the students studying at one centre – Prince of Songkla University – where they could support and encourage one another. It also made it much easier for supervision and training. We had fantastic support from the Dean of Science at the University, Dr Chutamas Satasook, who ensured that everything ran smoothly at all times.

We had much in-house expertise and were fortunate with being able to access a considerable amount of additional, external expertise at no extra cost.

The project was well-planned with perhaps the one caveat that 3 of the 4 students did not have sufficient time to finish off all their PhD studies within the lifetime of the project. They will complete in the first half of 2014. However, we were always aware that this was a risk, especially as they wrote and published numerous peer-reviewed papers during their studies. Each is committed to their research and we are working with them closely.

In contrast, 4 of the 5 MSc students completed their studies and the remaining individual only started in the second year of the project – MSc is a two year programme at PSU.

We found savings and additional sources of funding that allowed us to expand the project both in terms of students and in terms of taxa studied.

The flexibility of the Darwin Initiative allowed us to develop a far more extensive project than originally envisaged, which will have a lasting impact on biodiversity science in SE Asia, Zambia and Bhutan for years to come.

The primary lesson is that enthusiasm, hard work and flexibility can achieve a great deal with a relatively small amount of money. People will go the extra mile in all cases if they feel that their work is appreciated and if they feel they have ownership of the project. This enthusiasm is a very precious constituent part of all such projects.

6.1 Monitoring and evaluation

There were no major changes to the original project design and no changes to the logframe, except for the increase in numbers of student and publications. However, these changes did not affect original purpose of the project or the overall structure of the outputs.

M&E was practical if perhaps rather informal. I think a more formal process of M&E could have been beneficial in ensuring that the project did not expand too ambitiously. That said, I think the impact of the project and its outputs would have been reduced rather than enhanced but maybe the workload of the Darwin supervisory team would have been reduced.

There was no formal external evaluation. This would have been valuable but there was no budget line. However, external evaluation of the academic content was provided by the reviewers of the 32 international publications and by the examiners of 5 of the 9 students, who have currently completed their theses. Informal evaluation was provided by the numerous outside experts who contributed to all aspects of the project, including training of students and collaboration on papers.

6.2 Actions taken in response to annual report reviews

All feedback was discussed with collaborators.

Taxonomic capacity (as outlined above) is being built for a variety of reasons, including:

- to understand the diversity of life in SE Asia and develop new ways of identifying it – it should be noted that currently it is thought that only 50% of the actual diversity of species in some mammal groups has been recognised – Francis et al. (2010)
- to provide baseline data for ecologists, molecular scientists, and those interested in animal behaviour
- to publish academic papers and books providing information on biodiversity
- to provide authoritative data to update IUCN Red Lists
- to provide information of the impact of climate change, habitat fragmentation, and the introduction of invasive, alien species on biodiversity

- to provide authoritative data on potential extinction rates
- to provide information to policy makers at national and local level on the impact of economic development on biodiversity
- to identify species that are vulnerable to disease (especially amphibians)
- to provide information on biodiversity to agronomists looking to develop techniques to combat the predation of crops by pest species – both in the field and in storage (for this project, this is especially rodents and fruit bats)
- to provide information to medical teams to identify species that are vectors of diseases harmful to man (especially rodents and bats)

Taxonomy is an international science. The majority of existing taxonomic information relating to SE Asia is held in the zoological collections and libraries of Europe and North America. Much existing taxonomic expertise is also currently Western. It is therefore vital to build links with the West to facilitate the transfer/repatriation of data from the West to SE Asia – (pdf libraries, information about holotypes and other specimens) and also to learn new techniques and approaches to taxonomy from current experts.

Nature does not recognise political boundaries. Biodiversity in mainland SE Asia is a complex of species that have their origins in different zoogeographical regions. Some are Palearctic (Europe, China, eastern Russia), others are shared with southern Asia (India), others with the Sundaic Region (Malaysia, Indonesia). Some genera of bats and birds are shared with Africa.

Many of the impediments to studying taxonomy in Asia are comparable to those experienced in Africa.

As outlined in the original purpose, this project sought to train taxonomists based in SE Asia to be of international standard. To be of international standard, requires an international approach and knowledge of taxonomy – this is very different to a regional approach. This has always been recognised for Western taxonomists and the same must apply to SE Asian taxonomists, if they are to be global leaders in their field. This was/is the aim of the project. These students are to be part of a new cadre of young, talented, international taxonomists who live and work together in the Old World tropics.

- 1- As noted above, the students are not just academics but also linked to initiatives concerned with conservation, medical health and pest control.
- 2- there are no direct links to CITES but the students are trained to identify species, including those listed under CITES and can assist the police and customs, if requested
- 3- as noted above, the international focus is a primary aim of the project. These are the international scientists of the future, not based in the USA or Europe but living and working in their home-country institutions and teaching their home-country students. They are of 5 nationalities and are already collaborating in international publications with scientists from another 16 countries and also participating in international workshops and conferences.
- 4- the students can contribute to CMS – but in groups such as rodents, amphibians, insectivorous bats, this is not so relevant.

Partnerships consistently involve national partners – all 9 students are from the host countries, the vast majority of the publications include host country staff and students (many first authored by the students), all the MoUs include the host countries, the majority of international workshops, training workshops and conferences were based in SE Asia (attendance of the conference in Nairobi was not funded by Darwin but by BCI), the enhanced collections are in Thailand, Cambodia and Lao with only a tiny minority of specimens exported internationally. Networks are focused on SE Asia. International experts were brought to SE Asia to train the students. This is first and foremost a project for SE Asia and the Old World tropics. The Harrison Institute has benefited through association but the expertise has been built in Asia and Africa.

7 Darwin identity

The Darwin logo is on the Harrison institute homepage <http://www.harrison-institute.org/index.html> and on the Afro-Asian webpage http://www.harrison-institute.org/afro_asian/.

It was/is included in the acknowledgements of the publications. It was included in the publicity material for the international bird conference <http://www.harrison-institute.org/www/IOCSEA/>.

The project was distinct with its own identity. Through the students, its role is now well understood in sections of the academic/conservation communities of Thailand, Cambodia, Lao PDR, Bhutan and Zambia. In addition, collaborating partners worldwide (see listing above) are aware of the role of the Darwin Initiative in promoting taxonomic training.

8 Finance and administration

8.1 Project expenditure – there was no Darwin budget in 2013-14

Project spend since last annual report	2013/14 Grant (£)	2013/14 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)	0	0	0	
Consultancy costs	0	0	0	
Overhead Costs	0	0	0	
Travel and subsistence	0	0	0	
Operating Costs	0	0	0	
Capital items (see below)	0	0	0	
Others (see below)	0	0	0	
TOTAL				

Staff employed (Name and position)	Cost (£)
TOTAL	0.00

Capital items – description	Capital items – cost (£)
TOTAL	0.00

Other items – description	Other items – cost (£)
TOTAL	0.00

8.2 Additional funds or in-kind contributions secured

Source of funding for project lifetime	Total (£)
Harrison Institute	XXX
Prince of Songkla University	XXX
Royal University of Phnom Penh	XXX
CEPF	XXX
	XXX
TOTAL	XXX

Source of funding for additional work after project lifetime	Total (£)
TOTAL	

8.3 Value for Money

We tried at all times to maximise the impact of the project by using funding as efficiently as possible and bringing additional funding to pay for extra elements of the project.

To this end we had:

- 9 students instead of 4
- we included 5 countries (Bhutan, Cambodia, Lao, Thailand and Zambia) and 2 continents (Africa and Asia [southern and SE Asia) instead of 3 (Cambodia, Lao, and Thailand) and one region (SE Asia)
- studied 3 taxonomic groups (birds, mammals and amphibians) instead of the original 2 (birds and mammals)
- we published 32 papers instead of the initial target of 4

We kept costs to a minimum by

- avoiding using external consultants but rather relying on the generosity of international experts to donate their time to assist with training
- undertaking in-house administration
- seeking sponsorship for workshops and conferences

It was made possible by the generosity of the Prince of Songkla University who hosted and supported, through scholarships, many of the students. In addition, the Dean of Science, Dr Chutamas Satasook, administered the project (at no cost to the project) in the University and throughout SE Asia.

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

Note: For projects that commenced after 2012 the terminology used for the logframe was changed to reflect DFID's terminology.

Project summary	Measurable Indicators	Progress and Achievements in the last Financial Year (2010-2013)	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> <p>The conservation of biological diversity,</p> <p>The sustainable use of its components, and</p> <p>The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</p>		<p>We have drawn on UK expertise and worked extensively with local partners in SE Asia. We have built in-country capacity to help provide national (and international) centres of biodiversity expertise that will facilitate governments to fulfil their obligations to the CBD, CITES and IUCN initiatives</p>	<p>Do not fill not applicable</p>
<p>Purpose To enhance taxonomic capacity in SE Asia by developing a university-based, taxonomic training centre of international standard in Thailand and a regional taxonomic network with collaborating institutions in Cambodia and Lao PDR</p>	<p>PSU, RUPP and NUoL have:</p> <p>Qualified staff (PhD is a minimum requirement of university regulations) to:</p> <p>(1) supervise future MSc/PhD students in taxonomy</p> <p>(2) teach a taxonomic training course to under-/postgraduates</p> <p>(3) conduct taxonomic research.</p> <p>Functional and utilised research collections and libraries for taxonomic studies</p>	<p>One student from Thailand has completed his PhD; the remaining 3 students from Thailand, Lao PDR, Cambodia will complete their PhDs in 2014; 4 students have completed their MSc research, with one to complete in 2014.</p> <p>Research collections have been enhanced in PSU and RUPP and established in NUoL Darwin students and staff have published 32 taxonomic papers in international journals Digital libraries being utilised by staff and students</p>	<p>Do not fill not applicable</p>
<p>Output 1. A centre for taxonomic training and research based in the Natural History Museum and Department of Biology, Prince of Songkla University (PSU).</p>	<p>PSU to become an international centre for taxonomic research and training</p>	<p>PSU has 9 students in taxonomy from Thailand, Lao, Cambodia, Bhutan, and Zambia. In addition, it is part of a NSF grant (\$499,362) administered by Texas Tech University, USA and is working with the University of Ulm, Germany and the Hungarian Natural History Museum (amongst others) on a range of projects relating to the taxonomy of mammals, birds and amphibians</p>	
<p>Activity 1. Training for under- and post-graduates, especially four trainees (staff members of PSU, RUPP, & NUoL) to conduct taxonomic PhDs (to be completed in 2013) and four trainees for taxonomic MSc studies (also to be completed in 2013)</p>		<p>4 students from Thailand, Lao PDR, Cambodia have conducted taxonomic PhDs; five students have conducted taxonomic MScs. Undergraduates have attended training workshops at PSU.</p>	

Activity 1.2 Four taxonomic publications.	Darwin students and staff have already published 32 taxonomic papers/book chapter/editorial/discussion documents in international journals - originally, a target of 4 was set for the 3 year period
Activity 1.3 PSU to host training workshops on field, laboratory, and museum techniques (& ethical collecting policy) open to all students.	One international bat workshop/numerous smaller workshops
Activity 1.4 PSU to host an international conference on SE Asian taxonomy and zoogeography open to all.	PSU hosted the First International SE Asian Ornithological Congress held in Khao Lak in November, 2012, included presentations on taxonomy and phylogeography
Activity 1.5 Enhanced taxonomic libraries and research collections.	Research collections enhanced in PSU and RUPP and established in NUoL; digital library currently comprises over 3697 pdfs
Activity 1. Training for under- and post-graduates, especially four trainees (staff members of PSU, RUPP, & NUoL) to conduct taxonomic PhDs (to be completed in 2013) and four trainees for taxonomic MSc studies (also to be completed in 2013)	Currently 4 students from Thailand, Lao PDR, Cambodia are conducting taxonomic PhDs; five students are conducting taxonomic MScs – 1 PhD completed, 4 MSc studies completed. All to be completed in 2014. Undergraduates have attended training workshops at PSU.
Output 2. A SE Asian Taxonomic Network including PSU in Thailand, RUPP in Cambodia and NUoL in Lao PDR (to be subsequently expanded throughout the region).	Network members work in collaboration for training and research
Activity 2.1. MoUs and protocols supporting: student exchanges for training and research; trans-boundary field studies and specimen loans; joint hosting of workshops and conferences; joint publications in international journals.	An academic network has been developed in SE Asia with PhD students from Cambodia and Lao PDR being trained in Thailand. This network also includes staff and students from elsewhere in Asia and Africa. Workshops, publications, and field studies are collaborative and multi-national
Activity 2.2. Website for the Afro-Asian Taxonomic Network hosted by HI with contact details; project information and future research & training opportunities	An MoU has been signed at university level between PSU and NUoL. Students from Cambodia and Lao are being trained in PSU, Thailand; joint field studies conducted and specimens loaned between institutions; 32 publications have been produced all of which are multi-authored and multi-national
Output 3. A preliminary outreach programme which includes: Designing Museum exhibits that explain the role of taxonomy. Training staff from National Parks and conservation NGOs in workshops and field studies.	The Taxonomic Network is available at www.harrison-institute.org/afro_asian/index.html - most members are currently from SE/ southern Asia and the West, its current membership is nearly 200 from 51 countries.
Activity 3.1. Exhibits about taxonomy and taxonomists made for permanent and temporary display at the Natural History Museum of PSU.	Students and staff have worked with the conservation community in training workshops. We have made presentations about taxonomy and the project to national and international audiences that include conservationists in Europe, Africa and Asia. We have also written articles for publications that are targeted at political, conservation and scientific decision makers. Students and staff have worked with local councils and with Ministries at national level looking at different aspects of conservation and have worked with other research groups looking at the role of biodiversity as pest species and vectors of disease.
Activity 3.2. Increased capacity in the conservation community	Three exhibits on the role of bats, bat diversity and biodiversity have been added to the PSU Museum
	Conservationists have participated in our training workshops. Presentations have been made to the SE Asian conservation community. As noted above staff and students have worked closely with the conservation community.

Annex 2 Project's full logframe, including indicators, means of verification and assumptions

Note: Insert your full logframe. If your logframe was changed since your Stage 2 application and was approved by a Change Request the newest approved version should be inserted here, otherwise insert the Stage 2 logframe.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Goal: (Some minor amendments to the Logical Framework have been made in response to DI recommendations at Stage 1)			
Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.			
<p>Sub-Goal:</p> <p>To enhance taxonomic capacity in SE Asia - so that there is sufficient local expertise to</p> <ul style="list-style-type: none"> • identify and document the region's biodiversity • advise on conservation priorities • monitor the effects of environmental change • assist with the enforcement of CITES • support environmental impact assessments. 	<p>Government Departments and conservation NGOs use locally trained SE Asian taxonomists to help:</p> <ul style="list-style-type: none"> • inform and educate about the diversity of life in SE Asia • update biodiversity databases such as the IUCN Red List and SE Asian Mammal Databank • select priority species/sites for conservation funding • monitor biodiversity loss for initiatives such as IUCN Countdown 2010 • provide data for the Convention on Migratory Species and other initiatives • assist with legislation underpinning CITES 	<p>SE Asian taxonomists are on the advisory boards of and/or list of contributors to:</p> <ul style="list-style-type: none"> • outreach programmes concerned with wildlife conservation in SE Asia • IUCN Red List and SAMD • CEPF Indo-China, assisting with setting priorities and project selection • Ministry of Forestry and National Parks, and associated NGOs monitoring biodiversity • Customs and Excise with respect to the enforcement of CITES 	
<p>Purpose</p> <p>To enhance taxonomic capacity in SE Asia by developing a university-based, taxonomic training centre of international standard in Thailand and a</p>	<p>PSU, RUPP and NUoL have:</p> <ul style="list-style-type: none"> • Qualified staff (PhD is a minimum requirement of university regulations) to: (1) supervise future MSc/PhD 	<p>Students complete their PhD studies and are awarded postgraduate degrees.</p> <p>Research collections are of</p>	<p>Students and staff remain committed to conducting taxonomic/biodiversity research.</p> <p>PSU and RUPP continue to fund their</p>

<p>regional taxonomic network with collaborating institutions in Cambodia and Lao PDR</p>	<p>students in taxonomy (2) teach a taxonomic training course to under-/postgraduates (3) conduct taxonomic research</p> <ul style="list-style-type: none"> • Functional and utilised research collections and libraries for taxonomic studies 	<p>international importance and referred to in external publications.</p> <p>Network members publish in international journals.</p>	<p>respective Natural History Museums.</p>
<p>Outputs</p> <p>1. A centre for taxonomic training and research based in the Natural History Museum and Department of Biology, Prince of Songkla University (PSU).</p>	<p>Training for under- and post-graduates, especially four trainees (staff members of PSU, RUPP, & NUoL) to conduct taxonomic PhDs (to be completed in 2013)</p> <p>Four taxonomic publications.</p> <p>PSU to host training workshops on field, laboratory, and museum techniques (& ethical collecting policy) open to all students.</p> <p>PSU to host an international conference on SE Asian taxonomy and zoogeography open to all.</p> <p>Enhanced taxonomic libraries and research collections.</p>	<p>Students enrol for further taxonomic training. PhD graduates become</p> <ul style="list-style-type: none"> • national focal points within the Taxonomic Network. They continue to develop their respective taxonomic careers as: <ul style="list-style-type: none"> • curators in the Natural History Museums of PSU, Thailand and RUPP, Cambodia • lecturers and postgraduate supervisors at PSU and NUoL. <p>Network pdf library and zoological collections used by an expanding group of young taxonomists.</p> <p>Collaborative taxonomic papers published by Network members in international journals..</p>	<p>Current levels of enthusiasm and support for learning taxonomy and carrying out taxonomic research are maintained within the university system of SE Asia.</p>

<p>2. A SE Asian Taxonomic Network including PSU in Thailand, RUPP in Cambodia and NUoL in Lao PDR (to be subsequently expanded throughout the region).</p>	<p>MoUs and protocols supporting:</p> <ul style="list-style-type: none"> • student exchanges for training and research • trans-boundary field studies and specimen loans • joint hosting of workshops and conferences • joint publications in international journals. <p>Website for SE Asian Taxonomic Network hosted by HI with</p> <ul style="list-style-type: none"> • contact details • project information and future research & training opportunities 	<p>There is an exchange of students between members of the network.</p> <p>There are trans-boundary field studies, workshops and research, the outputs of which are published in international journals.</p> <p>The website is accessed by a wide variety of end-users – taxonomists, ecologists, conservationists.</p>	<p>Deans of Science and Heads of Biology Departments maintain their commitment to:</p> <ul style="list-style-type: none"> • supporting taxonomy/biodiversity research • positioning their institutions as centres of excellence in biodiversity studies • collaborating in trans-national studies and training programmes.
<p>3. A preliminary outreach programme which includes:</p> <ul style="list-style-type: none"> • Designing Museum exhibits that explain the role of taxonomy. • Training staff from National Parks and conservation NGOs in workshops and field studies. 	<p>Exhibits about taxonomy and taxonomists made for permanent and temporary display at the Natural History Museum of PSU.</p> <p>Increased capacity in the conservation community.</p>	<p>Exhibits will be counted, photographed and archived.</p> <p>Increased interaction between the academic and conservation communities.</p>	<p>PSU continues to fund the Natural History Museum.</p> <p>National Park and NGO staff maintain their interest in developing new skills in biodiversity identification and monitoring.</p>

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	35	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	35	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		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	30	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 (e.g. 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	3 (submit in 2014)
1b	Number of PhD qualifications obtained	1
2	Number of Masters qualifications obtained	4 (one more to submit in 2014)
3	Number of other qualifications obtained	
4a	Number of undergraduate students receiving training	3
4b	Number of training weeks provided to undergraduate students	20
4c	Number of postgraduate students receiving training (not 1-3 above)	20
4d	Number of training weeks for postgraduate students	150+
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(i.e. not categories 1-4 above)	
6a	Number of people receiving other forms of short-term education/training (i.e. not categories 1-5 above)	5
6b	Number of training weeks not leading to formal qualification	3
7	Number of types of training materials produced for use by host country(s)	2
Research Measures		
8	Number of weeks spent by UK project staff on project work in host country(s)	32
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	2
10	Number of formal documents produced to assist work related to species identification, classification and recording.	28 publications
11a	Number of papers published or accepted for publication in peer reviewed journals	28
11b	Number of papers published or accepted for publication elsewhere	4
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	pdf library (3697 pdfs)
12b	Number of computer-based databases enhanced (containing species/genetic	1 (museum catalogue in PSU)

Code	Description	Totals (plus additional detail as required)
	information) and handed over to host country	
13a	Number of species reference collections established and handed over to host country(s)	1 (NUoL)
13b	Number of species reference collections enhanced and handed over to host country(s)	1 (RUPP)
Dissemination Measures		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	8
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	10
15a	Number of national press releases or publicity articles in host country(s)	(articles in India)
15b	Number of local press releases or publicity articles in host country(s)	
15c	Number of national press releases or publicity articles in UK	2 (Public Service Review)
15d	Number of local press releases or publicity articles in UK	
16a	Number of issues of newsletters produced in the host country(s)	(no newsletters but 2 international websites)
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+ (websites and through publications)
17b	Number of dissemination networks enhanced or extended	
18a	Number of national TV programmes/features in host country(s)	
18b	Number of national TV programme/features in the UK	
18c	Number of local TV programme/features in host country	
18d	Number of local TV programme features in the UK	
19a	Number of national radio interviews/features in host country(s)	
19b	Number of national radio interviews/features in the UK	
19c	Number of local radio interviews/features in host country (s)	

Code	Description	Totals (plus additional detail as required)
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)	XXX
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 (See Section 8.2 above)	XXX
Other Measures used by the project and not currently including in DI standard measures		

Annex 5 Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year) (please the website for a more detailed list: http://www.harrison-institute.org/research/List%20of%20publications%20-%20Darwin%2018002.pdf)	Publishers (name, city)	Available from (e.g. contact address, website)
Journal Taxonomic Paper 4th Year	Furey, N., S. Phauk, S. Phen, S. Chheang, S. Ith, P. J. J. Bates , and G. Csorba. 2012. New country records for five bat species from Cambodia.	Cambodian Journal of Natural History, 2012(2): 141-149.	www.harrison-institute.org (no cost)
Journal Taxonomic Paper 4th Year	Sanamxay, D., B. Douangboubpha, S. Bumrungsri , S. Xayavong, V. Xayaphet, C. Satasook , and P. J. J. Bates . 2013. Rediscovery of <i>Biswamoyopterus</i> (Mammalia: Rodentia: Sciuridae: Pteromyini) in Asia, with the description of a new species from Lao PDR.	Zootaxa, 3686(4): 471-481.	as above
Journal Taxonomic Paper 4th Year	Soisook, P. , S. Karapan, C. Satasook , and P. J. J. Bates . 2013. A new species of <i>Murina</i> (Mammalia: Chiroptera: Vespertilionidae) from peninsular Thailand.	Zootaxa, 3746: 567-579	as above
Journal Taxonomic Paper 4th Year	Thomas, N. M. , J. W. Duckworth, B. Douangboubpha , M. Williams, and C. M. Francis. 2013. A checklist of bats (Mammalia: Chiroptera) from Lao P.D.R.	Acta Chiropterologica, 15(1): 193–260.	as above
Journal Taxonomic Paper 4th Year	Soisook, P. , S. Karapan, C. Satasook , V. D. Thong, F. A. A. Khan, I. Maryanto, G. Csorba, N. Furey, B. Aul, and P. J. J. Bates . 2013. A review of the <i>Murina cyclotis</i> complex (Chiroptera: Vespertilionidae) with descriptions of a new species and subspecies.	Acta Chiropterologica, 15(2): 271-292	as above
Chapter in a book 3 rd Year	Bates, P. J. J. <i>Bats</i> . Pp. 68-93. In: Johnsingh, A. J. T. & N. Manjrekar [Eds.]. 2012. <i>The Mammals of South Asia, Volume 1</i> .	Universities Press (India) Private Limited. 614 + lxviii pp.	as above
Journal Taxonomic Paper 3 rd Year	Vörös, J., C. Satasook, P. Bates , and S. Wangkulangkul . 2012. First record of the amphibian chytrid fungus, <i>Batrachochytrium dendrobatidis</i> in Thailand.	Herpetology Notes, 5: 519-521.	as above
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Article	Bates, P.J.J. 2010. The science of understanding and describing the diversity of nature.	Public Service Review, UK Science and Technology, 1: 116.	as above

Annex 6 Darwin Contacts

To assist us with future evaluation work and feedback on your report, please provide details for the main project contacts below. Please add new sections to the table if you are able to provide contact information for more people than there are sections below.

Ref No	18002
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