

# 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	EIDPO028
Project Title	Phase II – Building university capacity to train and support Cambodian conservationists
Host country(ies)	Cambodia
UK Contract Holder Institution	Fauna & Flora International
UK Partner Institution(s)	The Harrison Institute
Host Country Partner Institution(s)	Royal University of Phnom Penh (RUPP), Ministry of Environment (MoE), Cambodia
Darwin Grant Value	£ 134,975
Start/End dates of Project	01 April 2009 to 31 March 2011
Project Leader Name	Neil Furey, PhD
Project Website(s)	<a href="http://www.rupp.edu.kh/master/biodiversity_conservation/biodiversity_conservation.php">www.rupp.edu.kh/master/biodiversity_conservation/biodiversity_conservation.php</a> <a href="http://www.fauna-flora.org/publications/cambodian-journal-of-natural-history/">www.fauna-flora.org/publications/cambodian-journal-of-natural-history/</a> <a href="http://www.fauna-flora.org/initiatives/university-capacity-building-project-in-cambodia/">www.fauna-flora.org/initiatives/university-capacity-building-project-in-cambodia/</a>
Report Author(s) and date	Neil Furey, PhD (Project leader) and Rath Sethik (Project coordinator), June 2011

## 1 Project Background

Following the Khmer Rouge era, Cambodia's ability to manage its rich but little studied biodiversity has been severely hampered by a lack of skilled people and reliable information. The post-project aimed to 'strengthen Cambodia's conservation capacity by developing the Centre for Biodiversity Conservation (CBC) as a hub for original research, postgraduate education, information dissemination and inter-agency collaboration'. This was achieved through the formalisation of the CBC at the Royal University of Phnom Penh (RUPP), which continues to deliver a Masters programme in Biodiversity Conservation, to publish the *Cambodian Journal of Natural History* and develop natural history collections and a conservation research group at the university.

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

In addition to forming an important part of the Indo-Burma Hotspot and containing four Global 200 Ecoregions and 40 Important Bird Areas, Cambodia harbours many of the best remaining forests and wetlands in mainland Southeast Asia, with countless endemic and globally threatened species. As the country moves towards greater development and prosperity however, mounting pressures are being exerted on its natural resources by human population growth, infrastructure development and major new extractive industries.

The post-project made a significant contribution to enhancing the ability of Cambodian institutions to meet the country's commitments to the biodiversity conventions, both now and in

the future. In particular, the Ministry of Environment (MOE) (Convention on Biological Diversity Focal Point) and the Ministry of Agriculture, Forestry and Fisheries (MAFF) (the National Management Authority for CITES, with the Scientific Authorities being the Forestry Administration and Fisheries Administration). Though Cambodia is not yet a Party of the Convention on Migratory Species, it is a signatory of the Indian Ocean-South East Asian Marine Turtle Memorandum of Understanding (MoU), with the Fisheries Administration (within MAFF) the temporary focal point. Both ministries were heavily involved in activities throughout the post-project (see Section 3).

The post-project particularly addressed CBD Article 12 relating to Research and Training (estimated 50% of project effort), with both ministries directly benefitting from the training of dozens of staff (as students and Darwin Research Officers) in contemporary conservation biology theory and strategic planning and project management. The MSc curriculum covers the CBD ecosystem themes of Biodiversity and Tourism, Forest Biodiversity, Inland Waters Biodiversity, Protected Areas and Sustainable Use of Biodiversity, and touches on many cross-cutting issues to varying extents, including Alien Species, Governance Law and Policy, Identification, Monitoring and Indicators, Public Awareness and Education, Protected Areas and In-Situ Conservation. Both ministries and other important conservation actors and stakeholders in Cambodia also benefitted from access to essential tools for biodiversity assessment and planning, including the conservation library and zoological reference collection and herbarium. These resources were developed substantially during the post-project and are freely available to all individuals and organisations interested in Cambodian biodiversity and its conservation.

When the new generation of conservation scientists and learning tools are combined with the networking and dissemination facilities created by the project, there is almost no limit to the species, habitats and conservation issues that Cambodians can study and address. Indeed, the post-project enabled RUPP students (many of whom were in-service government and NGO staff) to undertake 27 research studies throughout the country (see Annex 7.3), while Darwin Research Officers, MSc graduates and project staff coauthored 27 peer-reviewed manuscripts (see Annex 5), with a further thirteen in press or preparation at the time of writing. All of these studies and publications are fully relevant to CBD Article 7 (Identification and Monitoring - estimated 30% of project effort), with several also focusing on CITES-listed species e.g. Asian Elephant (*Elephas maximus*), Siamese Crocodile (*Crocodylus siamensis*), Asian Soft-shell Turtle (*Pelochelys cantorii*), Hairy-nosed Otter (*Lutra sumatrana*), Smooth-coated Otter (*Lutrogale perspicillata*) and Lyle's Flying Fox (*Pteropus lylei*).

Building on the findings of these and other collaborative studies, CBD Article 17 (Exchange of Information - estimated 20% project effort) was addressed through the projects websites, guest lecture series and especially the continued publication of the project's open access periodical, the *Cambodian Journal of Natural History*. Three volumes of the journal were published, both online and in print, and physical copies were distributed to more than 20 countries during the post-project. Feedback from government stakeholders and wider conservation community strongly suggests that the journal has become widely recognized for its role in exchanging information (see also newspaper articles in Annex 7.7). An indication of this high regard is given in the following unsolicited letter received by the project team in February 2011:-

*"Dear Dr. Neil Furey,*

*I recently received hard copies of "Cambodian Journal of Natural History, vol. 02" from you.*

*On behalf of MoE's Department of EIA, I would like to thank you and your team for the time, the resources and the efforts in establishing this indispensable scientific journal which contributes a great deal to Cambodia's higher education and to the awareness of all about the country. I would also like to thank you for this journal in the sense that it gives chances to Cambodian researchers to be able to spread their resourceful and helpful studies to other academia both inside and outside of Cambodia. Not only that, this journal would also serve as an important document for the government, specifically MoE, in its policy making aiming for the preservation of its famous biodiversity and for the country's development without harmful effects on those precious fauna and flora.*

*I really appreciate and would like to strongly support to you and your team for doing such a great job, and I hope to see further development of the journal.*

*Puth Sorithy, Director of EIA Department, Ministry of Environment”*

For a broad measurement of the post-project’s contribution to articles 7, 12 and 17, please see Annex 3. It should be noted that the MSc curriculum was also designed to strengthen the capacity of Cambodian trainees to implement CBD Articles 6, 8, 10, 13 and 14 (Details are available at [www.rupp.edu.kh/master/biodiversity\\_conservation/biodiversity\\_conservation.php](http://www.rupp.edu.kh/master/biodiversity_conservation/biodiversity_conservation.php)).

The post-project was very timely, because escalating pressures are being exerted on Cambodia’s natural resources, both inside and outside of protected areas. As noted in previous project reports, the country’s biodiversity is seriously threatened by widespread illegal land clearance, logging, poaching, wildlife trade, the emergence of alien invasive species, and the collapse of traditional natural resource management practices. Improved understanding and management of in-country biodiversity will consequently have significant repercussions on its fast-growing population, over half of whom depend on forests and other natural resources for their survival. Though much remains to be done, the post-project enabled a better-informed and more professional approach to biodiversity conservation by training key technicians, planners and decision makers. Key national institutions now have a much better ability to understand and address Cambodia’s urgent biodiversity problems.

### 3 Project Partnerships

#### National Partners

Fauna & Flora International’s (FFI) principal partner for the post-project was the **Royal University of Phnom Penh** (RUPP), which played a pivotal role in identifying the need for and designing both the original project (DI: 14-037) and post-project. The partnership between the two organisations is expressed in a MoU which was renewed in April 2010 to better reflect our evolving relationship and the specific aims of the post-project. The post-project was governed by a steering committee comprising members of FFI and RUPP, who meet on a quarterly basis to ensure joint ownership and oversight. Day to day project implementation was managed by two individuals: one (Dr Neil Furey, Project Leader) employed by FFI, and the other (Mr. Rath Sethik, Project Coordinator) representing the RUPP. Both operated out of project offices ceded to the CBC by the RUPP in the Department of Biology, reported back to their parent organisations each week and otherwise liaised as needed on a daily basis. This partnership and management structure is still in place, as the Darwin post-project leveraged continuing grants from Macarthur Foundation and several other donors (see section 7.2).

Under the original project, development and delivery of the Masters (MSc) curriculum and research projects were handled by FFI, while integration of the students and curriculum into the university system was overseen by the RUPP. As the post-project progressed, however, the RUPP became increasingly involved in the MSc programme and research activities. By the end of the post-project, for instance, nine of the twelve taught modules comprising the 1<sup>st</sup> year of the MSc programme were delivered by Cambodian postgraduate lecturers, with arrangements made for Cambodian lecturers to take on the remaining modules shortly. In addition, four of the ten staff engaged by the post-project held permanent positions at the RUPP, thus being ideally placed to sustain the post-project’s long term goals. As the post-project’s remaining Darwin Research Officers continue to mature professionally, it is anticipated that these will also undertake the statutory exams to become full-time members of the university. These measures, and the close working relationships developed under both the original and post-project, have ensured a very effective and productive partnership between FFI and the RUPP.

Using experience from the original project, the RUPP and FFI also took several steps to enhance our support during the post-project. On the part of the RUPP, these measures included seconding of several university staff to the project and assisting with processes to formalise the CBC as an independent unit within the RUPP Faculty of Science. The latter was

significant as it resulted in an official charter which established institutional and operational arrangements for the CBC, and equally as important, reaffirmed the university's commitment to providing recurrent funding for its future operations. On FFI's part, supportive measures included the appointment of Dr Neil Furey (Project Leader) in Phnom Penh in mid-2009 to increase mentoring for project staff, partners and students at the RUPP, and several initiatives to deepen the project's ties to the **Ministry of Environment** (MOE: CBD focal point) and **Ministry of Agriculture, Forestry and Fisheries** (MAFF: national CITES authority). For example, arrangements were made during the post-project for additional staff from MOE (which contributed lecturers for two MSc modules, supported salaries for two Darwin Research Officers and provided numerous permits for research activities) to attend selected courses on the MSc curriculum, while MSc and BSc students benefitted from the use of the MAFF/Forestry Administration's Phnom Tamao Wildlife Rescue Centre for field practicals and thesis projects.

Several other Cambodian organisations collaborated in project activities by mentoring guest lectures, contributing guest lectures or by acting as peer-reviewers for the *Cambodian Journal of Natural History*, including the **Sam Veasna Centre for Wildlife Conservation**, **NFTP-Exchange Programme**, **University of Health Sciences**, **Marine Fisheries Research & Development Institute** and the **Culture and Environment Preservation Association**.

### **British and Other Partners**

The project benefited from very positive relationships with the Harrison Institute (UK) and Aberdeen University (both UK), in addition to several other organisations employing British expertise in Cambodia, e.g. **Frontier**, **Conservation International**, **Wildlife Conservation Society**, **Angkor Centre for Conservation of Biodiversity** and **Coral Cay Conservation**. These partnerships have provided a wide variety of important financial, technical and in-kind support and have led to the inclusion of the CBC and its staff in several multi-year funding applications to strengthen scientific capacity in-country. One such application proved successful (DI: 18-002), resulting in extensive overseas training for one Darwin Research Officer (Mr. Ith Saveng, PhD candidate) and links to ongoing capacity-building initiatives in Thailand, Lao and Vietnam. The post-project also benefitted from the help of a diverse array of individuals from numerous organisations who assisted in delivering and developing modules for the Masters course, contributing guest lectures, mentoring final-year student theses and Darwin Research Officer activities, and/or contributed to the *Cambodian Journal of Natural History* through submission of papers, peer-review assistance and service on the journal's international editorial board. Securing the involvement of these individuals and organisations, which was chiefly the post-projects doing, has helped to foster links and even new working relationships between Cambodia and researchers and conservationists worldwide.

In addition to other organisations already mentioned, for instance, organisations that contributed to the *Cambodian Journal of Natural History* included:- Aalto University (Finland), Asian Institute of Technology (Thailand), Asociacion Calidris (Columbia), Australian Museum (Australia), Bangor University (UK), Bristol University (UK), Canadian Wildlife Service (Canada), Catholic University of Leuven (Belgium), Cleveland Metropark Zoo (USA), Delegation of the European Union to Cambodia (EU), Global Wildlife Conservation (USA), Grassroot Soccer (USA), Harvard University (USA), International Crane Foundation (Vietnam and India), Khon Kaen University (Thailand), Korea National University of Education (South Korea), Kyoto University (Japan), La Sierra University (USA), Monash University (Malaysia), Murdoch University (Australia), Muséum National d'Histoire Naturelle (France), National Botanic Gardens (Ireland), National Museum of Natural History (Netherlands), National University of Malaysia (Malaysia), North Carolina Museum of Natural Sciences (USA), North-Eastern Hill University (India), Nykobing Falster Zoo (Denmark), Poverty Environment Network (Indonesia), Royal Belgian Institute of Natural Sciences (Belgium), Royal Botanic Gardens, Kew (UK), Russian Academy of Sciences (Russia), The Chinese University of Hong Kong (China), Universiti Kebangsaan Malaysia (Malaysia), Universiti Tunku Abdul Rahman (Malaysia), University College Dublin (Ireland), University of Bonn (Germany), University of East Anglia (UK), University of Kansas (USA), University of Kent (UK), University of Minnesota (USA), University of Munich (Germany), Vietnam National University (Vietnam), Villanova University (USA) and WWF Greater Mekong Programme.

## 4 Project Achievements

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

As noted in the previous annual report, positive impacts on biodiversity, sustainable use and equitable sharing of biodiversity benefits have been detected through the work of people and organisations trained and connected by the post-project. This influence is certain to continue with increasing numbers of students undertaking applied research projects at sites throughout Cambodia, and not least the prolific activities of the Darwin Research Officers.

To cite just two of many examples, a peer-reviewed paper by Darwin Research Officer Mr. Neang Thy in 2009\* concluded that incomes generated by resin collection in SW Cambodia can be significant and sustainable and reduce local dependencies on unsustainable logging, thereby promoting improved forest conservation. As a consequence, a series of best practices were recommended for its wider uptake. Though the impact of Thy's work may not be evident for years, such studies have potential to result in positive changes in the state of forest-dwelling biodiversity in Cambodia. A second study commissioned by The Angkor Centre for Conservation of Biodiversity (Cambodia) and published by Thy and project partners in 2010 investigated frog consumption and trade in Cambodia\*\*. This research found that while it appears that amphibian trade and consumption have yet to result in drastic species declines nationwide, growing market demand could rapidly change this. As a consequence, a series of recommendations to avert this possibility and other possible threats were provided.

In a wider context, the findings of all research undertaken by the project team (collaborative and otherwise) have been made available as reports to relevant site managers, local stakeholders and other interested parties, and disseminated more widely through publication in the *Cambodian Journal of Natural History* and other peer-reviewed journals (see Annex 5). In addition to providing recommendations to enhance conservation management and raising the conservation profile of the sites studied, these publications and the media attention generated by the discovery of several new species to science in particular has undoubtedly boosted local and international awareness of the conservation importance and management needs of Cambodian biodiversity (see Annex 7.7).

Being essentially a capacity-building initiative, the impacts of the post-project are perhaps best viewed in terms of the number of Cambodians and organisations with improved capacity to address biodiversity information gaps and conservation needs. Within the project team itself, the professional knowledge and skills of the Darwin Research Officers have steadily increased as a result of ongoing mentoring from specialists, dedicated training events and technical and practical experience gained through their personal research projects. Evidence for this can be seen not only through the increasing standard and quantity of publications co-authored by the team during the post-project (Annex 5), but also through the increased interest from other organisations in securing members of the project team to undertake biological assessments.

In a similar sense, it is notable that the majority of students trained by the project either quickly find employment within the conservation sector or are already in-service employees (typically experiencing promotion and/or salary increases on completion of their studies) and therefore well-placed to apply their newfound skills and knowledge. As long as such individuals remain in the environmental and education sectors - which appears highly likely in the foreseeable future - the project's activities will have positive impacts on biodiversity management in Cambodia for decades to come. As the reviewer of the previous annual report commented:-

*“There is absolutely no doubt that project outputs contribute significantly to improved biodiversity in Cambodia through the training of a cadre of professional scientists who are actively contributing to the biodiversity research base of the country and providing input into management decisions. The list of research studies [undertaken] is testimony to this [see Annex 5: Publications and Annex 7.3: Final-year research theses in present report]. In addition a national reference collection is being established which is actively being used by other organisations involved in biodiversity. The provision of adequately trained scientists*

*will enable Cambodia to more effectively fulfil its obligations under the Biodiversity Convention through enabling them to 'document, manage, monitor and report on biodiversity at risk'.*"

\* Neang, T. 2009. Liquid resin tapping by local people in Phnom Samkos Wildlife Sanctuary. *Cam. J. Nat. Hist.* 2009(1): 16-25. ([www.fauna-flora.org/publications/cambodian-journal-of-natural-history/](http://www.fauna-flora.org/publications/cambodian-journal-of-natural-history/))

\*\* Neang, T., Eastoe, T. 2010. An investigation into frog consumption and trade in Cambodia. Fauna & Flora International and The Angkor Centre for Conservation of Biodiversity, Cambodia. (<http://www.accb-cambodia.org/en/Frog%20Consumption%20Report.pdf>)

## 4.2 Outcomes: achievement of the project purpose and outcomes

The Darwin post-project officially ended on 31 March 2011, with all of the planned targets achieved and, in many cases, exceeded. The two-year post project unequivocally fulfilled its purpose which was to 'Strengthen and consolidate Cambodia's conservation science capacity by developing the Centre for Biodiversity Conservation (CBC) as the national hub for original research, postgraduate education, information dissemination and inter-agency collaboration'. Though biodiversity conservation in Cambodia will likely depend on external technical support for some time, the country gained from significantly improved resources, knowledge and social networks, as follows:

**Human Resources:** Over 80 Cambodians gain advanced training in biodiversity conservation during the post-project. All of the students and Darwin Research Officers have shown striking improvements in their understanding, capacity and enthusiasm for conservation, as demonstrated by the rising quality of their written work and examination grades. Most have found the work challenging, but feedback on courses to date has demonstrated a high level of satisfaction with the subjects and standard of teaching. As an average of 68% of the MSc candidates already hold posts with the government or NGOs in Cambodia (see Annex 7.2), they are well placed to apply their new skills, knowledge and experience to improving the conservation policies and actions of their institutions. In addition, the Royal University of Phnom Penh is committed to continuing the MSc in Biodiversity Conservation under the auspices of the CBC (devoting 80% of student fees to its operations) with the result that even greater numbers of Cambodians will receive advanced training in biodiversity conservation in future.

**Physical Resources:** Facilities established by the original Darwin Project (DI: 14-037) at the RUPP were substantially enhanced during the post-project. These improvements included expansion of the projects' conservation library (which now contains over >420 titles) and renovations to develop laboratory space, zoological and botanical reference collections and student computer facilities (which now include five desktop and two laptop computers), in addition to a greatly expanded stock of equipment permitting a wide range of field research, laboratory and curatorial activities. These assets are valued at over £100,000 and are in daily use by students, university staff and visiting scientists. In addition, the post-project encouraged and enabled more Cambodian scientists to disseminate their research findings through continued publication of the *Cambodian Journal of Natural History*. Three volumes were published and disseminated during the post-project (a fourth volume due for release in July 2011), with roughly half of authors to date Cambodian nationals.

**Knowledge:** The post-projects' students and Darwin Research Officers conducted dozens of original research projects on numerous subjects pertaining to biodiversity management, from pure taxonomy through to community use of natural resources. By the end of the post-project, 27 original research projects relevant to the biodiversity conventions had been undertaken by students in collaboration with a wide range of governmental, academic and non-governmental organisations (see Annex 7.3). Darwin Research Officers and project staff were similarly active, and their research activities, coupled with studies by MSc graduates, resulted in the publication of 27 peer-review papers (21 by the former and six by the latter) during the post-project, with four more in press and another nine in preparation at its end (see Annex 5 and 7.5). Additional studies are ongoing and form the basis of conservation projects under the auspices of various government agencies and NGOs. For instance, Darwin Research Officer Mr. Seng Rathea is

monitoring large mammal populations and landscape change at the important Phnom Samkos Wildlife Sanctuary in southwest Cambodia, and his findings are being used by the MOE to evaluate and improve management of this globally important protected area.

**Social Networks:** National capacity was further enhanced through networking and enlisting the involvement of numerous Cambodian and international institutions in the post-project. These contributed either by providing lecturers or learning materials for the MSc curriculum, contributing to the guest lectures series, or by hosting students and Darwin Research Officers while they undertook field research. Even more organisations contributed to *Cambodian Journal of History* through submission of papers, assistance with peer-review processes or through service on the journal's international editorial board (see section 3). In developing its networking role, the project helped to draw many national and international agencies together to communicate and collaborate on biodiversity research and conservation for the first time.

### 4.3 Outputs (and activities)

As detailed further in Annex 1, the project achieved and exceeded its planned activities and outputs. Although achieving such a large number of diverse outputs with multiple partners and stakeholders was rarely easy, the project team was able to overcome obstacles through adaptive management and by drawing on FFI's long experience of working in Cambodia.

**Output 1:** Though initial delays were experienced in activities to "*Formalize the Centre for Biodiversity Conservation (CBC) as an independent unit within the RUPP*" (due to the late arrival of the new project leader and subsequent two-month overseas absence of the RUPP project counterpart), this output was successfully achieved during the post-project.

Following a series of enabling discussions which resulted in the approval of a revised MoU between the RUPP and FFI, subsequent consultations led to the completion of an official charter for the CBC which was issued in February 2011 (a scanned copy of the charter is provided in Annex 7.1). In addition to describing the institutional basis for the CBC, the charter established operational regulations for the centre, which consequently possesses a director and two deputy directors, in addition to a steering committee comprising senior members of FFI and RUPP (Activity 1.1). The CBC Steering Committee meets on a quarterly basis to review operational and financial reports and forthcoming work plans prepared by the deputy directors and to provide guidance in relation to progress made, issues and opportunities for continued implementation, in addition to any other relevant matters that arise (Activity 1.2). The CBC charter also provides a basis for future fundraising activities and the centre's capacity in this regard has been partially demonstrated by the scholarships and small grants recently secured.

Following discussions regarding the post of Director for the CBC, it became apparent that this appointment was best suited to a senior member of the RUPP due to the ongoing need for the CBC to articulate effectively with various departments in the university. As a consequence, the existing vice-rector (H.E. Hang Chanthon, who served very effectively on the previous steering committee for the project) was nominated to the post by FFI and RUPP. As the CBC has been in existence for several years however and already achieved widespread recognition through several high-profile media events, extensive collaborations and numerous publications and conference presentations, project partners felt that there was very little to be gained by holding an opening ceremony as originally planned (Activity 1.3). As a result, it was agreed to include this activity in a repeat of the '*Biodiversity Research Day*' event (where students and Darwin Research Officers presented a series of lectures and posters on their research activities) organised by the post-project in August 2009. The event is scheduled to occur in the last quarter of 2011 and will be undertaken using funding secured from the MacArthur Foundation (USA) and Zoological Parks and Gardens Board of Victoria (Australia) (section 7.2)

**Output 2:** Substantial progress was achieved in '*Enhancing the Masters of Science in Biodiversity Conservation programme as a permanent fixture at RUPP*' and this output was entirely achieved during the post-project (with original targets significantly exceeded).

Two eight-week bridging courses were completed as scheduled for a total of 65 applicants in 2009 and 2010 and successful candidates (classes of 2010/11 and 2011/12) initiated their MSc studies in February of the following years (Activity 2.1; details of MSc entrants are given in Annex 7.2). Delivery of the 12 modules comprising the 1<sup>st</sup> year of the MSc curriculum also occurred smoothly and taught to a total of 41 MSc students (Activity 2.2). Selected courses were also attended on a stand-alone basis by RUPP staff and students and MOE officials, resulting in a significant increase in the number of individuals trained (18), all of whom received RUPP certificates on course completion. Further development of the MSc curriculum was undertaken, providing scope for a new module entitled '*Biodiversity Management*', which was introduced in May 2010. Taken together, a total of 82 MSc students received advanced training in Biodiversity Conservation during the post-project.

Excellent progress was achieved in coaching Cambodian postgraduates to replace international lecturers (Activity 2.3). Through an ongoing process of mentoring, seven 1<sup>st</sup> year MSc modules were transferred during the post-project period. Modules transferred included: Research Analysis - a process of inquiry (to Dr Khim Leang), Research methods and applied statistics (Dr Dok Doma), Natural Resources Management (Dr Mak Sithirith), Environmental Impact Assessment (Dr. Ngy Mithuna & Mr. Spoann Vin), Environmental Law (Mr. Soth Sang Bonn) and Protected Area Management and Project Cycle Management (Dr Seak Sophat). Twelve MSc and four BSc students successfully defended their thesis projects during the post-project and a further six MSc and five BSc students are currently completing their theses in collaboration with a variety of organisations in Cambodia (Activity 2.4; a full list of thesis projects is given in Annex 7.3). To enhance support to 2<sup>nd</sup> year MSc students, a series of procedures governing thesis development and supervision was also introduced.

**Output 3:** The post-project successfully completed all activities to establish a "*Permanent cadre of national scientists employed by the RUPP Centre for Biodiversity Conservation to advance biodiversity science in Cambodia*", exceeding many of its targets in the process.

Following transparent recruitment processes entailing national advertisements and interviews of shortlisted candidates, seven postgraduate Cambodian scientists were recruited as Darwin Research Officers and their terms of reference finalised (Activity 3.1). Three of the Darwin Research Officers recruited also hold permanent positions at the RUPP (Mr. Ith Saveng, Mr. Ly Viboth and Ms. Meas Seanghun) while two also hold permanent positions at the MOE (Mr. Neang Thy and Mr. Seng Rathea). (Since the post-project, one volunteer and an additional Darwin Research Officer have also been recruited). All of the Darwin officers developed research proposals during the post-project and several consequently secured scholarships and small grants (Activity 3.2). These included two three-year PhD scholarships for universities in Thailand and France (both studying Cambodian biodiversity), co-funding for overseas training (in America, Hungary, Laos, Malaysia, U.K. and Vietnam), and a wide variety of financial and in-kind support for research activities in Cambodia (see Section 7.2). With development of additional funding applications ongoing (see Section 6.1), this positive trend will undoubtedly continue.

All of Darwin Research Officers engaged by the post-project undertook original research projects in collaboration with a variety of domestic and overseas organisations (Activity 3.3). Their research projects typically emphasize lesser-studied taxa and conservation questions in Cambodia and summaries of these can be viewed online. (Additional research activities which have yet to be posted online include monitoring of large mammal populations and landscape change in SW Cambodia and research to compare freshwater assemblages in NW Cambodia). Though not scheduled until the final quarter of the post-project, a guest lectures series was initiated at the RUPP during its first year (Activity 3.4) and a total of 24 lectures were delivered by national and international academics by its end (a full list of lectures is given in Annex 7.4). Darwin Research Officers and staff were also very active in disseminating their research findings through publications, co-authoring a total of 21 peer-review manuscripts (see Annex 5), with four more in press at the post-projects' end (abstracts are given in Annex 7.5). MSc students also co-authored six peer-review manuscripts (included in Annex 5) and this positive trend is set to continue with Darwin Officers and staff currently preparing another nine papers for peer-review publication and further papers anticipated from MSc students.



**Output 4:** The post-project achieved major progress towards its fourth output (*'Continued growth and improvement of the national zoological reference collection, herbarium and journal as resources for conservation scientists nationwide'*), exceeding all of its original targets by a significant margin.

Alongside collecting efforts undertaken by MSc students as part of their thesis projects (Annex 7.3), a large series of collaborative expeditions to obtain voucher specimens for the CBC collections were completed with extensive co-funding during the post-project (Activity 4.1):-

- April '09: A survey of frog consumption and trade in several provinces, in collaboration with and co-funded by the Angkor Centre for Conservation of Biodiversity, Cambodia.
- July '09: A herpetological survey in Phnom Samkos Wildlife Sanctuary (SW Cambodia) in collaboration with and co-funded by Dr Lee Grismer of La Sierra University (USA).
- August '09: A herpetological study in Monduliri province (E Cambodia), in collaboration with and co-funded by Dr Jodi Rowley of the Australian National Museum (involving 12 students). Ongoing monitoring study for mammals utilising eight transect lines and four saltlick sites at Phnom Samkos (allowing opportunistic collecting); co-funded by Zoo's Victoria.
- October '09: A herpetological survey in Virachey National Park, Ratanakiri province (NE Cambodia). [cut short due to the ill health of one expatriate team member, since fully recovered].
- November '09: A bat survey in Preah Vihear province (N Cambodia) in collaboration with Dr Gabor Csorba of the Hungarian Museum; co-funded by CEPF via the Harrison Institute.
- December '09: Evaluations at an unexplored site in Phnom Samkos (Dalai), focussing on species inventories for large mammals, bats and amphibians; co-funded by Zoo's Victoria.
- January '10: First trip in a structured inventory study of amphibians and reptiles at Phnom Samkos, plus fixed-point photography to monitor landscape change; co-funded by Zoo's Victoria.
- February '10: The 1<sup>st</sup> in a two-part study of bats, amphibians and reptiles in Ratanakiri province (NE Cambodia) with Dr Gabor Csorba; co-funded by Conservation International.
- March '10: Ongoing monitoring study of mammals and reconnaissance of an unexplored area at Phnom Samkos (both allowing opportunistic collecting); co-funded by Zoo's Victoria.
- April '10: The 1<sup>st</sup> trip in an ongoing study of freshwater zooplankton (Rotifera) diversity among tributaries of the Mekong River (NE Cambodia), with Dr. Ken Wong of the RUPP.
- May '10: A rapid assessment of the bat fauna inhabiting the Song Saa Islands (S Cambodia); funded by the Song Saa Private Islands Resort Company.
- July '10: Continuation of structured inventory study of amphibians and reptiles at Phnom Samkos; co-funded by Rufford Foundation.
- August '10: The 2<sup>nd</sup> in a two-part study of bats, amphibians and reptiles in Veun Sai (Ratanakiri province) with Dr Gabor Csorba; co-funded by Conservation International.
- September '10: Continuation of inventory study of amphibians and reptiles (co-funded by Rufford Foundation) and mammal monitoring at Phnom Samkos (co-funded by Zoo's Victoria).
- October '10: Reconnaissance trip to an unevaluated area of Phnom Samkos to determine logistics for subsequent research (allowing opportunistic collecting); co-funded by Zoo's Victoria.
- November '10: The 2<sup>nd</sup> in an ongoing study of freshwater zooplankton (Rotifera) diversity among tributaries of the Mekong River (N Cambodia), with Dr. Ken Wong of the RUPP.
- December '10: Inventory study of birds, bats, butterflies, amphibians and reptiles in a new area of Phnom Samkos, with Dr. Andrei Kuznetsov and Dr. Alexander Monastyrskii (Vietnam Russian Tropical Centre) and Mr. Paul Neilson (freelance ornithologist).
- January '11: Continuation of inventory study for amphibians and reptiles (co-funded by the Rufford Foundation), landscape monitoring (co-funded by Zoo's Victoria), plus conifer research (co-funded by the Columbia University [USA]) at Phnom Samkos.
- February '11: Continuation of structured inventory study of amphibians and reptiles at Phnom Samkos Wildlife Sanctuary in SW Cambodia; co-funded by the Rufford Foundation.

March '11: Inventory study for bats in the Preah Vihear Protected Forest (N Cambodia) with Dr Gabor Csorba; co-funded by the CEPF via the Harrison Institute. Ongoing monitoring mammal study at Phnom Samkos; co-funded by Zoo's Victoria.

In addition, as the collections and taxonomic expertise of the CBC became better known during the post-period, several organisations in Cambodia donated material in return for species identifications, e.g. Frontier, Angkor Centre for Conservation of Biodiversity, Conservation International and the Wildlife Conservation Society. A substantial number of voucher specimens were consequently added to the zoological collection, which now hosts nearly 2,000 data-based specimens (a seven-fold expansion compared to late 2008), with a similar number of invertebrate specimens currently being catalogued. The herbarium enjoyed a similarly significant acquisition rate due to intensive collecting activity in collaboration with Sud Expert Plantes (France) and repatriation of >1,650 colonial-era specimens from the Museum National d'Histoire Naturelle (Paris). As a result, the herbarium now includes ca. 12,500 specimens of vascular plants, and both collections continue to grow on an almost monthly basis.

The first call for manuscripts for the 2009 volume, the two 2010 volumes, and the first (forthcoming) 2011 volume of the *Cambodian Journal of Natural History* were issued in April and December 2009 and in August 2010 and January 2011, respectively (Activity 4.2). Peer-review processes were subsequently completed during the post-project for all eligible manuscripts submitted to the journal's international editorial board for all but the last volume (complete at the time of writing). The 2009 volume of the *Cambodian Journal of Natural History* was released in December 2009, and the first and second 2010 volumes in August 2010 and January 2011. Hardcopy distribution (x400 copies per volume) was completed shortly afterwards and softcopies of all volumes published to date are freely available at [www.fauna-flora.org/publications/cambodian-journal-of-natural-history/](http://www.fauna-flora.org/publications/cambodian-journal-of-natural-history/) (Activity 4.3). The front cover and table of contents for each volume produced during the post-project are shown in Annex 7.6 and the first 2011 volume of the journal will be issued in July, at which time a call for manuscripts for the following edition will be released.

#### 4.4 Project standard measures and publications

Please see Annexes 4 and 5 for details. Of particular significance was the continued publication of the *Cambodian Journal of Natural History*, the country's first peer-reviewed scientific journal. During the post-project period, three volumes of this open-access journal were published, both online and in print, and hard copies were distributed to more than 20 countries. An additional volume due for release in July 2011 was also produced. The journal features Darwin Initiative logo and describes the Darwin Initiative scheme and has become widely recognized and appreciated, with several articles appearing in the Cambodian press (see Annex 7.7) and numerous links to the journal website created by interested parties online. Roughly half of the authors to date are Cambodian nationals and these positive trends are set to continue with numbers of manuscripts submitted to the journal steadily increasing.

One manuscript published by project partners and an MSc graduate in the *Journal of Herpetology* in 2010 attained an especially high profile. This paper named a new species of reptile, a gecko presently known only from the Cardamom Mountains in southwest Cambodia, after Darwin Research Officer Mr. Neang Thy (scientific name *Cnemaspis neangthyi*). This event attracted a great deal of media attention and resulted in features in over 60 websites and blogs worldwide, in addition to newspaper articles in Cambodia. Mr. Neang came to the attention of the Cambodian media again in 2011 through his publication of a new species of blind, legless lizard in the *Zootaxa* journal (which he named *Dibamus dalaiensis*). This event was significant in that it was the first reptile to be both discovered and formally described in a journal by a Cambodian national (a newspaper article on each event is included in Annex 7.7).

#### 4.5 Technical and Scientific achievements and co-operation

The post-project had a strong focus on developing national capacity to undertake high quality scientific research, which was achieved by building the skills and experience of individuals and fostering collaborative ties among organisations working in conservation science in Cambodia.

As mentioned previously, 27 research projects were carried out under the auspices of the post-project by students alone (not including short-term assignments completed as part of the MSc curriculum) (see Annex 7.3) and a large number of additional studies were also undertaken by Darwin Research Officers, many of which are still ongoing. In accordance with outputs two and three of the post-project, the majority of these studies were conceived and developed in collaboration with government agencies and NGOs from the environmental sector in Cambodia.

To meet the academic requirements of RUPP, every student thesis must be assessed and graded by a minimum of three examiners, including at least one external to the university. Officials from the Ministry of Education, Youth and Sports (MOEYS) also attend student thesis examinations. Since the RUPP continues to suffer from a shortage of experienced scientists, as in original project (DI: 14-037), the post-project continued to add external independent scientists to the examination committee to improve its evaluation processes. Several procedures governing thesis development and supervision were also introduced to improve support to the students. These measures assisted the RUPP Faculty of Science with an important rite of academic passage, and having drawn compliments from MOEYS officials, made university staff more aware of the importance of raising scientific standards.

Although the post-project has generated too many research projects to describe their methods and findings in detail here, these studies have been and continue to be disseminated in student theses, conferences and peer-reviewed journals, including the *Cambodian Journal of Natural History*. As mentioned previously, Darwin Research Officers and project staff were particularly active in disseminating research findings, co-authoring a total of 21 peer-review manuscripts during the post-project period (see Annex 5), with four more in press (see Annex 7.5) and another nine in preparation at its end. Darwin Research Officer Mr. Neang Thy was by far the most prolific, co-authoring seven peer-reviewed papers in four scientific journals (*Small Carnivore Conservation*, *Biology Letters*, *The Cambodian Journal of Natural History*, and *Zootaxa*), followed by his colleagues, Mr. Ith Saveng and Ms. Meas Seanghun, who also co-authored several peer-reviewed publications and are currently working to produce more.

#### **4.6 Capacity building**

The entire post-project was devoted to developing Cambodian capacity, as expressed in its purpose: 'Strengthen and consolidate Cambodia's conservation science capacity by developing the Centre for Biodiversity Conservation (CBC) as the national hub for original research, postgraduate education, information dissemination and inter-agency collaboration'. As all of its activities to this end consequently represent the sole focus of this report, comments in this section are confined to the effect of the post-project upon the capacity of the UK lead institution.

As in the original project (DI: 14-037), FFI gained increased capacity through the post-project, with its staff gaining important new skills and experience, and learning from its many partners. As the post-project is widely known and well respected, FFI's reputation (earned largely through the original project) for being a leading organisation building conservation capacity in Cambodia was also enhanced. In addition to facilitating FFI's partnership with the three main host country partners to become increasingly productive and stronger over time, the post-project also helped FFI to form effective working relationships with a large number of scientists and organisations in Cambodia and worldwide (see Section 3). This extensive network of collaborators has provided FFI and its partners with an excellent foundation to continue the post-projects initiatives, not to mention its other conservation projects in the SE-Asian region.

#### **4.7 Sustainability and Legacy**

Although the Darwin post-project has ended, its work continues. As explained in detail in Sections 6.1 and 7.2 of this report, the project team has successfully secured continued support for all of its initiatives until May 2012, in addition to funding for several of its staff and activities for several years thereafter. Though some of the post-projects' initiatives will undoubtedly rely upon external funding for some time, and others likely depend on continued technical support, the formalisation of the Centre for Biodiversity Conservation as an

independent unit with the RUPP has left in place an excellent vehicle for future capacity-building, networking and fundraising efforts.

Looking forwards therefore, the project team will continue working with its partners and collaborators to further embed and enhance all of the post-projects' initiatives within the RUPP environment to ensure these maintain their high standard and lasting impact. As detailed further in Section 6 of this report, the project team also intends to undertake an assessment involving consultations with government agencies and wider conservation community in Cambodia to determine whether new needs, constraints or opportunities have arisen that could be addressed through adjustments to its activities. It is anticipated that this assessment will provide an important source of orientation in the medium term and provide a solid basis for continued development of the project initiatives.

## 5 Lessons learned, dissemination and communication

Lessons learnt during the post-project are described in guest editorial (*'Lessons learnt in establishing a Masters programme in Biodiversity Conservation at the Royal University of Phnom Penh'*) which was published by Rath Sethik (Project Coordinator) in the 2009 issue of the *Cambodian Journal of Natural History* (a copy of this article is included in Annex 7.7).

Sustained efforts were undertaken to disseminate the post-project's work and achievements through a wide variety of activities which continue. These activities included the creation of websites; distribution of a project brochure; dissemination of articles through the FFI website and *Fauna & Flora* magazine; press releases and interviews timed to coincide with major project events and outputs, numerous peer-review publications; and, extensive collaborations with a variety of stakeholder organisations in Cambodia and overseas.

The *Cambodian Journal of Natural History* in particular formed a key part of the project's overall dissemination strategy. As mentioned previously, hardcopies of the three journal volumes produced during the post-project were distributed to over 20 countries and made available online. The target audience of the journal includes conservation professionals, academics, government departments, nongovernmental organizations, students, and interested members of the public. In addition to these, important communication activities included the following:-

- In August 2009, the post-project organised a one-day workshop at the RUPP where MSc students presented the findings of their thesis research through presentations and poster displays. The event resulted in several articles in national newspapers and periodicals (Annex 7.7) and attracted over 120 participants, including staff from conservation NGOs and related governmental organizations in Cambodia.
- In October 2009, the post-project organised a two-day workshop on SE-Asian bat conservation at the RUPP, in collaboration with the Harrison Institute (UK). Bat specialists from seven countries spoke at the event (including two project staff), which was attended by a range of NGO and government staff, in addition to RUPP students and staff.
- In March 2010, members of the project team attended the annual meeting of the Association for Tropical Biology and Conservation in Thailand and presented three lectures, including one plenary lecture and one devoted to describing the post-projects activities. In representing the only contributions from Cambodia during the conference, these lectures attracted a great deal of interest among its participants.

### 5.1 Darwin identity

Sustained efforts were made to publicise the Darwin Initiative during the post-project. The Darwin Initiative has been largest and the most consistent supporter of the project, and its name (and, where possible, logo) have been prominently displayed on all of the project's websites and in every press release, magazine article, project brochure, newspaper

advertisement, conference presentation, training document, guest lecture announcement and student thesis, in addition to featuring in each volume of the *Cambodia Journal of Natural History* and other publications. Alongside the post-project's many outputs to date, there are further press releases, scientific papers and other publications in the pipeline that will also credit Darwin Initiative's support. For instance, a peer-reviewed paper by project staff, Darwin Research Officers and partners announcing the discovery of three new bat species will appear in the highly-respected *Journal of Mammalogy* in August 2011 (abstract included in Annex 7.5), and a press release crediting the Darwin Initiative will be issued when it appears.

Though the Darwin Initiative was not the only sponsor of the programme (see section 7.2), it was identified with every component of its work (whereas the other sponsors tended to contribute to only one or a few components). The Darwin Initiative's role was notably reflected in the titles of the "Darwin Research Officers" - the seven officers supported by the post-project - even though the project team secured support from other sources for much of their work.

Consequently, the name of the Darwin Initiative will have become familiar to the very many individuals and organisations (both government and non-government) in the environmental and academic sector that were directly involved in the project, as well as the wider audience who read the various press articles and publications related to the project. Though not all of these will know what the Darwin Initiative does outside of Cambodia, the project team would like to think that the project has been a good example of what the scheme stands for. In this context, the team was highly gratified when the British Ambassador to Cambodia (Andrew Mace) expressed this very sentiment at an award ceremony in January 2010. (The ceremony was held to bestow the title of 'Officer of the Order of Sahemtri' to the Dr Jenny Daltry [project technical advisor and journal editor], an honour awarded to foreigners for distinguished services to Cambodia, and both the event and the British Ambassadors' comments are described in a newspaper article in Annex 7.7).

## 6 Monitoring and evaluation

No changes were made to the design of the post-project (please see Annex 1 and 2). Methods of monitoring and evaluation employed during by the project team included weekly meetings in Phnom Penh (where progress is discussed and peer-reviewed by other senior FFI staff in Cambodia); quarterly steering committee meetings involving senior RUPP personnel and FFI project leaders; quarterly activity reports in English and Khmer to the Cambodian Ministry of Foreign Affairs; monthly progress reports and dedicated field reports prepared by Darwin Research Officers and staff; student application and class attendance records; ratified grades for student assignments, examinations and theses; regular student mentoring sessions and debriefings by lecturers and mentors on their perception of progress made and lessons learnt by students and Darwin Research Officers; databases describing the holdings, use and condition of items deposited in the natural history collections and conservation library; distribution records for the *Cambodian Journal of Natural History*; and, inventory and use records for all field equipment managed by the project.

The project team regularly assessed the project's progress against activity milestones in the work plan and measurable indicators in the log frame (at all levels), as shown in its annual and half-year reports to the Darwin Initiative. The project team also tracked its progress against the original target list of standard measures in the post-project application. Both approaches were useful in gauging and discussing progress with project stakeholders and partners, though as in the original project (DI: 14-037), were supplemented with more detailed indicators of progress. The delivery of the MSc curriculum in particular requires a more sophisticated system for compiling and analysing statistics on the students and the course, including grades achieved in multiple examinations and assignments. Having this data to hand was crucial for effective reporting to the project steering committee and for meetings with the RUPP Research Office to determine objectively which students to admit to the course, and which students should pass or fail. In addition, class attendance records, mentoring sessions and lecturer debriefings were important in helping to identify students experiencing difficulties and needing additional support.

During implementation, the project team received visits from several organizations providing matched funding (section 9), including visits from Dr Jyotsna Puri (MacArthur Foundation, USA), Dr Paul Bates (Harrison Institute, UK), Dr Chris Banks (Zoological Parks and Gardens Board of Victoria, Australia), Dr. Hul Sovanmoly (Museum National d'Histoire Naturelle, France) and Dr Bryan Stuart (North Carolina Museum of Natural Sciences (USA)). Though positive verbal feedback was received from these staff, no written reports were prepared. As such, the only written external evaluation of the post-project was that produced by the Darwin Initiative in response to the annual project report submitted in April 2010. This review found '*very little that requires significant comment or clarification*' and concluded that '*the project is doing well and the standard of achievement is outstanding*' (see discussion in Section 6.1). As also suggested by the reviewer, the project team began monitoring the careers of MSc graduates in 2010 and subsequent graduate feedback has confirmed the validity of several cross-cutting issues addressed during the post-project.

The capacity needs assessment that provided the original stimulus for the project was undertaken in 2005, and revealed widespread deficiencies in the environmental sector. As a further means of measuring project impact, the project team is now planning to repeat the capacity assessment to determine whether the capacity of organizations supported by the post-project has changed against this original baseline. The findings of this assessment will also enable FFI and our partners to determine whether new needs or constraints have arisen that could be addressed through adjustments to the Masters curriculum or other means. Since the first needs assessment in Cambodia in 2005, for example, we are aware that there has been growing demand for technical expertise in climate change and REDD.

## **6.1 Actions taken in response to annual report reviews**

The review (dated June 2010) of our single annual report (as a two-year post-project) was shared with project partners at the RUPP. In his/her review, the reviewer requested two comments to be included in the final project report. These are provided below.

*Reviewer comment #1: The project has attracted significant matching funds through other organisations, notably the MacArthur Foundation. It is important for Darwin that project achievements are attributed to the right donor and this should be borne in mind when composing the final report. In terms of sustainability it would be useful to have a realistic appraisal of how the Centre will continue to be funded and whether FFI will continue a mentoring role and provision of editorial input for the Cambodian Journal of Natural History for example. How will salary costs of Darwin Research Scholars be maintained?*

At the time of writing, the project team has successfully secured continued support for all of its initiatives until May 2012 (through the MacArthur Foundation), and funding for several Darwin Research Officer salaries and activities until 2014 (through the Zoological Parks and Gardens Board of Victoria, Harrison Institute and Agent University Francophony). (Please see Section 7.2 for details). Project partners in the Cambodia have committed to continuing their existing secondments and (partial) salary support for other project staff (four holding permanent posts at the RUPP [Mr. Rath Sethik, Mr. Ly Viboth, Mr. Ith Saveng and Ms. Meas Seanghun] and two holding permanent posts in the MOE [Mr. Neang Thy and Mr. Seng Rathea]), while the RUPP has also undertaken to devote 80% of tuition fees paid by MSc students (=£500 /student) to CBC activities (as described in the CBC charter – Annex 7.1).

In addition, the project team has been asked to provide services by two large multi-year projects (funded by the EU and USAID), which if realised, would secure further support for staff salaries and activities. The project team also intends to assist its Darwin Research Officers to submit funding applications to conservation donors which operate a series of small grants aimed at longer term professional development (e.g. The Rufford Foundation and Conservation Leadership Programme) in the final quarter of 2011, in addition to other small grant schemes. Beyond these sources however, further funding will be required to maintain and develop the projects initiatives, particularly those needing support from experienced internationals (see below). Consequently, the project team is currently attempting to identify possible sources of

future multi-year support with help from the FFI fundraising team in Cambridge, as well as reviewing possibilities for consultancy work in Cambodia.

Given the ever-growing numbers of manuscripts submitted and growing numbers of readers, we feel it is desirable for the *Cambodian Journal of Natural History* to continue. At the time of writing, the first Cambodian RUPP co-editor has joined the journal board, marking a transfer of some mentoring and editing responsibilities from FFI. A full transfer to an all-national team of editors is unlikely to take place in the very near future however, due to the need for native English speakers to handle the English text. In the short term, FFI's input will be maintained through external funding and through staff volunteering spare time. In the longer term, the journal could generate funding through subscription fees to non-Cambodian residents (a number of our overseas subscribers have already offered to make a financial contribution) or corporate sponsorship, and significantly reduce costs by switching to online publication or (as some journals do) relying on unpaid editors only.

*Reviewer comment #2: A previously suggested idea to monitor the career path of graduated students would prove of interest. Similarly it would be informative to have some comment on why a large proportion of students completing the bridging course do not progress to the full MSc.*

As mentioned previously, the project team began monitoring the careers of MSc graduates in 2010. In addition to confirming the validity of several cross-cutting issues addressed by the post-project, data collected reveals that the majority of MSc graduates (and postgraduate diploma holders) to date very quickly found employment in the environmental or teaching sector, or, experienced promotion from their existing posts on completion of their studies. Most of the remainder (excluding three students who could not be contacted) consequently secured scholarships to undertake further study abroad in countries such as Australia, Canada, Japan, Korea and Thailand. Student feedback suggests that the primary reason for 'drop out' is primarily due to lack of financial means to support living costs (personal and for any dependents) during their study. This is related to the lack of grants for post-graduate education in Cambodia, which effectively mean that students must have adequate savings or part-time jobs to undertake these studies. To address this issue, the project team has begun seeking support for full scholarships (including tuition fees, thesis and living costs @ ca. £3,000 /student) and negotiations are ongoing with several stakeholders, including the International Crane Foundation (Vietnam and India) and WorldFish Centre (Cambodia), in addition to group of private donors interested in establishing a scholarship fund for the projects' female students.

## 7 Finance and administration

### 7.1 Project expenditure

The project spent the agreed total amount with only minor deviations in the six major budget lines:-

Item	Budget	Expenditure	Balance	Variance
<b>Salaries (specify by individual)</b>				
Dr Jennifer Daltry: Technical Advisor & Journal Editor				
Dr Neil Furey: FFI Project Leader				
Dr Carl Traeholt: Chief Lecturer				
Dr Mark Auliya: 'Species Conservation' Lecturer				
Dr Richard Paley: 'Protected Area & Project Management' Lecturer				
Dr Joerg Menzel: 'Research Methods and Applied Statistics' Lecturer				

Item	Budget	Expenditure	Balance	Variance
Dr. Knud Heller: 'Environment Law' Lecturer				
Poe Veasna: Accountant				
Rath Sethik: RUPP Coordinator				
Neang Thy: Darwin Research Officer and 'Ecological Field Techniques' Lecturer				
Ith Saveng: Darwin Research Officer and Curator				
Meas Seanghun, Ly Viboth, Choun Phiom, Seng Rathea, Hun Seiha, Chhin Sophea: Darwin Research Officers				
Sour Sethy (MoE): 'EIA' Lecturer				
Va Sovanna: 'GIS' Lecturer				
Various- Bridging Course Lecturers				
<b>Overhead costs (office rent, heating, transfers)</b>				
<b>Travel and subsistence</b>				
<b>Operation costs</b>				
<b>Capital equipment (specify)</b>				
Equipment for reference collection, furniture				
Field research equipment & consumables				
Teaching equipment & supplies				
Office equipment & consumables				
<b>Others (specify)</b>				
Health and medical insurance				
<b>TOTAL</b>				

## 7.2 Additional funds or in-kind contributions secured

£366,407 of additional funding was secured in support of the post-project:-

Donor	Duration	Amount secured (£)
MacArthur Foundation (USA) [Grant Code: 09-92411-000-GSS]	June 2009 - May 2012	260,000
North Carolina Museum of Natural Sciences (USA) [Sub-grant provided by Dr Bryan Stuart]	June 2009 - May 2012	5,000
Critical Ecosystems Protection Fund (USA) [Sub-grant provided by the Harrison Institute]	August 2009 - May 2010	4,000
Conservation International (Cambodia) [Grant for Darwin Officer research in NE Cambodia]	February 2010 - September 2010	3,300
Harrison Institute (UK) (through DI: 18-002) [PhD scholarship for Darwin Officer Mr. Ith Saveng]	April 2010 - October 2013	15,000*
Rufford Foundation (UK) [Project grant to Darwin Officer Mr. Neang Thy]	June 2010 - May 2011	5,107
Zoological Parks and Gardens Board of Victoria (Australia) [Grant to Darwin officers led by Mr. Neang Thy]	July 2010 - June 2014	52,000
Agent University Francophony (France) [PhD scholarship for Darwin Officer Mr. Ly Viboth]	October 2010 - September 2013	22,300
<b>TOTAL</b>		<b>366,407</b>



\* Estimated value.

Substantial in-kind support was also secured from a wide range of sources, to an estimated value of over **£105,000** including in-kind contributions anticipated in the post-project proposal. (The values below are estimated from the approximate cost of renting or purchasing these services or resources from equivalent suppliers):-

- The Royal University of Phnom Penh provided rooms, facilities and electricity for the project office, natural history collections, classroom, laboratory and student computer facilities, laboratory equipment and salaries for three Darwin Research Officers and the project coordinator (to a value of at least £10,000).
- Fauna & Flora International provided additional mentoring and costs for office facilities, travel, accommodation, subsistence and equipment for Darwin Officers and students conducting their theses with FFI projects in Cambodia, including the Cambodian Elephant Conservation Group, Cambodian Crocodile Conservation Programme, Coastal and Marine Conservation Project and the Cardamom Mountains Wildlife Sanctuaries Project (worth over £15,000 to the post-project).
- The Ministry of Environment and Ministry of Agriculture, Forestry and Fisheries contributed facilities, research permits and staff time (lecturers and Darwin Officers) to the value of £10,000.
- The Angkor Centre for Conservation of Biodiversity, Conservation International, Wildlife Conservation Society, Birdlife International and other organisations and projects in Cambodia provided additional mentoring and costs for MSc students including travel, accommodation, subsistence, office space and equipment (worth over £20,000).
- Seventeen weeks of overseas training for Darwin Research Officers in America, Laos, Malaysia and Vietnam were secured through partnerships with La Sierra University (USA), Sud Expert Plantes (France), Earthwatch / SEABCRU (UK / Malaysia) and the Global Taxonomy Initiative (Belgian Focal Point) respectively to a value of £10,000.
- International trainers generously donated their time to deliver MSc modules (Dr Brad Pettitt) and mentor Darwin Research Officers (including Dr Lee Grismer, Dr Bryan Stuart, Dr Sara Bumrungsri, Dr Gabor Csorba, Dr Nikky Hammond, Dr Hul Sovanmoly, Dr Jean-louis Devineau, Dr. Jerome Millet, Dr David Middleton, Dr Ken Wong, Mr. Paul Nielson and Dr Alexander Monastyrskii among others). Their contributions saved the project approximately £40,000.

In addition, many other experts contributed their time as guest lecturers or supervisors and peer reviewers for student theses and project publications, or served on the international editorial board of the *Cambodian Journal of Natural History* (see Section 3; as such services are commonly provided by scientists free of charge to scientific journals we have not attempted to place a price on these).

### 7.3 Value of DI funding

A major consequence of Darwin Initiative support was that it proved very influential in leveraging additional funding from the MacArthur Foundation and a wide range of other donors (£366,407 collectively), organizations and individuals (valued at an additional £105,000). This was highly significant as the MacArthur funding was directly relevant to achieving the outputs of the post-project, while the other funding and support allowed the post-project to expand activities across the board and thus broadened its short-term and long-term impact.

What has been especially important about Darwin Initiative funding is that its support has covered a long period: almost six years since the beginning of the original project (DI: 14-037) in June 2005. This has allowed project partners to develop a very effective working relationship through shared experiences and one that has proved increasingly productive over time. This support also allowed the project team to avoid the uncertainty inherent in shorter term investments and consequently plan project activities much more confidently, knowing that recurrent operating costs would be covered. The importance of this cannot be overstated. Because a good education in conservation science takes several years (with our MSc curriculum alone lasting 2-2.5 years), the project is unlikely to have got off the ground without Darwin Initiative's support.

Another major advantage of the Darwin Initiative scheme has been that it covered many of the necessary staff costs, including the British trainers. In our experience, many conservation grant schemes are reluctant to fund salaries, especially those of international staff. Nevertheless, a major capacity-building effort like the post-project demands a great deal of input and time from qualified and experienced teachers and trainers, and these did not exist in Cambodia when the project started. The success of the project therefore owes much to the fact that the Darwin Initiative covered a substantial portion of the recurrent costs, enabling us to devote sufficient time to coaching staff and students and ensuring outputs would be of high and lasting quality.

## 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 2009 - March 2011	Actions planned for next period
<p><b>Goal:</b> 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"> <li>• The conservation of biological diversity,</li> <li>• The sustainable use of its components, and</li> <li>• The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</li> </ul>		<p>Cambodia's capacity to conserve and sustainably use biodiversity has been greatly enhanced by the training and tools developed by the Darwin Project. This is translating into better biodiversity management (examples of this are given in the main text).</p>	
<p><b>Purpose:</b> Strengthen and consolidate Cambodia's conservation science capacity by developing the Centre for Biodiversity Conservation (CBC) as the national hub for original research, postgraduate education, information dissemination and inter-agency collaboration.</p>	<p>At least 20 original research projects on topics relevant to the conventions conducted by CBC scientists and postgraduate students in collaboration with at least 10 different institutions.</p> <p>MSc curriculum, reference collections and journal continue to be delivered and enhanced to benefit scientists and decision-makers in every province.</p>	<p>27 research projects relevant to the conventions were undertaken by students in collaboration with a wide range of governmental, academic and non-governmental organisations. Coupled with studies by Darwin Officers and staff, these resulted in 27 peer-review papers, with 13 more now in press/preparation.</p> <p>Delivery of the MSc curriculum, journal and reference collections was enhanced and exceeded all targets relating to student numbers trained, journal volumes published and collections development. Evidence suggests the CBC has achieved widespread recognition for its initiatives. Related assumptions still hold true.</p>	<p>Continued institutional development of the CBC and its operations in collaboration with RUPP, MOE and MAFF</p> <p>Continued development and transfer of the MSc curriculum to Cambodian lecturers; and support to undergraduate programme</p> <p>Continued development of proposals and grant applications by Darwin Officers to implement original conservation research</p> <p>Continued development and internationalisation of the zoological collections, herbarium and scientific journal</p> <p>Development of a series of species identification guides and methodological literature in Khmer and English</p>
<p>Output 1. The formalization of the Centre for Biodiversity Conservation as an independent unit within the Royal University of Phnom Penh (RUPP).</p>	<p>Centre for Biodiversity Conservation fully functioning, with its own director, regulations, operational budget, and capacity to generate funding.</p>	<p>Despite initial delays, this output was achieved during the post-project. Following extensive consultation processes in 2010, the CBC officially became an independent unit within the RUPP in early 2011. As a result, the centre now possesses a director, steering committee and operational regulations and work plans, while its capacity to generate funding has been demonstrated by scholarships and small grants secured during the post-project period.</p> <p>Note: This indicator is considered an appropriate measure of project progress.</p>	
<p>Activity 1.1. Develop Centre for Biodiversity Conservation (CBC) regulations and establish a management committee.</p>		<p>Following a series of enabling activities including development of a revised MoU between the RUPP and FFI, continued consultations led to the approval of an official charter for the CBC which was issued in February 2011. This charter described its institutional basis and formalised regulations and a steering committee (including members of RUPP and FFI) which now governs CBC operations (see Annex 7.1).</p>	

<p>Activity 1.2. Recruit Director and develop Centre for Biodiversity Conservation operational plan and budget.</p>	<p>Through informal discussions regarding the Director post, it became apparent that the appointment was ideally suited to a senior member of the RUPP establishment due to the ongoing need for the CBC to be able to articulate effectively with relevant departments within the university. As a consequence, the vice-rector (H.E. Hang Chanthon, who served on the existing project steering committee) was jointly nominated to the post by FFI and RUPP. Arrangements for implementing and reporting on operational plans and budgets for the CBC were completed and are described in its charter (Annex 7.1). As before, execution of CBC work plans and budgets is subject to approval from the steering committee in its quarterly and annual meetings.</p>	
<p>Activity 1.3. Organise official opening ceremony and press release.</p>	<p>As the CBC has been in existence for several years and achieved widespread recognition through several high-profile media events, extensive collaborations and numerous publications and conference presentations, it was felt by project partners that there was little to be gained by an opening ceremony. As a consequence, it was agreed that this activity should instead be included in a repeat of the 'biodiversity research day' event previously hosted by the post-project for which the RUPP has expressed interest in having as a recurrent event in the university calendar.</p>	
<p>Output 2. Masters of Science in Biodiversity Conservation programme enhanced and continued as a permanent fixture at RUPP.</p>	<p>Courses and exams held every semester and at least 40 students trained during the project period.</p> <p>At least 3 international lecturers on the MSc course replaced by Cambodian trainers.</p>	<p>The post-project entirely achieved this output, and in doing so significantly exceeded its original targets. All courses and exams scheduled in each semester were completed as planned and additional students (RUPP staff, undergraduate students, plus government officials) attended individual courses, leading to a total of 82 students receiving training during the post-project period.</p> <p>At the end of the post-project, nine of the 12 modules in the 1<sup>st</sup> year of the MSc were delivered by Cambodian postgraduate lecturers, seven of these having been transferred from international lecturers during the post-project. Further development of the MSc curriculum was also undertaken and is planned in future.</p> <p>Note: These indicators are believed to appropriately measure project progress.</p>
<p>Activity 2.1. Run eight-week Bridging Course every year for 20-40 applicants to the MSc course.</p>	<p>Eight-week bridging courses for a total of 65 applicants were completed in late 2009 and 2010 and successful candidates (classes of 2010/11 and 2011/12) initiated their MSc studies in February of the following years (details of MSc entrants are given in Annex 7.2). Following processing of applications for the 7<sup>th</sup> student cohort in August-September 2011, the bridging course will begin again in November 2011.</p>	
<p>Activity 2.2. Teach three terms of the MSc Biodiversity Conservation curriculum every year (12 modules and 40 students)</p>	<p>Delivery of the 12 taught modules that comprise the 1<sup>st</sup> year of the MSc curriculum was completed as scheduled, with modules divided equally between the 1<sup>st</sup> (February-June) and 2<sup>nd</sup> (September-January) semesters. During the post-project, these modules were taught to a total of 41 MSc students (classes of 2009/10, 2010/11 and 2011/12, Annex 7.2). Selected courses were also made available on a stand-alone basis to RUPP staff and students, as well as Ministry of Environment officials. This resulted in a significant increase in the number of individuals trained (18), all of whom received RUPP certificates on course completion. Further development of the MSc curriculum was undertaken, providing scope for a new module entitled '<i>Biodiversity Management</i>', which was introduced in May 2010.</p>	

<p>Activity 2.3. Identify and coach at least three Cambodian postgraduates to replace international lecturers.</p>	<p>Through an ongoing process of mentoring, seven 1<sup>st</sup> year MSc modules were transferred to Cambodian postgraduate lecturers during the post-project period. Modules transferred included: Research analysis, a process of inquiry (to Dr Khim Leang), Research methods and Applied statistics (Dr Dok Doma), Natural Resources Management (Dr Mak Sithirith), Environmental Impact Assessment (Dr. Ngy Mithuna &amp; Mr. Spoann Vin), Environmental Law (Mr. Soth Sang Bonn) and Protected Area Management and Project Cycle Management (Dr Seak Sophat). Activities are underway to similarly transfer the remaining three 1<sup>st</sup> year MSc modules still taught by international lecturers (Dr Neil Furey and Dr Carl Traeholt).</p>	
<p>Activity 2.4. Enable final-year students to conduct their research theses in collaboration with other projects and organisations in Cambodia.</p>	<p>Twelve MSc and four BSc students successfully defended their thesis projects during the post-project and a further six MSc and five BSc students are currently completing their theses in collaboration with a variety of organisations in Cambodia (a full list of these is given in Annex 7.3). To enhance support to 2<sup>nd</sup> year students, procedures governing thesis development and supervision were introduced during the reporting period. The class of 2011/12 will begin development of their thesis proposals during the 2<sup>nd</sup> semester of 2011 (September 2011 to January 2012).</p>	
<p>Output 3. A permanent cadre of national scientists ('Darwin Research Officers') employed by the RUPP Centre for Biodiversity Conservation to advance biodiversity science in Cambodia.</p>	<p>5-10 full-time, postgraduate Cambodian scientists recruited to supervise students and pursue original lines of research on topics pertaining to the CBD and CITES.</p>	<p>This output was fully completed during the post project period with seven postgraduate Cambodian scientists recruited as Darwin Research Officers. All of these officers are undertaking original research projects relating to CBD and CITES. Substantial co-funding was secured for their research efforts, including two three-year PhD scholarships, support for overseas training internships and conferences, and a wide variety of financial and in-kind support for research activities in Cambodia. As preparation of additional funding proposals by project staff and collaborators is ongoing, this positive trend is firmly set to continue.</p> <p>Note: This indicator is believed to appropriately measure project progress.</p>
<p>Activity 3.1. Using a transparent selection process, recruit 5-10 Darwin Research Officers and finalise their terms of reference.</p>	<p>Recruitment processes entailing national advertisements and interviews for shortlisted candidates were completed during the first year of the post-project. Seven individuals (Mr. Ith Saveng, Mr. Ly Viboth, Ms. Meas Seanghun, Mr. Neang Thy, Mr. Chhin Sophea, Mr. Hun Seiha and Mr. Seng Rathea) were subsequently engaged as Darwin Research Officers and their terms of reference finalised. Since the post-project period, terms of reference for one additional Darwin Research Officer (Mr. Sor Ratha) have also been completed and one part-time volunteer (Ms. Chhuon Socheata) has joined the project.</p>	
<p>Activity 3.2. Darwin Research Officers develop original research proposals and apply for PhD scholarships and small grants.</p>	<p>All of the above Darwin Research Officers developed research proposals during the post-project and several secured scholarships and small grants. PhD scholarships were secured by two officers (Mr. Ith Saveng and Mr. Ly Viboth) for universities in Thailand and France (both studying Cambodian biodiversity) and they and other officers (Mr. Neang Thy and Ms. Meas Seanghun) obtained co-funding for training internships in America, Hungary, Laos, Malaysia, U.K. &amp; Vietnam. Mr. Neang Thy also secured a grant from the Rufford Foundation for a project seeking to build herpetological capacity (see <a href="http://www.ruffordsmallgrants.org/rsg/projects/thy_neang">www.ruffordsmallgrants.org/rsg/projects/thy_neang</a>) in Cambodia and both Thy and the remaining Darwin Research Officers are actively pursuing additional co-funding for their research activities with project support.</p>	

<p>Activity 3.3. Darwin Research Officers conduct original research in collaboration with other projects and organisations in Cambodia.</p>	<p>All of above Darwin Research Officers initiated original research activities entailing liaison with a variety of domestic and overseas organisations during the post project. These research projects emphasize lesser-known taxa and contemporary conservation questions in Cambodia and project summaries can be viewed at <a href="http://www.rupp.edu.kh/master/biodiversity_conservation/centerbc.php">www.rupp.edu.kh/master/biodiversity_conservation/centerbc.php</a> (under the 'Conservation Research' section). Additional research project which have yet to be posted online include activities to monitor large mammal populations and landscape change in the Phnom Samkos Wildlife Sanctuary in southwest Cambodia (led by Mr. Seng Rathea) and research to compare freshwater assemblages inhabiting lakes and reservoirs in northeast Cambodia (led by Mr. Sor Ratha).</p>
<p>Activity 3.4. Darwin Research Officers organise guest lecture series and disseminate their findings in conferences and various journals.</p>	<p>Though not scheduled until the final project quarter, a guest lectures series was initiated at the RUPP during the first year of the post-project with assistance from Darwin Research Officers. By the end of the post-project, 24 guest lectures had been delivered by national and international conservation professionals and academics on a wide range of subjects (a full list is given in Annex 7.4), and the series continues with an average of two lectures each month.</p> <p>The project's Darwin Research Officers and staff were also very active in disseminating their research findings through publications. During the post-project, these co-authored a total of 21 peer-review manuscripts (see Annex 5), with four more papers in press at the time of writing (abstracts for three of these are given in Annex 7.5). MSc students also co-authored six peer-review manuscripts (Annex 5) and this positive trend is set to continue with Darwin Research Officers and staff currently preparing another nine papers for peer-review publication and more papers anticipated from MSc students.</p>
<p>Output 4. Continued growth and improvement of the national zoological reference collection, herbarium and journal as resources for conservation scientists nationwide.</p>	<p>50% increase in the number of voucher specimens maintained in the national zoological reference collection and herbarium.</p> <p>At least two issues of the <i>Cambodian Journal of Natural History</i> published, with peer-reviewed manuscripts from scientists from at least 15 different institutions.</p> <p>The post-project achieved major progress towards this output, exceeding all of its original targets by a significant margin. A substantial number of voucher specimens were added to the zoological collection, which now hosts nearly 2,000 data-based specimens (a seven-fold expansion compared to late 2008), with a similar number of invertebrate specimens currently being catalogued. The herbarium also enjoyed a significant acquisition rate due to intensive collecting activity and repatriation of &gt;1,650 specimens from the Museum National d'Histoire Naturelle (Paris). As a result, the herbarium currently includes ca. 12,500 plant specimens, and both collections continue to grow on an almost monthly basis.</p> <p>Three issues of the <i>Cambodian Journal of Natural History</i> were published and distributed during the post-project period, such that the project also exceeded its original targets in this regard. The forthcoming issue of the journal is scheduled for release in July 2011.</p> <p>Note: These indicators are felt to appropriately measure project progress.</p>
<p>Activity 4.1. Organise expeditions to collect additional voucher specimens of plants and lower animals, ensuring they are correctly preserved, labelled and documented.</p>	<p>A large series of expeditions to collect voucher specimens for the CBC zoological collection and herbarium were undertaken at sites throughout Cambodia during the post-project, most of which entailed ongoing collaborations with domestic and overseas organisations. The herbarium collection currently consists of vascular plants while the zoological collection encompasses reptiles (79 species), amphibians (57), small</p>

	mammals (>50), butterflies (>150) and rotifers (>100). All material in the collections is governed by standard museum procedures which entail each specimen being uniquely identifiable, subjected to curation techniques which vary according to group and fully data-based upon entry into the main collections.
Activity 4.2. Issue call for papers and undertake rigorous peer review process for all eligible manuscripts received.	Calls for manuscripts for the 2009 volume, the two 2010 volumes, and the first (forthcoming) 2011 volume of the <i>Cambodian Journal of Natural History</i> were issued in April and December 2009 and in August 2010 and January 2011, respectively. Peer-review processes were subsequently completed during the post-project for all eligible manuscripts submitted to the journal's international editorial board for all but the last volume (these were complete at the time of writing).
Activity 4.3. Peer-review manuscripts, publish and disseminate the <i>Cambodian Journal of Natural History</i> .	The 2009 volume of the <i>Cambodian Journal of Natural History</i> was released in December 2009, and the first and second 2010 volumes in August 2010 and January 2011. Hardcopy distribution (x400 copies per volume) was completed shortly afterwards in each instance. Contents for each volume produced during the post-project are shown in Annex 7.6 and softcopies of all volumes published to date are freely available at <a href="http://www.fauna-flora.org/publications/cambodian-journal-of-natural-history/">www.fauna-flora.org/publications/cambodian-journal-of-natural-history/</a> ). The first 2011 issue of the journal is due for release in July, at which time a call for manuscripts for the following edition will also be issued.

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

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<b>Goal</b> 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.			
<b>Sub-Goal</b> Heightened capacity of Cambodian scientists to meet national requirements for the CBD and CMS.	Within 5 years of project end, scientists trained and equipped by this project inform and evaluate conservation decisions to a higher standard within Cambodia.	Country reports to CBD and CITES.	
<b>Purpose</b> Strengthen and consolidate Cambodia's conservation science capacity by developing the Centre for Biodiversity Conservation (CBC) as the national hub for original research, postgraduate education, information dissemination and inter-agency collaboration.	At least 20 original research projects on topics relevant to the conventions conducted by CBC scientists and postgraduate students in collaboration with at least 10 different institutions. MSc curriculum, reference collections and journal continue to be delivered and enhanced to benefit scientists and decision-makers in every province.	Papers, theses and other scientific publications produced by CBC scientists and alumni. Records of nationals enrolled on MSc curriculum, using the reference collections, and/or subscribing to the journal. Darwin Initiative final project report and ECTF evaluation.	Cambodian government continue to give national scientists free rein to conduct research, organise meetings and publicly disseminate their findings. Continued interest and cooperation from other NGOs in Cambodia.
<b>Outputs</b> 1. The formalization of the Centre for Biodiversity Conservation as an independent unit within the Royal University of Phnom Penh (RUPP).	Centre for Biodiversity Conservation fully functioning, with its own director, regulations, operational budget, and capacity to generate funding.	Regulations developed and officially endorsed. Annual reports and accounts. Site visit by Darwin Initiative.	Continued support from RUPP leaders and the wider conservation community.
2. Masters of Science in Biodiversity Conservation programme enhanced and continued as a permanent fixture at RUPP.	Courses and exams held every semester and at least 40 students trained during the project period. At least 3 international lecturers on the MSc course replaced by Cambodian trainers.	Attendance records and examination results. Theses produced by final-year students. Trainer records and contracts.	Continued high interest in the course from prospective students and employers. Sufficient postgraduates interested in teaching.
3. A permanent cadre of national scientists ('Darwin Research Officers') employed by the RUPP Centre for Biodiversity Conservation to advance biodiversity science in Cambodia.	5-10 full-time, postgraduate Cambodian scientists recruited to supervise students and pursue original lines of research on topics pertaining to the CBD and CITES.	Contracts, terms of reference, and work plans for each Darwin Research Officer. At least 5 scientific papers produced by Darwin Research Officers. Guest lecture series	Sufficient number of high-calibre postgraduates interested in career in science. Other donors willing to co-fund research studies through small grants.



Project summary	Measurable Indicators	Means of verification	Important Assumptions
4. Continued growth and improvement of the national zoological reference collection, herbarium and journal as resources for conservation scientists nationwide.	50% increase in the number of voucher specimens maintained in the national zoological reference collection and herbarium. At least two issues of the <i>Cambodian Journal of Natural History</i> published, with peer-reviewed manuscripts from scientists from at least 15 different institutions.	Reference museum holdings database. Journal, both in print and online.	The relevant government agencies continue to grant permits to collect specimens. Sufficient authors submitting manuscripts and continued support from peer-reviewers.

**Activities:**

- 1.1 Develop Centre for Biodiversity Conservation regulations and establish a management committee.
- 1.2 Recruit Director and develop Centre for Biodiversity Conservation operational plan and budget
- 1.3 Organise official opening ceremony and press release.
- 2.1 Run 8-week Bridging Course every year for 20-40 applicants to the MSc course.
- 2.2 Teach three terms of the MSc Biodiversity Conservation curriculum every year (12 modules and 40 students).
- 2.3 Identify and coach at least three Cambodian postgraduates to replace international lecturers.
- 2.4 Enable final-year students to conduct their research theses in collaboration with other projects and organisations in Cambodia.
- 3.1 Using a transparent selection process, recruit 5-10 Darwin Research Officers and finalise their terms of reference.
- 3.2 Darwin Research Scholars develop original research proposals and apply for PhD scholarships and small grants.
- 3.3 Darwin Research Scholars conduct original research in collaboration with other projects and organisations in Cambodia.
- 3.4 Darwin Research Scholars organise guest lecture series and disseminate their findings in conferences and various journals.
- 4.1 Organise expeditions to collect additional voucher specimens of plants and lower animals, ensuring they are correctly preserved, labelled and documented.
- 4.2 Issue call for papers and undertake rigorous peer review process for all eligible manuscripts received.
- 4.3 Peer-review manuscripts, publish and disseminate the *Cambodian Journal of Natural History*.

**Monitoring activities:**

**Indicator 1:** *Centre for Biodiversity Conservation fully functioning, with its own director, regulations, operational budget, and capacity to generate funding.*

- 1.a *Weekly meetings of the FFI Project Manager, RUPP Coordinator and MoE biologist (and Director of the Centre, when recruited in Year 2).*
- 1.b *Monthly meetings of the FFI-RUPP Steering Committee.*
- 1.c *Monthly oversight of the Centre for Biodiversity Conservation budget and accounts by FFI project leaders and finance manager.*
- 1.d *Annual Reports by the Centre for Biodiversity Conservation.*

**Indicator 2:** *Courses and exams held every semester and at least 40 students trained during the project period. At least 3 international lecturers on the MSc course replaced by Cambodian trainers.*

- 2.a *Examination results compiled by the project team, verified by Steering Committee and stamped by the Dean.*
- 2.b *Theses reviewed and graded by Ministry of Youth, Education and Sports examiners and verified by the Steering Committee.*
- 2.c *Project office maintains records of trainers and student feedback (using questionnaires) on the quality of teaching.*

**Indicator 3:** 5-10 full-time, postgraduate Cambodian scientists recruited to supervise students and pursue original lines of research on topics pertaining to biodiversity management.

3.a Darwin Research Scholars submit work plans and monthly progress reports to project leaders.

3.b Copies of all research publications by Darwin Research Scholars deposited in project files and the university library.

3.c Records maintained by project office of the guest lecturers and titles.

**Indicator 4:** 50% increase in the number of voucher specimens maintained in the national zoological reference collection and herbarium. At least two issues of the Cambodian Journal of Natural History published, with peer-reviewed manuscripts from scientists from at least 15 different institutions.

4.a Reference museum holdings database kept up to date by curators and subject to random checks by project leaders.

4.b Journal papers monitored using standard peer-review process, and layout reviewed by FFI Communications before going to press.

**Other relevant project management monitoring activities:**

Project accounts compiled monthly by the FFI Cambodia office and reviewed by FFI Finance Department in Cambridge.

Biannual reporting by the project leaders to Darwin Initiative.

Quarterly and Annual reporting by project leaders to Fauna & Flora International against agreed milestones.

Quarterly reports from Fauna & Flora International Cambodia Programme to the Ministry of Foreign Affairs (Royal Government of Cambodia).

## 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	30	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	50	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	20	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)
<b>Training Measures</b>		
2	Number of Masters qualifications obtained	<b>12</b> Cambodians (with more nearing graduation - see 4c)
3	Number of other qualifications obtained	<b>11</b> postgraduate diplomas (awarded to Cambodian students finishing the 1 <sup>st</sup> year of the MSc curriculum only) & <b>26</b> course certificates (for <b>18</b> Cambodians finishing stand-alone courses)
4a	Number of undergraduate students receiving training	<b>9</b> Cambodians
4b	Number of training weeks provided to undergraduate students	<b>9</b> (one week per student)
4c	Number of postgraduate students receiving training (not 1-3 above)	Excluding 2 and 3 (above), <b>65</b> undertook the bridging course in late 2009 and 2010, while <b>39</b> received training on the MSc curriculum (class of 2009/10, 2010/11 & 2011/12).
4d	Number of training weeks for postgraduate students	<b>&gt;70</b> weeks provided to each successful student, from the Bridging Course to the end of the MSc curriculum.
6a	Number of people receiving other forms of short-term education/training (ie not categories 1-5 above)	<b>7</b> Darwin Officers trained in taxonomy, specimen collection and preservation, including the curators of the zoological collection and herbarium.
7	Number of types of training materials produced for use by host country(s)	<b>16</b> training modules enhanced or developed, all with supporting materials: (Bridging Course modules) Biostatistics, Introduction to Biology, Ecology and Evolution, English for Academic Purposes, (MSc modules) Research Analysis – a process of inquiry, Research Methods and Applied Statistics, Integrated Natural Resource Management, Biodiversity Management, Environmental Law, Environmental Impact Assessment, Species Conservation, Behavioural Ecology, Geographical Information Systems, Ecological Field Techniques, Project Cycle Management, and Protected Areas Management.
<b>Research Measures</b>		
8	Number of weeks spent by UK project staff on project work in host country(s)	<b>&gt;180</b> weeks spent by FFI staff and other British experts including Dr Neil Furey, Dr Jenny Daltry, Dr Carl Traeholt, Dr Stephen Browne, Dr Richard Paley, Emily Woodfield and Callum McCulloch.
11a	Number of papers published or accepted for publication in peer reviewed journals	<b>31</b> (25 by Darwin Officers and staff, 6 by MSc graduates), excluding papers published by project partners in the <i>Cambodian Journal of Natural History</i> and elsewhere.

Code	Description	Totals (plus additional detail as required)
11b	Number of papers published or accepted for publication elsewhere	3
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	2 (one relating to the zoological collections and the other to the conservation library, both housed at the RUPP).
13b	Number of species reference collections enhanced and handed over to host country(s)	2 (the zoological reference collection and herbarium, both housed at the RUPP).
<b>Dissemination Measures</b>		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	2 (An annual student research day in August 2009 and a bat conservation conference in October 2009, both held at the RUPP)
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	1 (3 presentations, including one plenary lecture at the annual meeting of the Association for Tropical Biology and Conservation in Thailand 2011)
15a	Number of national press releases or publicity articles in host country(s)	>15 newspaper articles in Cambodia. (Over 60 websites/blogs worldwide featured the honour bestowed on Darwin Officer Mr. Neang Thy in March 2010 - Annex 7.7).
15c	Number of national press releases or publicity articles in UK	2 (1 article about the project in the <i>Fauna &amp; Flora News</i> magazine and 1 article in issue 16 of the Darwin newsletter)
17b	Number of dissemination networks enhanced or extended	2 networks enhanced (CBC Steering Committee and <i>Cambodian Journal of Natural History</i> network)
19a	Number of national radio interviews/features in host country(s)	4 (2 comprising advertisements for the MSc course in and 2 interviews with Darwin Officer Mr. Neang Thy).
<b>Physical Measures</b>		
20	Estimated value (£s) of physical assets handed over to host country(s)	>£100,000
21	Number of permanent educational/training/research facilities or organisation established	1 (Establishment of the CBC as an independent unit at the RUPP)
23	Value of additional resources raised for project	£471,707
<b>Other Measures used by the project and not currently including in DI standard measures</b>		
	Websites	1 (one project website in Cambodia, plus two web pages on FFI website)
	Scientific journals	3 volumes of peer-reviewed journal ( <i>Cambodian Journal of Natural History</i> ) disseminated to over 20 countries, with another due for release in July 2011.

## Annex 5 Publications

Type	Details	Publishers	Available from	Cost £
Magazine article (by project staff)	Daltry, J., Woodfield, E. 2009. Not just an academic exercise. <i>Fauna &amp; Flora Magazine</i> 2009: 16-20.	FFI, UK	<a href="http://www.fauna-flora.org/publications/fauna-flora-magazine/">http://www.fauna-flora.org/publications/fauna-flora-magazine/</a>	Free
Newsletter article (by project staff)	Daltry, J. 2009. Building university capacity to train and support Cambodian Conservationists. <i>Darwin News</i> 16 (October): 10-11.	Darwin Initiative	<a href="http://darwin.defra.gov.uk/newsletter/">http://darwin.defra.gov.uk/newsletter/</a>	Free
Peer-reviewed paper (by project staff and Darwin Officer)	Holden, J., Neang, T. 2009. Small carnivore records from the Cardamom Mountains, southwestern Cambodia. <i>Small Carnivore Conservation</i> 40:16-21.	IUCN/SCC Small Carnivore Specialist Group (SCSG).	<a href="http://smallcarnivores.org/">http://smallcarnivores.org/</a>	25.00 (per issue)
Peer-reviewed paper (by project partners and Darwin Officer)	Rowley, R., Brown, R., Bain, R., Kusri, M., Inger, R., Stuart, B., Wogan, G., Neang, T., Chan-ard, T., Trung, C. T., Diesmos, A., Iskandar, D. T., Lau, M., Ming, L. T., Makchai, S., Truong N. Q., and Phimmachak, S. 2009. Impending conservation crisis for southeast Asian amphibians. <i>Biology Letters</i> , 1-3, (doi:10.1098/rsbl.2009.0793)	Royal Society Publishing: <a href="http://rsbl.royalsocietypublishing.org/">http://rsbl.royalsocietypublishing.org/</a>	<a href="http://rsbl.royalsocietypublishing.org/content/early/2009/12/04/rsbl.2009.0793.full.pdf+html">http://rsbl.royalsocietypublishing.org/content/early/2009/12/04/rsbl.2009.0793.full.pdf+html</a>	Free
Peer-reviewed scientific journal	The <i>Cambodian Journal of Natural History</i> . Volume 2009, No. 1.  (contains the papers listed below)	Centre for Biodiversity Conservation, Phnom Penh	<a href="http://www.fauna-flora.org/publications/cambodian-journal-of-natural-history/">www.fauna-flora.org/publications/cambodian-journal-of-natural-history/</a>	Free
Peer-reviewed paper (by project coordinator)*	Rath, S. 2009. Guest Editorial: Lessons learnt in establishing a Masters Programme in Biodiversity Conservation at the RUPP. <i>Cam. J. Nat. Hist.</i> 2009: 3-4.	as above	as above	Free
Peer-reviewed paper (by project partners and staff)	Bradfield, D., Daltry, J. 2009. Short Communication: Progress in breaking the link between narcotics crime and rainforest loss in Cambodia. <i>Cam. J. Nat. Hist.</i> 2009: 5-6.	as above	as above	Free
Peer-reviewed paper (by project partners)	Goes, F. 2009. The status and distribution of green peafowl <i>Pavo muticus</i> in Cambodia. <i>Cam. J. Nat. Hist.</i> 2009: 7-15.	as above	as above	Free
Peer-reviewed paper (by Darwin Officer)	Neang, T. 2009. Liquid resin tapping by local people in Phnom Samkos Wildlife Sanctuary. <i>Cam. J. Nat. Hist.</i> 2009: 16-25.	as above	as above	Free
Peer-reviewed paper (by project partners)	Royan, A. 2009. Avifaunal inventory with annotated accounts for Botum-Sakor National Park, Southwest Cambodia. <i>Cam. J. Nat. Hist.</i> 2009: 26-39.	as above	as above	Free
Peer-reviewed paper (by MSc graduate, project staff and partners)	Oum, S., Hor, L., Han, S., Sonn, P., Simpson, B.K., Daltry, J. 2009. A comparative study of incentive-based schemes for Siamese crocodile <i>Crocodylus siamensis</i> conservation in the Cardamom Mountains. <i>Cam. J. Nat. Hist.</i> 2009: 40-57.	as above	as above	Free

Type	Details	Publishers	Available from	Cost £
Abstracts from MSc theses (by MSc students)	Phan, C., Heng C., Lim, K., Chey K., Nop, N., Ith, S. 2009. Recent Masters Theses. <i>Cam. J. Nat. Hist.</i> 2009: 58-62.	as above	as above	Free
Website (by project staff)	CBC. 2010. Masters of Science in Biodiversity Conservation Programme.	FFI-FUPP, Phnom Penh	<a href="http://www.rupp.edu.kh/master/biodiversity_conservation/biodiversity_conservation.php">http://www.rupp.edu.kh/master/biodiversity_conservation/biodiversity_conservation.php</a>	n/a
Research report (by Darwin Officer and project partner)	Neang, T., Eastoe, T. 2010. An investigation into frog consumption and trade in Cambodia. Fauna & Flora International and The Angkor Centre for Conservation of Biodiversity, Cambodia.	The Angkor Centre for Conservation of Biodiversity, Cambodia.	<a href="http://www.accb-cambodia.org/en/Frog%20Consumption%20Report.pdf">http://www.accb-cambodia.org/en/Frog%20Consumption%20Report.pdf</a>	Free
Peer-reviewed paper (by project partners, staff and Darwin Officer)	Wood Jr., P.L., Grismer L.L., Grismer, J.L., Neang T., Chav T. & Holden, J. 2010. A new cryptic species of <i>Acanthosaura</i> Gray, 1831 (Squamata: Agamidae) from Thailand and Cambodia. <i>Zootaxa</i> 2488, 22–38.	Magnolia Press, New Zealand, <a href="http://www.mapress.com">http://www.mapress.com</a>	<a href="http://www.mapress.com/zootaxa/">http://www.mapress.com/zootaxa/</a>	16.00 (for issue)
Peer-reviewed paper (by project partners, and Darwin Officer)	Rowley, J.J.L., Stuart, B.L., Neang T. & Emmett, D.A. 2010. A new species of <i>Leptolax</i> (Anura: Megophryidae) from northeastern Cambodia. <i>Zootaxa</i> 2567, 57–68.	Magnolia Press, New Zealand, <a href="http://www.mapress.com">http://www.mapress.com</a>	<a href="http://www.mapress.com/zootaxa/">http://www.mapress.com/zootaxa/</a>	16.00 (for issue)
Peer-reviewed paper (by project partners and staff)	Meyer, C., Aguiar, L., Aguirre, L., Baumgarten, J., Clarke, F., Cosson, J., Villegas, S., Fahr, J., Faria, D., Furey, N.M., Henry, M., Hodgkison, R., Jenkins, R., Jung, K., Kingston, T., Kunz, T., MacSwiney, C., Moya, I., Pons, J., Racey, P., Rex, K., Sampaio, E., Stoner, K., Voigt, C., Staden, D., Weise, C., Kalko, E. 2010. Long-term monitoring of tropical bats for anthropogenic impact assessment: gauging the statistical power to detect population change. <i>Biological Conservation</i> 143: 2797-2807.	Elsevier, <a href="http://www.elsevier.com/wps/find/journaldescription.cws_home/405853/description#description">http://www.elsevier.com/wps/find/journaldescription.cws_home/405853/description#description</a>	<a href="http://www.sciencedirect.com/science/article/pii/S0006320710003356">http://www.sciencedirect.com/science/article/pii/S0006320710003356</a>	20.00
Peer-reviewed paper (by project partners and MSc graduate)	Grismer, J.L., Grismer, L.L. & Chav T. 2010. New species of <i>Cnemaspis</i> Strauch 1887 (Squamata: Gekkonidae) from southwestern Cambodia. <i>Journal of Herpetology</i> , 44, 28-36.	The Society for the Study of Amphibians and Reptiles, <a href="http://www.ssa-rherps.org/">http://www.ssa-rherps.org/</a>	<a href="http://www.bioone.org/doi/abs/10.1670/08-211.1">http://www.bioone.org/doi/abs/10.1670/08-211.1</a>	6.50
Peer-reviewed paper (by MSc graduate and project partners)	Gray, T.N.E., Phan, C., Long, B. 2010. Modelling species distribution at multiple spatial scales: gibbon habitat preferences in a fragmented landscape. <i>Animal Conservation</i> , 13, 324-332.	The Zoological Society of London, <a href="http://www.zsl.org/">http://www.zsl.org/</a>	<a href="http://onlinelibrary.wiley.com/doi/10.1111/j.1469-1795.2010.00351.x/full">http://onlinelibrary.wiley.com/doi/10.1111/j.1469-1795.2010.00351.x/full</a>	10.00
Peer-reviewed scientific journal	<i>The Cambodian Journal of Natural History</i> . Volume 2010, No. 1.  (contains the papers listed below)	Centre for Biodiversity Conservation, Phnom Penh	<a href="http://www.fauna-flora.org/publications/cambodian-journal-of-natural-history/">www.fauna-flora.org/publications/cambodian-journal-of-natural-history/</a>	Free
Peer-reviewed paper (by project staff)	Traeholt, C. 2010. Guest editorial: In memoriam of Lim Kannitha. <i>Cam. J. Nat. Hist.</i> 2010(1): 3-4.	as above	as above	Free
Peer-reviewed	Goes, F., Claassen, A., Nielsen, N.	as above	as above	Free



Type	Details	Publishers	Available from	Cost £
paper (by project partners)	2010. Obituary to the black-bellied tern. <i>Cam. J. Nat. Hist.</i> 2010(1): 5-6.			
Peer-reviewed paper (by MSc graduate and project partners)	Heng, S., Hon, N., Rawson, B. 2010. A new record of <i>Macaca fascicularis</i> x <i>M. mulatta</i> hybrids in Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(1): 7-11.	as above	as above	Free
Peer-reviewed paper (by project staff)	Holden, J. 2010. Introducing some charismatic species of Cambodian flora. <i>Cam. J. Nat. Hist.</i> 2010(1): 12-14.	as above	as above	Free
Peer-reviewed paper (by project partners)	Durkin, L., Handschuh, M., Keo, S., Ward, L., Hulse, N., Mould, A. 2010. Discovery of a hitherto unknown breeding population of the Asian leaf turtle <i>Cycllemys</i> aff. <i>atripons</i> in Phnom Kulen National Park, northwestern Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(1): 15-17	as above	as above	Free
Peer-reviewed paper (by project partners)	Handschuh, M., Angarita-Martinez, I., Sang, M. 2010. First record of Eastern grass owl <i>Tyto longimembris</i> in Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(1): 18-21.	as above	as above	Free
Peer-reviewed paper (by project partner)	Royan, A. 2010. Significant mammal records from Botum-Sakor National Park, southwest Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(1): 22-26.	as above	as above	Free
Peer-reviewed paper (by project partner)	Mann, M. 2010. Assessment of the impact of bamboo harvesting on livelihoods and bamboo resources in the Seima Protection Forest, Mondulkiri, Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(1): 27-37.	as above	as above	Free
Peer-reviewed paper (by project partners and Darwin Officer)	Stuart, B.L., Rowley, J.J.L., Neang, T., Emmett, D.A., Som, S. 2010. Significant new records of amphibians and reptiles from Virachey National Park, northeastern Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(1): 38-47.	as above	as above	Free
Peer-reviewed paper (by Darwin Officer and project partner)	Meas, S., La-orsri, S. 2010 New records of rotifer fauna in the Cambodian Mekong River Basin. <i>Cam. J. Nat. Hist.</i> 2010(1): 48-62.	as above	as above	Free
Abstracts from MSc theses (by MSc students)	Hem, C., Heng, S., Kea, R., Srey, C. 2010. Recent Masters Theses. <i>Cam. J. Nat. Hist.</i> 2010(1): 63-65.	as above	as above	Free
Peer-reviewed paper (by project staff)	Daltry, J.C. & Furey, N.M. 2010. Recent literature from Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(1): 66-79.	as above	as above	Free
Peer-reviewed scientific journal	The <i>Cambodian Journal of Natural History</i> . Volume 2010, No. 2.  (contains the papers listed below)	Centre for Biodiversity Conservation, Phnom Penh	<a href="http://www.fauna-flora.org/publications/cambodian-journal-of-natural-history/">www.fauna-flora.org/publications/cambodian-journal-of-natural-history/</a>	Free
Peer-reviewed paper (by project partner)	Bates, P.J.J. 2010. Guest editorial: Taxonomy and conservation go hand-in-hand. <i>Cam. J. Nat. Hist.</i> 2010(2): 83-85.	as above	as above	Free
Peer-reviewed paper (by project partner)	Everaert, K. 2010. Announcing the Cambodia Climate Change Alliance. <i>Cam. J. Nat. Hist.</i> 2010(2): 86.	as above	as above	Free

Type	Details	Publishers	Available from	Cost £
Peer-reviewed paper (by project partners)	Elliott, V.L., Wilson, K. J. 2010. Building conservation genetic capacity in Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(2): 87-88.	as above	as above	Free
Peer-reviewed paper (by MSc graduate and project partners)	Channa, P., Sovanna, P., Gray, T.N.E. 2010. Recent camera trap records of globally threatened species from the Eastern Plains Landscape, Mondulkiri. <i>Cam. J. Nat. Hist.</i> 2010(2): 89-93.	as above	as above	Free
Peer-reviewed paper (by project partners)	Starr, A.T., Han, S., Det, L. 2010. New records of threatened mammals in Southwest Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(2): 94-96.	as above	as above	Free
Peer-reviewed paper (by project partners)	Roland, H-J., Roland, U., Pollard, E. 2010. Incidental records of dragonflies and damselflies (Order Odonata) in Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(2): 97-102.	as above	as above	Free
Peer-reviewed paper (by project partners)	Hands Schuh, M., Rours, V., Rainey, H. 2010. Clutch size of sarus crane <i>Grus antigone</i> in the Northern Plains of Cambodia and incidence of clutches with three eggs. <i>Cam. J. Nat. Hist.</i> 2010(2): 103-105.	as above	as above	Free
Peer-reviewed paper (by project partner)	Mey, F.S. 2010. Introduction to the pitcher plants ( <i>Nepenthes</i> ) of Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(2): 106-117.	as above	as above	Free
Peer-reviewed paper (by MSc graduate and project partner)	Phan, C., Gray, T.N.E. 2010. Ecology and natural history of banteng in eastern Cambodia: evidence from camera trapping in Mondulkiri Protected Forest and Phnom Prich Wildlife Sanctuary. <i>Cam. J. Nat. Hist.</i> 2010(2): 118-126.	as above	as above	Free
Peer-reviewed paper (by Darwin Officer and project partners)	Thy, N., Grismer, L.L., Chan, K.O., Grismer, J.L., Wood Jr., P.L., Youmans, T.M. 2010. First report on the herpetofauna of Dalai Mountain in Phnom Samkos Wildlife Sanctuary, southwestern Cardamom Mountains, Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(2): 127-143.	as above	as above	Free
Abstracts from MSc theses (by MSc students)	Long, K., Seng, R. 2010. Recent Masters Theses. <i>Cam. J. Nat. Hist.</i> 2010(2): 144-145.	as above	as above	Free
Peer-reviewed paper (by project staff)	Daltry, J.C. 2010. Recent literature from Cambodia. <i>Cam. J. Nat. Hist.</i> 2010(2): 146-171.	as above	as above	Free
Peer-reviewed paper (by Darwin Officer, project partners and staff)	Neang, T., Holden, J., Eastoe, T., Seng, R., Ith, S., Gismer, L.L. 2011. A new species of <i>Dibamus</i> (Squamata: Dibamidae) from Phnom Samkos Wildlife Sanctuary, southwestern Cardamom Mountains, Cambodia. <i>Zootaxa</i> 2828: 58-68.	Magnolia Press, New Zealand, <a href="http://www.mapress.com">http://www.mapress.com</a>	<a href="http://www.mapress.com/zootaxa/">http://www.mapress.com/zootaxa/</a>	16.00 (for issue)
Peer-reviewed paper (by Darwin Officer, project partners and staff)	Ith, S., Soisook, S., Bumrungsri, S., Kingston, T., Puechmaille, S., Struebig, M.J., Bu, S.S., Thong, V.D., Furey, N.M., Hammond, N., Bates, P.J.J. 2011. A taxonomic review of <i>Rhinolophus coelophyllus</i> Peters 1867	Museum and Institute of Zoology, Polish Academy of	<a href="http://www.bioone.org/doi/pdf/10.3161/150811011X578615">http://www.bioone.org/doi/pdf/10.3161/150811011X578615</a>	10.00

Type	Details	Publishers	Available from	Cost £
	and <i>R. shameli</i> Tate 1943 (Chiroptera: Rhinolophidae) in continental Southeast Asia. <i>Acta Chiropterologica</i> 13(1): 41-59.	Sciences, <a href="http://miiz.waw.pl/">http://miiz.waw.pl/</a>		
Peer-reviewed paper (by project partners and staff)	Meyer, C., Aguiar, L., Aguirre, L., Baumgarten, J., Clarke, F., Cosson, J., Villegas, S., Fahr, J., Faria, D., Furey, N.M., Henry, M., Hodgkison, R., Jenkins, R., Jung, K., Kingston, T., Kunz, T., MacSwiney, C., Moya, I., Patterson, B., Pons, J., Racey, P., Rex, K., Sampaio, E., Solari, S., Stoner, K., Voigt, C., Staden, D., Weise, C., Kalko, E. 2011. Accounting for detectability improves estimates of species richness in tropical bat surveys. <i>Journal of Applied Ecology</i> 48: 777-787.	British Ecological Society, <a href="http://www.britishecologicalsociety.org/">www.britishecologicalsociety.org/</a>	<a href="http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2664.2011.01976.x/abstract">http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2664.2011.01976.x/abstract</a>	10.00
Peer-reviewed paper (by project staff and partners)	Daltry, J.C. & Starr, A. 2010. Development of a re-introduction and reinforcement programme for Siamese crocodiles in Cambodia. In (ed. P. Soorae) <i>Global Re-introduction Perspectives: 2010</i> , pp. 118-123.	IUCN/SSC Re-introduction Specialist Group and Environment Agency, Abu Dhabi.	<a href="http://www.iucnsscrg.org/download/Global%20Reintro%20Perspectives.pdf">www.iucnsscrg.org/download/Global%20Reintro%20Perspectives.pdf</a>	Free
Peer-reviewed paper (by project staff and partners)	Starr, A., Daltry, J.C., & Nhek R. (2010) DNA study reveals <i>C. siamensis</i> at the Phnom Tamao Wildlife Rescue Centre, Cambodia. <i>Newsletter of the IUCN/ SSC Crocodile Specialist Group</i> , 28, 5-7.	IUCN Crocodile Specialist Group	<a href="http://iucncsg.org/p/h1/modules/Publications/newsletter.html">http://iucncsg.org/p/h1/modules/Publications/newsletter.html</a>	Free
Peer-reviewed paper (by project staff and partners)	Starr, A., Sam H. & Daltry, J. 2010. 2010 monitoring and nest surveys reveal status and threats of community-protected <i>Crocodylus siamensis</i> sub-populations in Cambodia. <i>Crocodile Specialist Group Newsletter</i> , 29, 7-9.	IUCN Crocodile Specialist Group	<a href="http://iucncsg.org/p/h1/modules/Publications/newsletter.html">http://iucncsg.org/p/h1/modules/Publications/newsletter.html</a>	Free

\* The above list excludes manuscripts in the first 2011 volume of the *Cambodian Journal of Natural History* which will be published in July (the contents list for this volume is shown in Annex 7.6).

## Annex 6 Darwin Contacts

<b>Ref No</b>	EIDPO028
<b>Project Title</b>	Phase II – Building university capacity to train and support Cambodian conservationists
<b>UK Leader Details</b>	
Name	Neil Furey, PhD
Role within Darwin Project	Project leader
Address	c/o Fauna & Flora International, PO Box 1380, #19, Street 360, Boeung Keng Kong I, Phnom Penh, Cambodia. 12000.
Phone	
Fax	
Email	
<b>Other UK Contact (if relevant)</b>	
Name	Jenny Daltry, PhD
Role within Darwin Project	Technical advisor and Chief journal editor
Address	Jupiter House, 4th Floor, Station Road, Cambridge, CB1 2JD, UK.
Phone	
Fax	
Email	
<b>Partner 1</b>	
Name	Rath Sethik
Organisation	Royal University of Phnom Penh
Role within Darwin Project	Host country partner
Address	Centre for Biodiversity Conservation, Room 415, Faculty of Science, The Royal University of Phnom Penh, Confederation of Russia Boulevard, Phnom Penh, Cambodia.
Fax	
Email	
<b>Partner 2 (if relevant)</b>	
Name	Paul Bates, PhD
Organisation	Harrison Institute
Role within Darwin Project	UK partner institution
Address	Bowerwood House, 15 St Botolph's Road, Sevenoaks, Kent, TN13 3AQ, United Kingdom.
Fax	
Email	

# Annex 7 Supplementary Material

## 7.1 Official charter for the *Centre for Biodiversity Conservation*



### The *Centre for Biodiversity Conservation*, Royal University of Phnom Penh

#### 1. Introduction

Established in 2005, the overall goal of the University Capacity Building Project (UCBP) is to strengthen conservation decision-making and action within Cambodia by arming a new generation of scientists with essential skills, experience, information, resources and connections in the government, non-government and academic sectors. The UCBP is collaboratively managed and implemented by the Royal University of Phnom Penh (RUPP) and Fauna & Flora International (FFI), though direction jointly provided by a *National Coordinator* from the former and an *International Coordinator* from the latter.

In accordance with the RUPP-FFI Memorandum of Agreement (dated April 2010 to December 2013), the UCBP will consolidate all of its initiatives under the *Centre for Biodiversity Conservation* (CBC), through establishment of the centre as an official body within the RUPP. As a consequence, this document

- Hereby declares the CBC a permanent and independent entity within the RUPP, overseen by a steering committee comprising selected representatives of the RUPP and FFI;
- Identifies initiatives and facilities the centre will undertake responsibility for; and,
- Details provisions for CBC management and how this will be overseen by RUPP-FFI.

This document does not alter any provisions detailed in the existing RUPP-FFI Memorandum of Agreement. Rather, it serves to clarify arrangements for addressing these provisions through the *Centre for Biodiversity Conservation*. To this end, the following arrangements hereby come into official effect:

#### 2. Purpose and operational remit

The purpose of the *Centre for Biodiversity Conservation* (CBC) is to provide a "national hub for postgraduate education, original biodiversity research, information dissemination and inter-agency collaboration". To this end, management of and representation for the following UCBP initiatives hereby represent the sole responsibility of the CBC:

- The *Masters course in Biodiversity Conservation* established in 2005;
- The *Zoological Reference Collection* established in the RUPP Department of Biology in 2007 to promote research and tertiary education on Cambodian biodiversity;



- The *Cambodian Journal of Natural History* established in 2008 to provide a platform for Cambodian scientists to publish their findings and address existing knowledge gaps;
- An interdisciplinary group dedicated to undertaking and publishing original lines of conservation-orientated research on Cambodian biodiversity;
- Development of institutional and operational links between the RUPP and national & international institutions and universities.

### 3. Facilities

All existing arrangements relating to facilities utilized by the UCBP at the RUPP are hereby transferred to the CBC, and their management must accord with articles 1.3 and 2.3 of the RUPP-FFI Memorandum of Agreement. These facilities specifically include, but shall not be limited to:

- Office space (Room 415) and existing desk space behind Room 415;
- Classroom space (Room 418), and as needed, Room 427;
- Zoological reference collection (Room 414);
- Laboratory space (Zoology Lab, Room 417).

Similarly, all existing arrangements concerning equipment owned or utilized by the UCBP are hereby transferred to the CBC, and their use and management must accord with articles 1.12, 3.1 and 3.2 of the RUPP-FFI Memorandum of Agreement.

### 4. Finances

#### 4.1 Fundraising

In accordance with article 1.10 of the RUPP-FFI Memorandum of Agreement, RUPP and FFI and their associated representatives will continue to work closely to secure ongoing funding for CBC initiatives, with periodic support and guidance from the CBC steering committee (see section 5).

In addition, the CBC and its staff will actively seek to generate funds to support the recurrent and other costs of CBC activities through the development and submission of grant applications and undertaking of consultancy activities as an independent unit.

It is anticipated that funds generated by the CBC will be handled by the RUPP accounts office and be subject to nominal charges to cover related administrative costs, though also recognised that in some instances exceptions may prove desirable. Such exceptions will be allowable provided these have the foreknowledge and mutual approval of RUPP and FFI.

#### 4.2 Student fees

The RUPP will deliver eighty percent (80%) of all fees paid by students enrolled on the Masters of Science in Biodiversity Conservation programme for expenditure by the CBC on activities approved by the CBC Steering Committee and RUPP Rector.



To this end, the accounts office of the RUPP will prepare a statement of income secured from fees paid by MSc students once every six months, and present this to the CBC Steering Committee for review at the end of the 2<sup>nd</sup> and 4<sup>th</sup> quarter, in June and December respectively (see section 5.3).

### 5. Steering committee

#### 5.1 Membership

As an independent entity within the RUPP Faculty of Science, the CBC is not under the management of any department, but will be overseen by a steering committee comprising selected representatives drawn from the RUPP and FFI. A CBC Steering Committee will replace the existing UCBP steering committee and will consist of one director, two deputy directors, an advisory group and one secretary.

The composition of the CBC Steering Committee (CBCSC) will reflect that of the previous UCBP steering committee, as follows:

CBCSC, Director:	RUPP-FFI nomination, currently Mr. Hang Chanthon
CBCSC, Deputy Director:	RUPP, UCBP National Coordinator, currently Mr. Rath Sethik
CBCSC, Deputy Director:	FFI, UCBP International Coordinator, currently Dr. Neil M. Furey
CBCSC, Advisory Group:	RUPP, Faculty of Science Dean, currently Mr. Ing Heng RUPP, Head of Biology Dept., currently Mr. Thao Sokunthea RUPP, Vice-head of Environmental Science Dept., currently Mr. Seak Sophat RUPP, Vice-head of Research Office, currently Mr. Thou Reno FFI, Country Director, currently Mr. Stephan van der Mark FFI, Operations Manager, currently Mr. Berry Mulligan MoE/FFI, CMRG Leader, currently Mr. Neang Thy
CBCSC, Secretary:	RUPP-FFI, currently Mr. Ith Saveng

#### 5.2 Roles of committee members

The roles of members serving on the CBC Steering Committee (CBCSC) shall be as follows:

CBCSC, Director:	Chairing steering committee meetings, reviewing and approving CBC activity reports, work plans and financial records, and, providing ongoing support for CBC operations through a mixture of representation, liaison, administrative and technical inputs.
CBCSC, Deputy Directors:	Organising steering committee meetings, preparing CBC activity reports, work plans and financial records for review, amending these as approved and subsequently managing their implementation through direction of all CBC day-to-day operations.
CBCSC, Advisory Group:	Providing guidance for CBC activities, with an emphasis on improving technical and management aspects, enhancing CBC operations and profile within the RUPP and externally, and, development of proposals to secure funding.



CBCSC, Secretary: Assisting preparation and organisation of steering committee meetings, recording minutes of all meetings held and circulating these among committee members.

### 5.3 Meeting and reporting schedules

The CBC Steering Committee will ordinarily meet once at the end of each quarter (March, June, September and December) to review activities undertaken by the CBC in the preceding quarter and work plans for the forthcoming quarter, with specific reference to the initiatives identified in section 2. The CBC Steering Committee will also attend any extraordinary meetings proposed, subsequent to their approval by the CBCSC Director.

At all such meetings, members of the CBC Steering Committee shall review activity reports and work plans provided by the CBC Deputy Directors, and provide support and guidance in relation to:

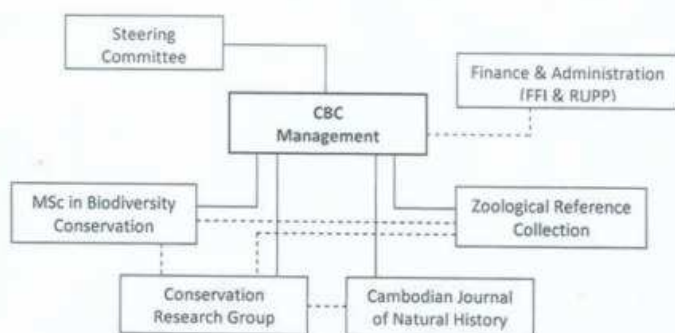
- Progress made in undertaking CBC initiatives;
- Issues and opportunities for CBC implementation;
- Staff employed and their roles and activities;

One quarterly meeting each year will represent an annual meeting, during which the CBC Steering Committee will review activities undertaken in the preceding year and plans for the forthcoming year. In addition to reviewing annual activity reports and work plans and providing guidance on these, financial records and plans for the preceding and forthcoming year (respectively) shall also be reviewed.

## 6. Organisational structure and staffing

### 6.1 Organisational structure

The organisation structure for the *Centre for Biodiversity Conservation* is as follows (solid lines indicate management & reporting lines, dashed lines indicate additional operational links):



Section	Personnel details
CBC Steering Committee	See details in sections 5.1-5.3.
CBC Management	Co-ordinated by <i>CBC Deputy Directors</i> (Mr. Rath Sethik and Dr Neil Furey), with assistance from the RUPP Research Office, RUPP Accounts Office and FFI Finance and Administration Department.
MSc in Biodiversity Conservation	Co-ordinated by <i>CBC Deputy Directors</i> (Mr. Rath Sethik and Dr Neil Furey), with assistance from selected members of the Conservation Research Group.
Zoological Reference Collection	Managed by <i>Head Curator</i> (Mr. Ith Saveng), with support from an <i>Assistant Curator</i> (Mr. Hun Seiha). Includes management of CBC library, student computer room and field & laboratory equipment.
Conservation Research Group	Coordinated by <i>CBC Deputy Director</i> (Dr Neil Furey), existing <i>Research Officers</i> including Mr. Ith Saveng, Mr. Ly Viboth, Ms. Meas Seanghun, Mr. Neang Thy, Mr. Seng Rathea, Mr. Chhin Sophea and Mr. Hun Seiha.
Cambodian Journal of Natural History	Co-managed by four <i>Editors</i> (Dr Jenny Daltry, Dr Neil Furey, Dr Carl Traeholt and Mr. Hang Chanthon), with support and guidance from an international editorial board.

### 6.2 Staffing and secondment

In accordance with article 1.9 of the RUPP-FFI Memorandum of Agreement, the RUPP and FFI and associated representatives shall work closely together to recruit additional staff for the CBC, with the aim of developing CBC operations and improving collaboration with other departments at the RUPP.

To this end, all RUPP staff seconded to the CBC under agreements approved by the CBC Steering Committee must be allowed adequate time by their manager at the RUPP to meet their secondment responsibilities. This applies to all RUPP staff already seconded to the UCBP, and in all such cases, the time allowed by the relevant managers must match that stated in the secondment agreement.

Phnom Penh 01/10/2011



## 7.2 MSc in Biodiversity Conservation: Student Information

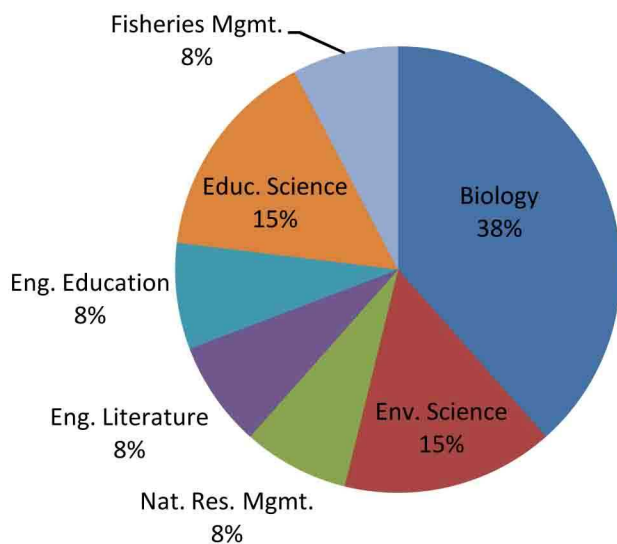
Please note that the following annexes contain confidential personal data and should therefore ideally be removed before release of this document into the public domain.

### MSc Class of 2009-2010\*

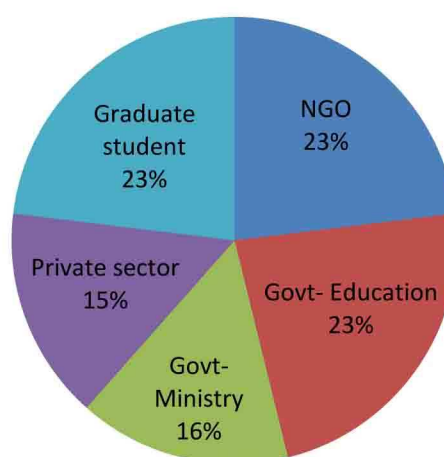
Surname	First name	Age	Sex	Employer	Category
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\* The above students began the MSc in February 2009, having passed the eight-week bridging course in November-December 2008.

**Educational Background**



**Employment Background**



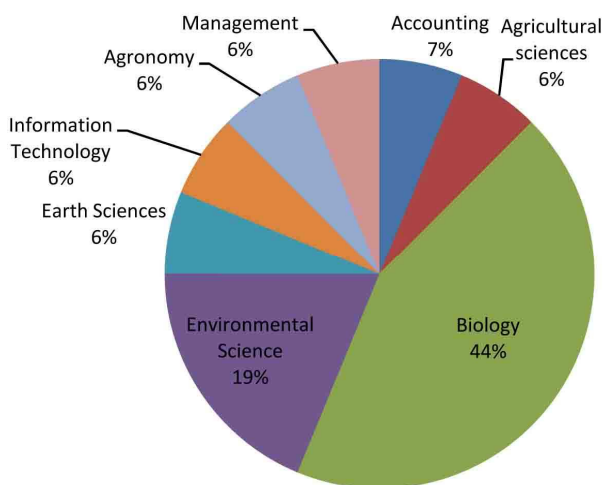


**MSc Class of 2010-2011\***

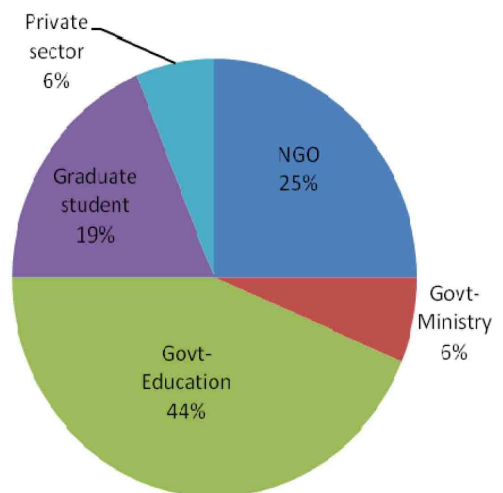
Surname	First name	Age	Sex	Employer	Category
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\* The above students began the MSc in February 2010, having passed the eight-week bridging course in November-December 2009. ^ This student transferred from the previous year into the class of 2010/11.

**Educational Background**



**Employment Background**



MSc in Biodiversity Conservation, Class of 2010-2011: Photo Gallery



កែ សុជាតិ  
Ke Socheata



សោ រដ្ឋា  
Sor Ratha



ឡឿ ចំឡូធិបុល  
Choeur Chanvibol



ជួន គិរិយ្យ  
Choun Phirom



យ៉ុង វិរៈសុគមន្ត  
Yong Vireaksopheakmukul



ហេង វង្សា  
Heng Vantha



ឈិន សុគា  
Chhin Sophea



ឡេង បូណា  
Leng Bona



ជុំ ចំរើន  
Chum Chamreun



នឿម បូរ៉ានី  
Nhem Borany



ពៅ នារីត  
Poeuv Narith



ចន្ទា នាសាក់  
Chantha Nasak



សូ ដានេន  
So Dane



ឡេង្រូង សារៈ  
Chheang Sarak



សំ សុធរាម្យ  
Sam Sothearom



គីម ចំនាត  
Kim Chamnan

### MSc Class of 2011-2012\*

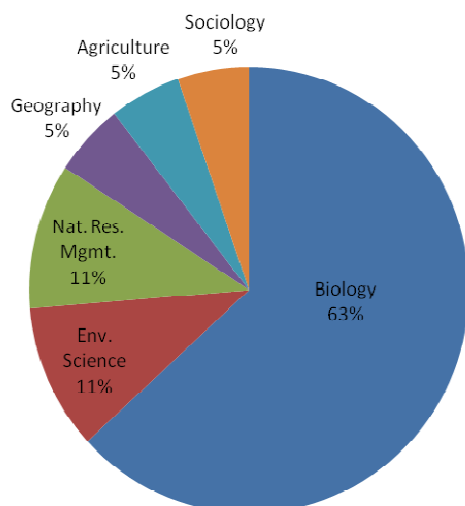
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Surname	First name	Age	Sex	Employer	Category
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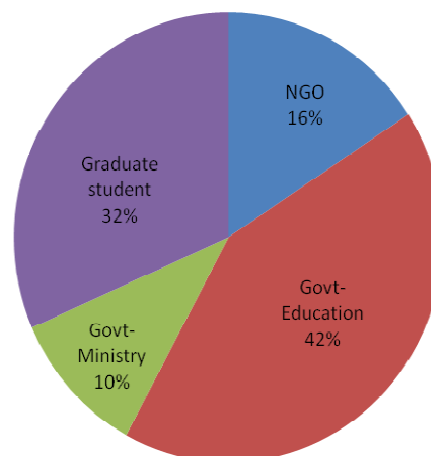
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\* The above students began the MSc in February 2011, having passed the eight-week bridging course in November-December 2010. ^ These students transferred from the previous year into the 2011/12 class.

#### Educational Background



#### Employment Background



MSc in Biodiversity Conservation, Class of 2011-2012: Photo Gallery



ហ្វូយ វណ្ណារ៉េត  
Huoy Vannareth



ចាយ សុខម៉ានីន  
Chhay Sokmanin



មីន ម៉ាលីយ  
Min Malay



តី ស្រ្តីន  
Ty Srun



ស មុនីរ័ត្ន  
Sar Monyrath



ពៅ ណារីត  
Poeuv Narith



ហ៊ុន សីហា  
Hun Seiha



ភីន ឈុនហៀង  
Phoeun Chhunheang  
Vuth



តួន រដ្ឋា  
Thuon Ratha



ហ៊ឹម ច័ន្ទជេត  
Him Chandath



សុខ បុរ៉ា  
Sok Bora



សំ សុធារម្យ  
Sam Sothearom



ស្ទេវ៉ាន គុដ  
Svean



មាង ម៉ឿន  
Meang Moeun



ផុន សុខរឹម  
Phon Sokrem



សុំ ភារុណ  
Sum Phearun



លៀង បុណា  
Leng Bona



ជុំ ចំរើន  
Chum Chamreun



នៀម បុរ៉ានី  
Nhem Borany

### 7.3 Final-Year research theses supported by the post-project

#### MSc theses sustained during the post-project

Student	Collaborating organisation	Thesis Title
Mr. Hem Chanrithy*	Ministry of Environment, Forestry Administration	An analysis of threats and site-level conservation approaches at Cambodian Protected Forests
Ms. Srey Chansorphea*	Forestry Administration, Fauna & Flora International	Socio-economic influence of domesticated elephants of Phnong people in Monduliri Province
Ms. Kea Ratha*	Conservation International	Feeding behaviour, activity patterns and food preferences of juvenile Asian Soft-shell Turtles ( <i>Pelochelys cantorii</i> ) in captivity
Mr. Heng Sokrith*	Forestry Administration, Conservation International	Factors affecting site selection and feeding habits of Hairy-nosed otter <i>Lutra sumatrana</i> and Smooth-coated otter <i>Lutrogale perspicillata</i> , at Tonle Sap Great Lake, Cambodia
Mr. Seng Rathea*	Ministry of Environment, Fauna & Flora International	Monitoring of law enforcement, illegal activity and biodiversity at Phnom Samkos Wildlife Sanctuary, Cardamom Mountains, Southwest Cambodia
Mr. Long Kheng*	Ministry of Environment, Wildlife Conservation Society	Impacts of ecotourism in the Tonle Sap Biosphere Reserve, Cambodia: A case study in the Prek Toal Core Area, Battambang Province
Ms. Peou Youleang ^	Muséum National d'Histoire Naturelle (Paris), Sud Expert Plantes	A systematic review of selected Cambodia dipterocarps ( <i>Dipterocarpus</i> , <i>Hopea</i> and <i>Shorea</i> ) with an identification key and notes on their conservation status
Mr. Phen Sarith ^	Angkor Centre for Conservation of Biodiversity, Harrison Institute	The effects of forest disturbance on the species richness and abundance of bat assemblages at Phnom Kulen National Park, Cambodia
Ms. Khom Sokkhea ^	Ministry of Environment	A taxonomic review of Cambodian amphibians within the genus <i>Rana</i> ( <i>Hylarana</i> ), with comparisons between similar species
Ms. Lim Sotheary ^	Phnom Tamao Wildlife Rescue Centre, Conservation International	Food preferences of Vulnerable Smooth-coated Otter ( <i>Lutrogale perspicillata</i> ), inferred by analysis of spraint from wild and captive animals
Mr. Phauk Sophany ^	Angkor Centre for Conservation of Biodiversity, Harrison Institute	The utility of bat (ultrasound) detectors in identifying bat species: A case study at Phnom Kulen National Park, Cambodia
Ms. Sett Sophak ^	Angkor Centre for Conservation of Biodiversity, Conservation International	Papilionidae butterflies in Cambodia: Does maternal host plant choice influence larval food preferences and survivorship?

Abstracts for theses marked \* appeared in the 2010 issues (Vol. 1 & 2) of the *Cambodian Journal of Natural History*, while abstracts for theses marked ^ will appear in the first issue of the journal in 2011. The latter is due for release at the start of July and all issues of the journal can be freely downloaded from: [www.fauna-flora.org/publications/cambodian-journal-of-natural-history/](http://www.fauna-flora.org/publications/cambodian-journal-of-natural-history/)

### Ongoing MSc thesis projects \*

Student	Collaborating organisation	Thesis Title
Mr. Chantha Nasak	Angkor Centre for Conservation of Biodiversity	A baseline butterfly survey of Kbal Spean, Phnom Kulen National Park: A comparison of species diversity and relative abundance between forest and non-forest habitats
Mr. Chheang Sarak	Centre for Biodiversity Conservation (FFI-RUPP)	A systematic review of the horseshoe bat fauna (Rhinolophidae) of Cambodia
Mr. Chhin Sophea	Ministry of Environment, Centre for Biodiversity Conservation (FFI-RUPP)	The impacts of habitat disturbance on the species richness and abundance of avifauna at Phnom Samkos Wildlife Sanctuary, southwest Cambodia
Ms. Ke Socheata	Fauna & Flora International	Community structure of rocky shores: Comparison of the vertical distribution of intertidal invertebrates on the rocky shores of Koh Bong and Koh Smach
Mr. Kim Chamnan	Angkor Centre for Conservation of Biodiversity, Conservation International	Habitat preferences and population status of the Asian Leaf Turtle <i>Cycllemys atripons / oldhamii</i> at Phnom Kulen National Park
Mr. Sor Ratha	Centre for Biodiversity Conservation (FFI-RUPP)	Comparison of the zooplankton (rotifer) fauna of lakes and reservoirs in the upper part of Cambodian Mekong river basin

\* Scheduled for defence in December 2011.

### BSc theses sustained during the post-project\*

Student	Collaborating organisation	Thesis Title
Mr. Min Malay	Centre for Biodiversity Conservation (FFI-RUPP)	Species diversity of Rotifers in the upper part of the Cambodian Mekong River Basin in Stung Treng Province
Ms. Hong Lina	Sud Expert Plantes	Species diversity and traditional uses of Zingiberaceae in semi-evergreen forest, Russei-Chrum Commune, Koh Kong province
Ms. Chi Dany	Centre for Biodiversity Conservation (FFI-RUPP)	Population size and roost selection in <i>Pteropus lylei</i> and <i>P. vampyrus</i> at Wat Phnom in Phnom Penh, Cambodia
Mr. Pheun Chhunheang	Sud Expert Plantes	Species occurrence of Dipterocarpaceae and a review of usage in Cambodia

\* Following graduation two of the above students (Min Malay and Pheun Chhunheang) entered the MSc programme, while another (Hong Lina) obtained a scholarship to do an MSc in 'Tropical Plant Biodiversity' in Montpellier, France.

### Ongoing BSc thesis projects \*

Student	Collaborating organisation	Thesis Title
Mr. Che Ratana	Forestry Administration, Fauna & Flora International	Thermoregulation in Siamese Crocodiles, <i>Crocodylus siamensis</i> , at Phnom Tamao Wildlife Rescue Centre, Takeo Province, Cambodia: A study to assist the conservation breeding program
Mr. Chuon Kimleng	Forestry Administration	Differences between two populations of Long-tailed Macaques ( <i>Macaca fascicularis</i> ) concerning feeding behaviour and habitat property
Ms. Phat Phanna	Centre for Biodiversity Conservation (FFI-RUPP)	Salt Tolerance of <i>Arabidopsis thaliana</i> and <i>Thellungiella parvula</i>
Ms. Leng Phalla	Forestry Administration, Fauna & Flora International	Effect of human-elephant conflict mitigation methods on elephants in Keo Seima Protected Forest, Monduliri province, Cambodia
Mr. Pel Pisey	Centre for Biodiversity Conservation (FFI-RUPP)	Evaluation of three freshwater streams (forest, agriculture, urban) in Stung Treng province using phytoplankton, periphyton and bacteria

\* Scheduled for defence in June 2011.

## 7.4 Guest Lectures hosted by the CBC at the Royal University of Phnom Penh

### 2010 guest lectures

Date	Lecture title	Lecturer / Organisation
22/01/10	Alien Invaders - How to tackle the second greatest threat to biodiversity	Jenny Daltry, Fauna & Flora International
12/02/10	Status of marine fisheries in Cambodia: A case study on the establishment of Blood Cockle refugia in Prey Nup 2, Sihanuk Province.	Yos Chanthana, Marine Fisheries Research & Development Institute
19/02/10	A review of the carnivorous plant flora of Cambodia	Francois Mey, Independent Researcher
26/02/10	Climate Change: Scientific basis, effects on the global environment, and on Cambodian natural resources.	Frances Lambrick, Oxford University
05/03/10	Asian elephants in Cambodia: Conservation of a flagship species	Tuy Sereivathana, Fauna & Flora International
12/03/10	Climate Change: Biodiversity impacts - with reference to Cambodia's coral reefs, forests and the Mekong region.	Frances Lambrick, Oxford University
19/03/10	Reduced Emissions from Deforestation and Degradation: Seeing the light or seeing red?	Frances Lambrick, Oxford University
26/03/10	The future of protected areas: Conservation planning in a changing world	Frances Lambrick, Oxford University
02/04/10	Challenges for environmental management in Cambodia	Tom Murphy, Independent Researcher
23/04/10	Cambodia Coral Reefs Project – Mapping the coral reefs of Cambodia	Vicki Bush, Coral Cay Conservation

<b>Date</b>	<b>Lecture title</b>	<b>Lecturer / Organisation</b>
30/04/10	World Bank Environmental Assessment Policies	Leng Bunlong, World Bank (Cambodia)
21/05/10	Global amphibian declines and local efforts to save species	James Gaertner, Texas State University-San Marcos
28/05/10	Natural resource management at RAMSAR sites through community participation	Tek Vannara, CEPA (Cambodia)
23/09/10	How do local people adapt natural resource use to changes? A case study of Cardamom use from the Cardamom Mountains, Cambodia	Mr. Hiroyuki Ishibashi, University of Tokyo
15/10/10	A place for genetics in conservation & biodiversity: The basics	Vittoria Elliot, Cambodian Molecular Biology Group
28/10/10	The effectiveness of a conservation area: A case study on the 'Song Saa' Marine Reserve, Cambodia	Baart Kluskens, Song Saa Private Island Resort
05/11/10	Introduction to biological scientific preparation (writing and presentation)	Kao Dana, Forestry Administration
19/11/10	Ecotourism: Processes & practice	Mike Haynes, Independent Researcher
24/12/10	Using GIS and geostatistics to develop hazard and risk maps for arsenic in shallow ground waters of Cambodia	Sovann Chansopheaktra, University of Manchester
31/12/10	Estimation of methane and nitrous oxide emission from rice fields with rice straw management	San Vibol, RUPP

### **2011 guest lectures (ongoing)**

<b>Date</b>	<b>Lecture title</b>	<b>Lecturer / Organisation</b>
28/01/11	Community forestry in Cambodia: Potential for REDD?	Frances Lambrick, Oxford University
09/03/11	Flora of Indochina	Hul Sovanmoly, Muséum National d'Histoire Naturelle
18/03/11	Cambodia Reef Conservation Project: Mapping the coral reefs of Cambodia	Sam Hope, Coral Cay Conservation
25/03/11*	Sharing experiences on non-timber forest products and methods of participatory resource assessment	Khou Eang Hourt, Forestry Administration
22/04/11	An introduction to Cambodian orchids	Cedric Jancloes, Independent Researcher
06/05/11	Conservation & community livelihoods in the northern plains of Cambodia	Hugo Rainey, Wildlife Conservation Society
20/05/11	Monitoring for conservation: A case study from Siema Protection Forest, Mondulkiri	Hannah O'Kelly, Wildlife Conservation Society
03/06/11	Development of a communication strategy for the Seima Protection Forest, Mondulkiri	Hanneke Noreen, University of Queensland

\* Final lecture during the post-project period.

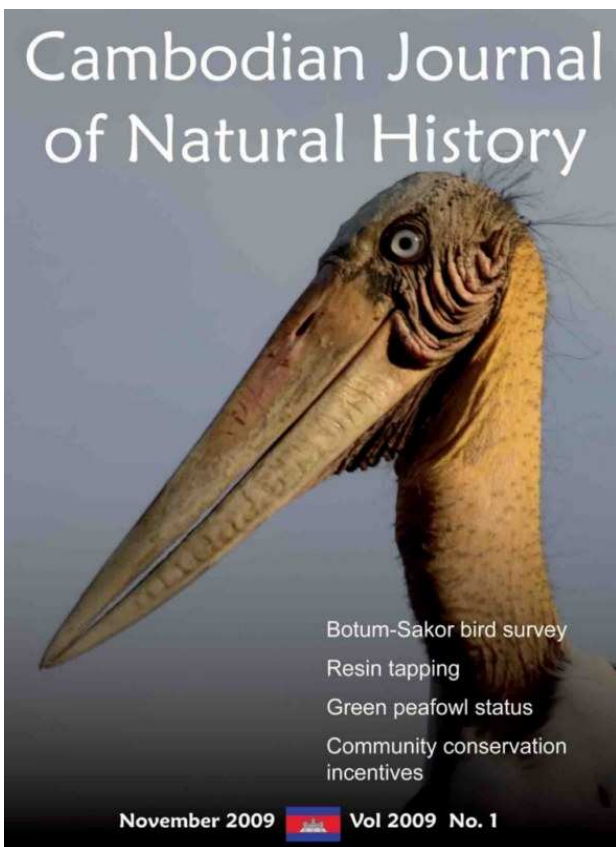


**7.5 --CONFIDENTIAL-- Abstracts for manuscripts co-authored by Darwin Research Officers and accepted for peer-review publication during the post-project**



7.6 **Cambodian Journal of Natural History** volumes produced during the post-project

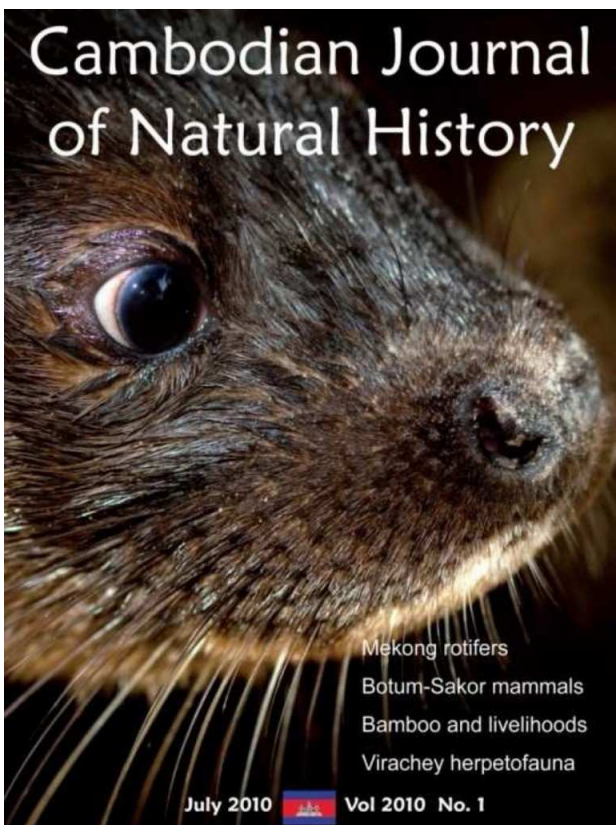
Softcopies of all journal volumes published can be freely downloaded at:  
[www.fauna-flora.org/publications/cambodian-journal-of-natural-history/](http://www.fauna-flora.org/publications/cambodian-journal-of-natural-history/)



**Cambodian Journal of Natural History** **Volume 2009, Number 1**

**Contents**

- 3 Guest Editorial: Lessons learnt in establishing a Masters Programme in Biodiversity Conservation at the Royal University of Phnom Penh, *Rath Sethik*.
- 5 Short Communication: Progress in breaking the link between narcotics crime and rainforest loss in Cambodia, *David Bradfield and Jenny C. Daltry*.
- 7 The status and distribution of green peafowl *Pavo muticus* in Cambodia, *Frédéric Goes*.
- 16 Liquid resin tapping by local people in Phnom Samkos Wildlife Sanctuary, *Neang Thy*.
- 26 Avifaunal inventory with annotated accounts for Botum-Sakor National Park, Southwest Cambodia, *Alexander Royan*.
- 40 A comparative study of incentive-based schemes for Siamese crocodile *Crocodylus siamensis* conservation in the Cardamom Mountains, Cambodia, *Oum Sony, Hor Leng, Han Sam, Sonn Pisith, Boyd K. Simpson and Jenny C. Daltry*.
- 58 Recent Masters Theses: *Phan Channa, Heng Chinda, Lim Kannitha, Chey Koulang, Nop Navy, and Ith Saveng*.
- 63 Instructions for Authors.

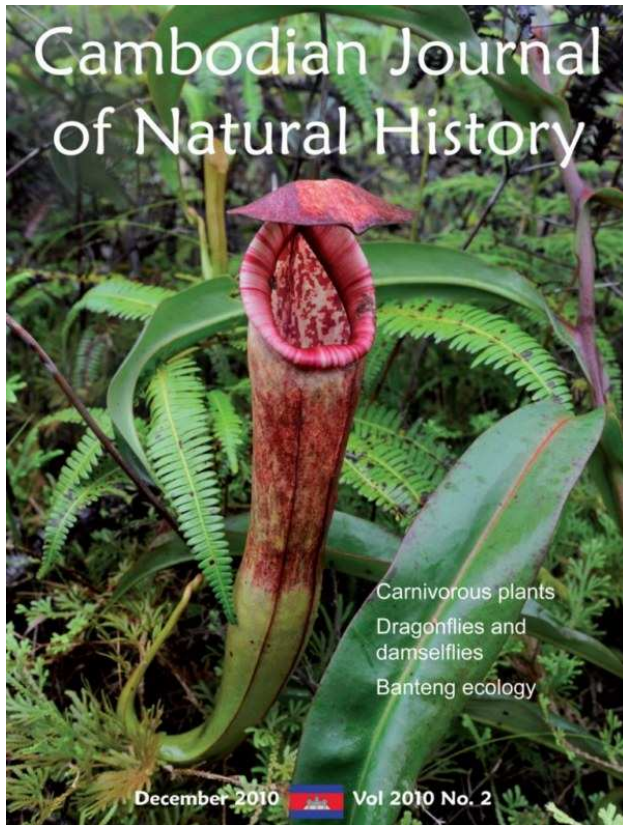


**Cambodian Journal of Natural History** **Volume 2010, Number 1**

**Contents**

- 3 Editorial: In memoriam of Lim Kannitha, *Carl Træholt*.
- 5 Letter to the Editor: Obituary to the black-bellied tern, *Frédéric Goes, Andrea Claassen and Howie Nielsen*.
- 7 Short Communication: A new record of *Macaca fascicularis* x *M. mulatta* hybrids in Cambodia, *Heng Sokrith, Hon Naven and Benjamin Rawson*.
- 12 Short Communication: Introducing some charismatic species of Cambodian flora, *Jeremy Holden*.
- 15 Short Communication: Discovery of a hitherto unknown breeding population of the Asian leaf turtle *Cyclemys aff. atripons* in Phnom Kulen National Park, northwestern Cambodia, *Louise Durkin, Markus Handschuh, Keo Sovannak, Lizzy Ward, Nikki Hulse and Alistair Mould*.
- 18 Short Communication: First record of Eastern grass owl *Tyto longimembris* in Cambodia, *Markus Handschuh, Isadora Angarita-Martinez and Sang Mony*.
- 22 Short Communication: Significant mammal records from Botum-Sakor National Park, Southwest Cambodia, *Alexander Royan*.
- 27 Assessment of the impact of bamboo harvesting on livelihoods and bamboo resources in the Seima Protection Forest, Mondulkiiri, Cambodia, *Mann Muoy*.
- 38 Significant new records of amphibians and reptiles from Virachey National Park, northeastern Cambodia, *Bryan L. Stuart, Jodi J.L. Rowley, Neang Thy, David A. Emmett and Som Sitha*.
- 48 New records of rotifer fauna in the Cambodian Mekong River Basin, *Meas Seanghun and Sanoamuang La-orsti*.
- 63 Recent Masters Theses: *Hem Chanrithy, Heng Sokrith, Kea Ratha and Srey Chansorphea*.
- 66 Recent literature from Cambodia: *Jenny C. Daltry and Neil M. Furey*.
- 80 Instructions for Authors.

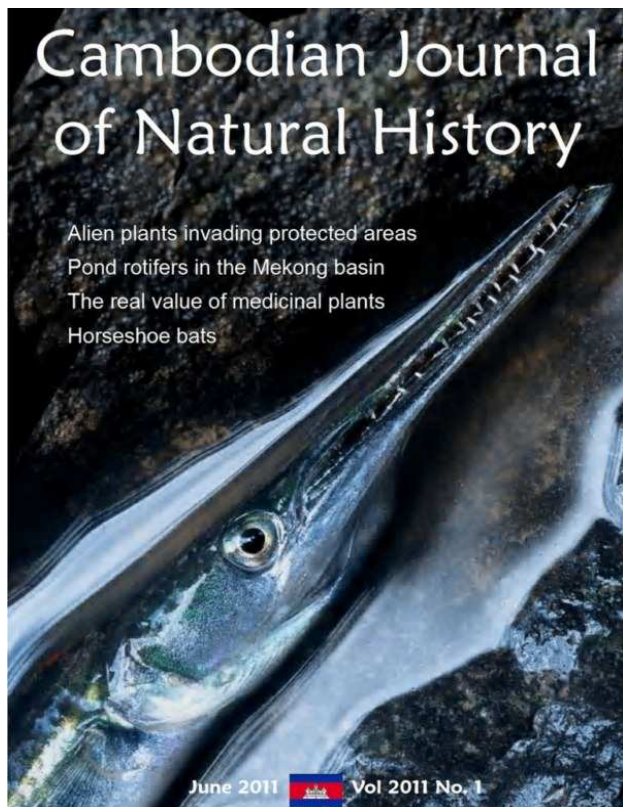




## Cambodian Journal of Natural History **Volume 2010, Number 2**

### Contents

- 83 Editorial: Taxonomy and conservation go hand-in-hand, *Paul J.J. Bates.*
- 86 News: Announcing the Cambodia Climate Change Alliance, *Koen Everaert.*
- 87 Letter to the Editor: Building conservation genetic capacity in Cambodia, *Vittoria L. Elliott and Kenneth J. Wilson.*
- 89 Short Communication: Recent camera trap records of globally threatened species from the Eastern Plains Landscape, Mondulikin, *Phan Channa, Prum Sovanna and Thomas N.E. Gray.*
- 94 Short Communication: New records of threatened mammals in Southwest Cambodia, *Adam T. Starr, Sam Han and Lun Det.*
- 97 Short Communication: Incidental records of dragonflies and damselflies (Order Odonata) in Cambodia, *Hanns-Jürgen Roland, Ursula Roland and Edward Pollard.*
- 103 Short Communication: Clutch size of sarus crane *Grus antigone* in the Northern Plains of Cambodia and incidence of clutches with three eggs, *Markus Handschuh, Yann Rours and Hugo Rainey.*
- 106 Introduction to the pitcher plants (*Nepenthes*) of Cambodia, *François Sockhom Mey.*
- 118 Ecology and natural history of banteng in eastern Cambodia: evidence from camera trapping in Mondulikin Protected Forest and Phnom Prich Wildlife Sanctuary, *Phan Channa and Thomas N.E. Gray.*
- 127 First report on the herpetofauna of Dalai Mountain in Phnom Samkos Wildlife Sanctuary, southwestern Cardamom Mountains, Cambodia, *Neang Thy, L. Lee Grismer, Chan Kin Onn, Jesse L. Grismer, Perry L. Wood Jr. and Timothy M. Youmans.*
- 144 Recent Masters Theses: *Long Kheng and Seng Rathea.*
- 146 Recent literature from Cambodia: *Jenny C. Daltry.*
- 172 Instructions for Authors.



## Cambodian Journal of Natural History **Volume 2011, Number 1**

### Contents

- 1 Editorial: A new point of view for Cambodian aquatic natural resources, *Ronald W. Jones.*
- 4 News: Cambodian Reef Conservation Project scholarships from Coral Cay Conservation, *Sam Hope*; A new website for orchid research in Cambodia, *Cédric Jancloes.*
- 5 Short Communication: First record of dusky thrush *Turdus eunomus* for Cambodia, *Duong Nara and Howie Nielsen.*
- 7 Short Communication: First record of *Psammophilis indochinensis* Smith, 1943 from Cambodia, within the context of a distributional species account, *Timo Hartmann, Markus Handschuh and Wolfgang Böhme.*
- 11 Short Communication: Notes on the trade of orchids in the Cardamom Mountains, Pursat and Koh Kong Provinces, *Amy Hirstley.*
- 14 Rotifer fauna in pond samples from the upper Cambodian Mekong River Basin, *Min Malay, Ken K.Y. Wong and Meas Seanghun.*
- 23 A method for identifying the sex of lesser adjutant storks *Leptoptilos javanicus* using digital photographs, *Regine Weckauf and Markus Handschuh.*
- 29 The contribution of wild medicinal plants towards poverty alleviation and health improvements: a case study in two villages of Mondulikin Province, Cambodia, *Pauline Laval, Hantra Rakotoarison, Nicolas Savajol and Toun Vanny.*
- 40 Observations on the spread and extent of alien invasive plant species in six protected areas in Cambodia, *Swen C. Renner, Nuon Vanna and Jonathan C. Eames.*
- 49 A checklist of bats from Cambodia, including the first record of the intermediate horseshoe bat *Rhinolophus affinis* (Chiroptera: Rhinolophidae), with additional information from Thailand and Vietnam, *Phouthone Kingsada, Bounsavane Douangboubpha, Ith Saveng, Neil Furey, Pipat Sisook, Sara Bumrungri, Chutamas Satasook, Vu Dinh Thong, Gabor Csorba, David Harrison, Malcolm Pearch, Paul Bates and Nikky Thomas.*



- 60 Recent Master's Theses: *Khom Sokkhea, Lim Sotheary, Peou Youleang, Phauk Sophany, Phen Sarith and Seit Sophak.*
- 64 Recent literature from Cambodia: *Jenny C. Daltry.*
- 72 Instructions for Authors.

## 7.7 Selected media produced on the post-project

### Project brochure



*Fauna & Flora International acts to conserve threatened species and ecosystems worldwide, proposing solutions that are sustainable, based on sound science and take account of human needs.*

Dr Neil Furey  
Head of Academic Development

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Royal University of Phnom Penh  
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[www.fauna-flora.org](http://www.fauna-flora.org)

Following decades of underinvestment in educational and scientific conservation in Cambodia is severely hampered by a shortage of trained biologists and technicians. The goal of the University Capacity Building Project (UCBP) is to strengthen conservation decision-making and management within Cambodia by arming a new generation of scientists with essential skills, experience, resources and connections in the government, non-government and academic sectors. Donors supporting this work include the Darwin Initiative, MacArthur Foundation and the US Fish and Wildlife Service.

#### Postgraduate Education

The UCBP strives to provide essential knowledge and experience in contemporary conservation biology and the management and sustainable use of living natural resources. In 2005, the UCBP started a two-year Masters course in Biodiversity Conservation at the Royal University of Phnom Penh (RUPP), the first scientific higher degree course of its kind in Cambodia. Currently on its 5th intake, the MSc course aims to provide students with (a) a firm grounding in contemporary ecology and conservation theory, (b) knowledge of project management and strategic planning, and (c) practical experience in field research, data analysis, reporting and presentation.

#### Natural History Museums

Linked to the MSc course, the UCBP established zoological and botanical collections in climate-controlled rooms at the RUPP in 2007. These collections are an important step in reversing the historical pattern of biological material from Cambodia being lodged in western institutions, which few Cambodian scholars can afford to access. The purpose of the collections is to promote studies on Cambodia's little known biodiversity by university staff and students, as well as researchers from other organisations. As such, they will become an important asset for cataloguing Cambodian biodiversity.



*Continued on reverse*

**Cambodian Journal of Natural History**

Alongside these activities, the UCBP launched the Cambodian Journal of Natural History in 2008, the first scientific periodical of its kind in Cambodia. This free and peer-reviewed journal aims to publish original work by Cambodian or foreign scientists on any aspect of Cambodian natural history, including fauna, flora, habitats, management policy and use of natural resources. To date, two issues of the journal have been published under direction provided by an international editorial board, and it is envisaged that future issues will be produced on a biannual basis.

**Looking forward**

The UCBP is currently working to consolidate its existing initiatives under the Centre for Biodiversity Conservation. As part of this, it is in the process of establishing an interdisciplinary academic body dedicated to undertaking original lines of conservation research in Cambodia. This body includes the Cardamom Mountains Research Group which undertakes monitoring and focused studies to assist FFI's Cardamom Mountains Wildlife Sanctuary Programme (CMWSP), with a particular emphasis on the globally important Phnom Samkos Wildlife Sanctuary.

**FAUNA & FLORA International**  
Conserving wildlife since 1903  
[www.fauna-flora.org](http://www.fauna-flora.org)

*FFI is a registered 501(c)(3) non-profit organization EIN #04-2730954.*

## **Guest Editorial - Lessons learnt in establishing a Masters Programme in Biodiversity Conservation at the Royal University of Phnom Penh**

Rath Sethik

Project Coordinator for the Masters Programme in Biodiversity Conservation, Room 415, Main Campus, The Royal University of Phnom Penh, Confederation of Russia Boulevard, Phnom Penh, 12000, Cambodia. Email biodiversity.conservation.1@gmail.com

Cambodia is one of the richest countries in the region in terms of its biodiversity (MoE, 2004). More than 30 years of civil war, however, meant that baseline surveys of Cambodia's biodiversity did not begin in earnest until 1997 and, therefore, most plants and wild animal species are not well understood or documented (Daltry, 2008). Increasingly, Cambodia's natural resources are being destroyed by both internal and external forces, which is resulting in plants and wild animals becoming rare and threatened with extinction (MoE, 2004).

Cambodia suffers from a lack of skilled human resources to manage and conserve biodiversity in a more sustainable manner. More qualified Cambodian managers, planners and researchers are considered indispensable. In response to this need, the Royal University of Phnom Penh (RUPP), in conjunction with Fauna & Flora International (FFI), decided to establish a Masters of Science programme in Biodiversity Conservation in 2005. The MSc course covers a wide range of subjects including *Integrated Natural Resources Management, Research Analysis, Environmental Impact Assessment and Environmental Law, Project Cycle Management, Protected Areas Management, Data Presentation and Scientific Report Writing, Species Conservation, Research Methods and Applied Statistics, Geographical Information Systems, and Ecological Field Techniques*.

Since 2005, 120 students have enrolled in this programme, including staff from the government agencies, NGOs and private sector. The students have found this programme to be very useful, and have especially benefited from the diverse experience and perspectives of the international profes-

sors who deliver many of the lectures. By applying very strict grading and examination rules and regulations, the students have learned to work hard and become more proficient in self-study and practical research. Consequently, this programme has produced high quality students who have quickly found good jobs with higher salaries or gained promotion within their institutions. Some of our students have won scholarships to pursue their further studies abroad.

Even though our programme has had many indications of success, however, it has faced some challenges. The first is that some of our students have low proficiency in English and therefore struggle with lectures and reading materials in this language. The second challenge is that the majority of modules are taught by international lecturers who are not permanently based in Cambodia, which gives students fewer opportunities to benefit from their ongoing instruction and one-to-one mentoring. The shortage of qualified people in Cambodia can also make it difficult to find external supervisors to assist the students with their thesis projects. Finally, most students have other work to attend to and therefore have limited time to study. Consequently, some students fail their examinations and assignments, and it can take them longer than the intended two years to gain their degrees.

To overcome some of these challenges, Dr Neil Furey was appointed as Head of Academic Development in 2009 to work permanently with the programme. This has helped the programme to run more smoothly because Dr Furey can give additional mentoring and tuition to students while

they conduct their course assignments and thesis research. Another important strategy is to gradually transfer teaching duties to Cambodian nationals as more suitably qualified people become available. The immediate benefits of doing this will be to further increase the frequency of personal tutorials for students, to enable more lectures to be delivered in Khmer language, and to make the programme more sustainable.

We hope this course will continue forever and that the Centre for Biodiversity Conservation will become a research centre of excellence. We are now establishing an applied research programme to assist graduate students to pursue doctoral studies on biodiversity conservation themes in Cambodia. Alongside this, scholarships are being made available to assist good students from disadvantaged backgrounds to enrol on the Masters programme.

In my opinion, the Masters course is having a positive impact within the RUPP itself because graduate students can demonstrate the capacity to conduct research independently, offer lectures, and

supervise graduate and undergraduate students in both the Department of Environmental Science and Department of Biology. This “multiplier effect” will enable even more Cambodians to understand and care for our natural heritage.

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*Editor's note:- Rath Sethik and some of the recent graduates from this programme can be seen in Fig. 1 below, and the abstracts from several recent Masters theses can be found on pages 58 to 62. In addition, graduate Oum Sony is the lead author of a full paper on pages 40-57, which was based on his MSc research thesis.*



**Fig. 1** Rath Sethik (far right) and Callum McCulloch with MSc graduates in 2009 (© J. Holden, FFI-RUPP).

## Graduates of Royal University Present Conservation Projects

By CHRISTI HANG  
THE CAMBODIA DAILY

Vietnam, Thailand and Laos each have more than 100 different species of bats, while Cambodia has less than half that number.

It's not that fewer bats live in Cambodia, according to researcher Va Vuthy. It's just that no one's discovered them yet.

Mr Vuthy discovered three new species of bats, updating the country's total to 53 species, while becoming one of the first people in Cambodia to earn a master's degree in biodiversity conservation. He and six other graduates presented their thesis projects at the Royal University of Phnom Penh on Friday.

Mr Vuthy said he was excited to find the new species, but he is still thinking about how many more species he could have found during his research period.

"We should have similar species because the range is very similar," he said of the difference between Cambodia and its neighbors.

He hypothesized that more species would have been found during the dry season if acoustic methods were used in addition to simply trapping the bats in nets.

"July to October is not ideal for bat surveying," Mr Vuthy said. "One drop of water [on the nets]

can increase the bat's detection and decrease our capture rate," he explained.

Fellow biodiversity master's student Koulang Chey said almost all Impressed Tortoises die in captivity, but he hopes his research findings will help conservationists improve the animals' habitats and decrease the rate of mortality. He used radio telemetry to record the tortoises' habits, behaviors and environment.

Mr Chey said he found that the tortoises do not do well in captivity because their natural environment is very specific. He said the tortoises live on mountaintops in places that have a rainy season and high humidity. He added that another problem is the tortoises' particular diet, which mainly consists of wild mushrooms. Disease was also a factor that plagued tortoises in captivity, Mr Chey said.

"It was very hard because it was the first study in Cambodia," Mr Chey said of his university project, adding he did not have enough information to even predict the number of tortoises in the country.

Noy Navy spent four months researching and conducting interviews for her project about human activities and their impact on otters. She said four types of otters can be found in the country and all are

near-threatened or worse.

"We have the most rare species in our country," Ms Navy said of the hairy-nose otter, a species that was once thought to be extinct.

Through interviews with people who live near and interact with otters, Ms Navy found that the majority of otters are killed for their skins and because they are known to ruin fishing nets. In addition to hunting, Ms Navy found water pollution, forest fires, natural disasters and disease threatened otters.

But her work did not just cover problems; she said she also asked for solutions. Ms Navy suggested monetary compensation or incentives for not hunting otters and stronger law enforcement and punishment for those who do. For example, she said the presence of WildAid is noticed by the residents in Koh Kong province.

"A lot of people are scared of WildAid, so they don't hunt otters," she said.

Other projects presented included studies on gender roles in communities located in protected areas, crocodile conservation in the Cardamom Mountains and the behavior patterns of the yellow-cheeked crested gibbon in Ratanakkiri province.

The biodiversity master's program was developed after the realization that short training courses and workshops in conservation were too specific, said Callum McCullough, Fauna and Flora International's university capacity project program manager.

"Many necessary conservation skills tend to be omitted from short-term training courses, such as how to manage budgets, how to work with local communities, or alternative approaches for managing protected areas," he said.

He added that an additional five students will be presenting their thesis projects at the end of the year, and the university is looking for more candidates to join the program.

The two-year postgraduate degree is divided into a year of classroom courses that cover topics such as overall conservation themes and critical thinking, while the second year is dedicated to working on a thesis subject, Mr McCullough said.

"On a personal note, it has been a great pleasure for me to be part of the journey that these young people have embarked on. From the quiet, shy and unsure master's candidates in the beginning to the confident and outspoken young scientists that they are today," he said.





# Young Eco-Warriors take up the Fight

By Him Sokunthea  
*Economics Today*

In biological terms, Cambodia is one of the richest countries in the world.

The kingdom boasts a dizzying diversity of flora and fauna, with more than 1,000 species of fish and approximately 11 million ha of forest cover. Natural resources are the mainstay of Cambodia's economy: more than 80 percent of Cambodians depend directly on natural resources for subsistence and income. However, development and a rapidly growing population are increasing pressure on biodiversity and the environment; Cambodia risks losing much of this natural wealth to the detriment of present and future generations.

It may sound batty, but the future of Cambodia's biological wealth may well be in the hands of people like Va Vuthy, a Master Biodiversity Conservation graduate. He said that a course in Environmental Science at the Royal University of Phnom Penh sparked an interest in the natural world, a passion that grew as he engaged in environmental activities in locations across Cambodia.

The understudied area of the order Chiroptera—bats to the layman—were the subject of Va Vuthy's special thesis project, and the dismissive attitude of many to this undervalued creature can get him in a flap. He said that bats provide multiple benefits to the environment, although "bat study is a blank page in Cambodia."

"Bat droppings are a good fertilizer, they eat other insects which cause

trouble to people, they can pollinate flowers and plants," he said, listing some of the benefits of bat populations. "If there are no more bats, it could cause many trouble for many people," he warned, noting that bats are instrumental in pollinating durian trees, the fruit of which is a major cash crop in Cambodia.

Bats usually live in remote areas in Cambodia, Saveng said. In his thesis, he examines 44 populations of bats samples. "I have been to Steng Treng province, Pursat province and in ... a National Park in Thailand. It is quite hard working with bats because I have to go to remote places, particularly in the forest. I had to work at night time since bats are only active nocturnally," he said.

The Phnom Samkos Wildlife Sanctuary in Pursat and another in the Seima Biodiversity Conservation area in Mondulakiri provided useful data, Va Vuthy said. Still, a lack of



*It Saveng, a recent Masters graduate in Biodiversity Conservation*

clear information and the conditions unforgiving wilderness made for major difficulties during his studies, though Va Vuthy said he was happy to be adding to a body of knowledge that is far from comprehensive.

Another recent addition to the kingdom's eco-warriors is 28-year-old It Saveng, a recent Masters graduate in Biodiversity Conservation now working as the Curator of Natural History Museum at the Royal University of Phnom Penh. With his inborn-interest in natural environment and wildlife and the outlook of job market available, Saveng said he decided to pursue master degree in Biodiversity Conservation, a course which only began to be offered in 2006.

It Saveng said he hoped that going against the flow of degrees in management and accounting would pay off. "It is a new subject so I think the job market will become broader," he told *Economics Today*. However, he added that conservation is a tough topic, especially as the course demands fluency in foreign languages and incorporates complex concepts. Apparently, 90 percent of lecturers are foreign, and internet access is needed for research.

It Saveng admitted that Cambodia lacks equipment and research about wildlife. "We need to take from abroad when we want to do any project about the species in Cambodia. So usually it takes a long time and a lot of effort when we plan to do any project."

Conservation in Cambodia is still a problem, with areas of virgin forest still being encroached upon. Some species are critically endangered.

Saveng was concerned that biodiversity is under threat because of lax law enforcement, and many Cambodian's are unaware of the benefits of biodiversity. Hunting is still a livelihood in some areas. ■

## Objectif biodiversité



Heng Sokrith, coordinateur de recherche à « Conservation International » : « Le master en biodiversité m'a aidé à améliorer ma compréhension des problématiques de conservation et de recherche de solutions pour le Cambodge. »

**D**erniers jours pour s'inscrire au master de biodiversité proposé par l'Université royale de Phnom Penh (URPP) en partenariat avec l'ONG Flora and Fauna International (FFI). Ce master, lancé en 2005 pour répondre au besoin de plus en plus urgent du pays en scientifiques qualifiés et en techniciens spécialisés en gestion de la biodiversité, permet aux étudiants de trouver du travail dans les agences environnementales de l'État, les cabinets

de conseil, les ONG et autres agences internationales, affirme FFI. « De nombreuses organisations ou projets au Cambodge ont permis au pays de proposer des ateliers et des formations courtes, estime Neil Furey, représentant du Projet universitaire de création de compétences (UCBP). Néanmoins, cela ne suffit pas à apporter aux participants les compétences intersectorielles que recherchent les gestionnaires de la conservation, comme établir des budgets, travailler avec les com-

munautés ou adopter des approches alternatives des zones protégées. L'objet principal du programme de l'URPP est d'apporter des compétences sur le long terme en la matière. »

Les candidats au master doivent être âgés de moins de 45 ans, être titulaires d'une licence et avoir au moins deux ans d'expérience. Les candidatures sont ouvertes jusqu'au vendredi 9 octobre.

Contact :  
[biodiversity.conservation@gmail.com](mailto:biodiversity.conservation@gmail.com)

## NATIONAL

## Cambodia's Natural Environment Explored in New Journal

BY CHRISTI HANG  
THE CAMBODIA DAILY

The second issue of the Cambodian Journal of Natural History, a collection of current research papers about Cambodia's rich biodiversity and one of the few opportunities for Cambodian researchers to get their work published, has been released in a magazine-style format and will soon be available online.

The second edition features articles about various aspects of Cambodian biodiversity such as a study of the green peafowl, drug crimes and rainforests and incentive plans for people living in conservation areas.

The journal is published by the Center for Biodiversity Conservation, the organization responsible for the Biodiversity Conservation master's program at the Royal University of Phnom Penh, said Neil Furey, head of academic development for Fauna and Flora International, who is involved in the master's program.

"It's a platform for Cambodians to air their findings," he said of the latest edition of the journal.

Mr Furey said the journal's editorial board includes international researchers and all submissions

are peer-reviewed and revised before publication.

"The response is growing," he said of the latest submissions.

"The first edition had all overseas people with one Cambodian co-author but [the second edition] has two papers with lead authors who are Cambodian nationals," he said.

Mr Furey said 400 copies have been printed of the second edition and will be distributed to government officials, NGOs, researchers and other stakeholders but a digital copy of the journal will be available online soon.

The journal includes an article by FFI researcher Neang Thy about resin tappers and their impact on conservation efforts in the Phnom Samkos Wildlife Sanctuary in Koh Kong province.

Mr Thy said in Cambodia, resin is mainly used to repair boats and to seal them from water. His article explained how the resin industry provides income for villagers without seriously impacting the environment.

"People have been harvesting resin for generations and generations so it's either sustainable or has a small amount of impact," he said.

Tappers had also indirectly

protecting trees from illegal loggers, he added.

During his research Mr Thy found that resin tapping is a small operation that consists of individuals collecting the resin then selling it to middlemen who then pass it on to local businesses or export it.

"If supplemented with seasonal crops (eg rice, corn, bean and sesame), the current income generated mainly from resin collection could support the tappers without resorting to illegal and unsustainable activities," Mr Thy wrote in his paper.

Mr Thy explained that in order to collect resin, tappers cut a pyramid-shaped hole into a tree trunk and then start a small controlled burn lasting from three to five minutes, which encourages the tree to increase the amount of resin produced. His research also pointed to problems that arise if the tappers are not careful, such as cutting off the flow of water throughout the tree.

However, the benefits outweigh the possible problems associated with the practice.

"Resin tapping seems to fit well with the goal of the Wildlife Sanctuary because communities indirectly preserve wildlife through protecting resin trees and their habitats, and also provides local people with a substantial income from selling the resin," the paper concluded.

The other Cambodian-authored article is by FFI researcher Oum Sony on the effectiveness of indirect and direct incentives from conservation groups for communities when it comes to the protection of the Siamese crocodile, a species classified as "critically endangered."

Indirect incentives include developing other ways to help a community economically, such as assisting in small industries or building schools and hospitals, according to the article.

This method is widely used in

conservation work while the use of direct incentives is rare and unreported on in developing countries.

Direct incentives include giving money to resource owners in exchange for protection.

"This study found no significant differences between two incentive-based schemes in terms of their impact on local economy, fishing behavior and relative crocodile population trends," the report concluded. "Both appear to have been effective in maintaining wild crocodile population at the studied sites, with a conspicuous halt in crocodile poaching."

Mr Sony said the project was originally part of his master's thesis but he decided to expand on the paper for the journal.

"There aren't enough places to publish or advertise our findings," he said. "It's a good way to disseminate our work."

The journal also includes abstracts of the theses from the master's program spring graduates, with topics ranging from using technology to track wildlife to human interaction with the environment.

"This is a great opportunity for researchers to publish their research and a great opportunity for our master's students too," said RUPP master's program project coordinator Rath Sethik.

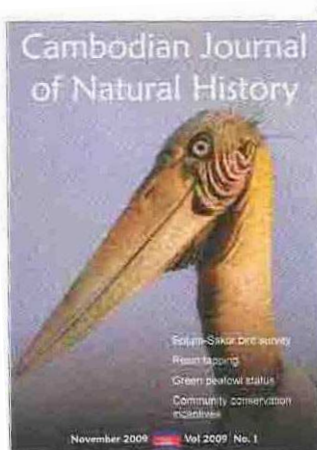
He added the university and FFI created the post-graduate program to better train Cambodians in conservation and research.

"We are trying to build our own capacity from our resources," Mr Sethik said. "We've hired researchers from abroad but we need to start to build up our own researchers."

### AsiaLife Phnom Penh Magazine, February 2010

#### ■ CONSERVATION JOURNAL

The second annual Cambodian Journal of Natural History was published in early January. Exploring conservation issues and research in Cambodia, the journal also features thesis abstracts from graduates of a Masters course in Biodiversity Conservation at the Royal University of Phnom Penh (RUPP). Birdwatchers will be pleased to read about the status and distribution of the green peafowl in Cambodia, as well as see an avifaunal inventory for Botum-Sakor National Park in the southwest of the country. Progress in breaking the link between narcotics crime and rainforest loss is also investigated, as is liquid resin tapping by locals in Phnom Samkos Wildlife Sanctuary. The journal is published by the Centre for Biodiversity Conservation at RUPP, and jointly managed by FFI Cambodia and RUPP. To get your own copy, send your contact details to [danc\\_ouk@yahoo.com](mailto:danc_ouk@yahoo.com) with 'Journal' and either 'digital copy' or 'hardcopy' as a subject.



## NATIONAL

# Conservationist Wins Royal Honor for Service to Cambodia

BY CHRISTI HANG  
THE CAMBODIA DAILY

Before Jenny Daltry led a team of researchers into the Cardamom Mountains in 2000, the Siamese crocodile was thought to be extinct in the wilds of Cambodia.

But Ms Daltry, a conservationist with Fauna and Flora International, said going into the mountains, she knew if the crocodiles still existed, they could only be there.

"It was in the middle of the night [when I saw the crocodile], I started jumping up and down," she said. "It was like seeing a unicorn or a dinosaur."

The rediscovery of the crocodile was only one of the reasons why she was awarded the title of officer of the Order of Sahemetri, an award given to foreigners recognized for their service to the King and to Cambodia.

"I was very surprised and did not expect it," Ms Daltry said of her award on Friday at a ceremony at the Forestry Administration in Phnom Penh.

"It's a positive reference to everyone's work, but it also shows the government's interest in conservation and its importance," she said.

Ms Daltry has spent a combined 10 years working in Cambodia,

including serving as FFI's country director for five years.

Some of her accomplishments in Cambodia include creating the Cambodian Crocodile Conservation Program after the discovery of the Siamese crocodile, developing a Masters degree program for conservation at the Royal University of Phnom Penh and establishing the Cambodian Journal of Natural History.

Although she has accomplished a lot in Cambodia, Ms Daltry said the main goal of FFI is capacity building so that one day the organization is not needed in the country.

"It's their country and Cambodians should be doing conservation work," she said, adding that over the years, she has seen a significant increase in Cambodians taking up such work.

She noted that Cambodia has done well in designating conservation areas, with more than a quarter of the country protected, which is more than in any Western nation, but that the country also faces big challenges. Development projects like hydro-power dams and land concessions have a large negative impact on the environment, she said.

"Other parts of the world have



Pring Samrang

Conservationist Jenny Daltry on Friday receives the Order of Sahemetri, an honor created by retired King Norodom Sihanouk to recognize foreigners who have demonstrated distinguished service to the king and Cambodia.

both development in a sustainable way," Ms Daltry said. "The massive hydro dams are not sustainable."

British Ambassador Andrew Mace was present at the ceremony to honor Ms Daltry and FFI's work as part of the Darwin Initiative, a fund that helps provide British experts to countries that have a rich biodiversity but lack resources.

"The work of Dr Daltry and FFI in Cambodia is a great example of how the initiative's aims can be fulfilled," he said. "It is helping to build the expertise and skills of Cambodian scientists to understand and protect the riches of their country's natural heritage, and to share the results of their research."

## Illegal R'kiri Gold Mines Raided, Locals Warned Arrests To Follow

BY KUCH NAREN  
THE CAMBODIA DAILY

Authorities in Ratanakiri province on Wednesday confiscated machinery used at illegal gold min-

the region since early 2000.

Local minority villages only provide the labor to the mines, said the man, who only gave his name as Phhoeng for fear of retribution.

## Gecko Species Named for Cambodian Researcher

BY CHRISTI HANG  
THE CAMBODIA DAILY

Cambodia has over 30 species of gecko, including four species considered "household" geckoes, but few words for the creature.

The newest species discovered might earn an honorable mention with the Cambodian people, as its name has a personal connection to the country.

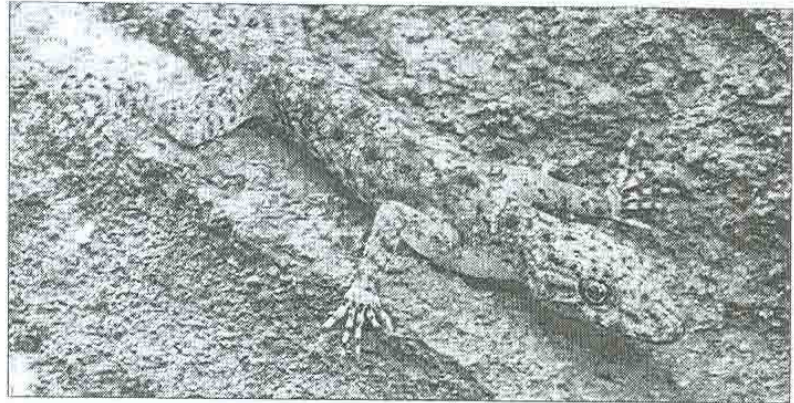
Named in honor of Cambodian researcher and herpetologist Neang Thy, *Cnemaspis neangthyi* was first spotted during a 2007 expedition to the Cardamom Mountains led by Lee Grismer from La Sierra University and was reported in a peer-reviewed study on March 11 in the *Journal of Herpetology*.

"I'm very happy about having my name given to the new species, and I hope it lets people know that everything has a name because in Khmer, it only has one name," Mr Thy said yesterday in an interview.

The new species is on average 5.4 cm long, not counting the tail, and olive green with a distinct light green chevron stripe on the back of its neck, according to Fauna & Flora International. There are currently 75 known species of *Cnemaspis* in the world. Thirty species live in Southeast Asia, with only one other species in the *Cnemaspis* genus found in Cambodia, according to the organization.

Mr Thy is the head of research for FFI's Cardamom Mountains Research Group and is also a department head at the Ministry of Environment.

"I think conservation is taken seriously but it's not as effective because this is new field and it's not



Lee Grismer

***Cnemaspis neangthyi*, a gecko discovered in the Cardamom Mountains in 2007, was officially certified as a species on March 11.**

fully understood yet," he said. "Cambodia started [conservation efforts] a bit late because the long conflicts in the country and started surveying a bit late and many of the animals were already described by neighboring countries."

Mr Thy said that during the 2007 expedition, the researchers were not specifically looking for a new species but looked carefully at rocky and hilly habitats that were thought likely to be home to geckoes.

"I think this [gecko is] very rare as it's the first time to be discovered," Mr Thy said, adding the animal is quite good at camouflaging itself within its environment.

Mr Thy also compiled the first guidebook to Cambodia's 62 species of amphibians and 130 reptile species, including 80 types of snakes. He added the book was geared toward young researchers doing field work, interested tourists or visitors who photograph wildlife and students who might go into the field of conservation.

"I hope people realize how many animals Cambodia has and that

they need to be protected," he said.

Neil Furey, head of academic development at FFI, said the honor of having a species named after a person is "rare enough." New species' names take three routes, he added. Animals are named after a distinctive characteristic like size or color, the area where the species was found or a person—never the person who discovered the species but a person who has made a great contribution in that field of research.

"Thy is recognized for his help to researchers in the field and his contribution to Cambodian conservation," he said.

Mr Furey said Mr Thy furthered his contribution by helping to foster a stronger conservation community in the future by leading field expeditions with conservation students and advancing his own skill set.

Mr Thy is to leave Sunday for a three-month taxonomy internship in California to catalog the new species, Mr Furey said.

"He's pursuing excellence in science and the future of conservation in Cambodia," Mr Furey said.



Neang Thy

The *dibamus dalaiensis*, a blind, legless lizard, was discovered in the Cardamom Mountains.

### Cambodian Scientist Discovers Blind, Legless Lizard

A species of blind and legless lizard in the Cardamom Mountains became the first animal to be discovered by a Cambodian scientist, the conservation NGO Fauna and Flora International announced Thursday. Cambodian herpetologist Neang Thy discovered the Dalai Mountain blind lizard, known in binomial nomenclature as *dibamus dalaiensis*, last year and his findings were recently published in the journal *Zootaxa*. Mr Thy said that when he turned over a log in the mountains and first saw the lizard, which resembles a snake, he did not realize its significance. "I didn't know this was a new species. Later we found that this is something new and had never been found before," said Mr Thy, who works for both the Ministry of Environment and FFI. Scientists have discovered several other species in the Cardamom Mountains in recent years. "This latest find is particularly remarkable because it is not only a new species, but also the first reptile to be both discovered and formally described in a scientific journal by a Cambodian national," said Dr Jenny Daltry, senior conservation biologist with FFI, according to the statement. *(Tim Shroock)*