

Final Project Report

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# Conservation of Cave Fauna in the Ba Be / Na Hang Karst Complex, Vietnam

(Rufford Grant Reference 13.02.06)

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Cover illustration drawn by Ricardo Insua-Cao

## Introduction and Overview

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This document is the final report for the project '*Conservation of cave fauna in the Ba Be / Na Hang Karst Complex*' (Rufford Grant Reference 13.02.06) and as such, it provides a comprehensive review of all activities undertaken by the project from September 2006 to March 2008<sup>1</sup>.

During the above period, the project completed activities in support of its objectives, which were originally formulated as:

- ❖ **Conservation Research:** To conduct surveys to identify a representative network of key sites for bats and develop strategies for their conservation
- ❖ **Capacity-building:** To establish capacity for cave conservation and community education among local protected area staff
- ❖ **Awareness-raising:** To implement awareness campaigns to strengthen understanding and support for conservation of local (and wider) cave ecosystems and their bat populations
- ❖ **Publications:** To promote improved support and understanding regarding requirements and methods for sustainable cave management in Vietnam

Due to domestic military interests, bureaucratic difficulties were encountered in securing permissions to work at Na Hang. As these threatened the projects objectives, it proved necessary to substitute Na Hang with the nearby Kim Hy Nature Reserve. Subsequent findings wholly justified this choice (below).

The projects **conservation research** programme was highly successful at both sites. Results include the discovery of three new bat species to science and unprecedented levels of species diversity, including numerous rarely-recorded and poorly known species. As project research evolved to address key questions for conservation management, a great deal of important ecological data was also generated. This provided the basis for bat conservation strategies which were subsequently developed for both sites.

The projects **capacity-building** programme proved similarly productive. Formal training events were undertaken at Kim Hy and Ba Be to equip local officials with skills in karst ecosystem and cave conservation management. These were reinforced and extended by practical instruction and mentoring throughout the projects research programme. Extensive training was also provided for three Vietnamese (two MSc & one BSc) students through the research programme, with assistance from other donors.

Project **awareness-raising** campaigns focussed on participatory development and distribution of a range of high-quality and cost-effective media (T-shirts, calendars, brochures & conservation agreements). Evaluations with local partners indicate that the campaign made a substantial contribution to improving local understanding of conservation and provided those implementing the campaign with important practical experience. Activities to raise wider awareness included publications, conference presentations, a forthcoming TV documentary and mainstream media articles.

**Publications:** A range of documents were produced by the project team to ensure that the projects activities reached the wider scientific and conservation community. Together with student theses, these included survey reports, conference abstracts and papers published in international peer-reviewed journals. A full list of these is provided in the documentation section of this report.

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<sup>1</sup> Although the projects life was originally intended to be 12 months (Sept '06 - August '07), a six month extension was kindly granted by the Rufford Foundation in order to allow completion of project activities.

## Project Activities: Conservation Research

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### Ba Be National Park

Project research began at Ba Be in the second half of 2006, with activities to determine existing knowledge concerning bat populations and identify priority sites and habitats for further research. Since many scientists had previously visited the national park, historical data was available. However, it became apparent that related species lists were confused and unreliable. Consultation with local authorities subsequently decided that the best return from the projects resources could be achieved by:

- ❖ ***Resolving existing uncertainties*** - To this end, an intensive review of previous specimen collections was undertaken, entailing correspondence with overseas museums (British, Canadian & Hungarian) and contact with Vietnamese scientists to examine all material in Vietnam. This was supplemented by opportunistic surveys in previously unsurveyed areas of the park.
- ❖ ***Intensive research of a major cave colony at the national park*** - Rather than repeat previous surveys, it was felt that targeted ecological research was desirable to provide guidance for local conservation management. A monitoring programme was therefore designed and undertaken at a large cave (Na Phong) within the national park, well known for supporting a substantial bat colony.

The review led to major revision of the bat species list for Ba Be and confirmed the presence of least 30 bat species, including 13 previously unrecorded species. Most significantly, the projects supplementary field surveys resulted in the discovery of one new bat species to science (named *Kerivoula titania*) which was subsequently described in a peer-reviewed journal (all project publications are provided in the 'documentation' section of this report). To ensure that the projects findings reached the Vietnamese scientific community, a full account was presented at the annual conference of the Vietnam Ecological Society in late 2007. Results from the projects ecological research at Na Phong Cave were similarly provided in the projects bat conservation strategy for Ba Be National Park.

### Kim Hy Nature Reserve

The research programme at Kim Hy Nature Reserve spanned the second half of 2006 to late 2007 and proved immensely productive. As very little was known about biodiversity at Kim Hy prior to the project, initial emphasis was placed upon identifying priority sites and habitats for bat conservation with the help of local officials and communities. Field research thereafter evolved towards addressing key questions for bat conservation at the site. Several of these related to seasonal variation in bat populations in different habitats and local caves. Primary results may be briefly summarised as follows:

- ❖ At least forty-two bat species are now known to occur at Kim Hy, which according to literature review, is the highest bat species diversity ever recorded at a single site in Vietnam. The forty two species include an exceptional number of very rarely-recorded and poorly known bat species.
- ❖ Two new bat species to science were discovered. A description of one (named *Murina tiensa*) was subsequently published in a peer-reviewed journal, while the description of the second is under preparation. Both bat species appear to be rare forest dwellers and are currently known only from two sites in the world.
- ❖ A major cave complex was discovered deep within the nature reserves interior which possesses outstanding conservation importance. The complex is surrounded extensive areas of primary forest and supports ca. 35,000 bats of at least 20 species, one of the highest species totals ever recorded for a SE-Asian cave.

- ❖ Cave-dwelling bats at Kim Hy Nature Reserve are highly vulnerable to disturbance, particularly during winter for those species which enter torpor and hibernation, as this has high potential to prove fatal. Local cave-dwelling fruit bat populations are at risk during the breeding season, as local colonies appear relatively larger during these periods and are therefore more vulnerable to incidental or deliberate disturbance and/or harvesting.

## Project Activities: Capacity-building

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### Protected Area Management

Four-day training events were undertaken at Kim Hy Nature Reserve and Ba Be National Park in December 2006 and February 2007 respectively. Each event was designed to equip participants with an understanding of the values and vulnerabilities of karst and cave ecosystems and requirements for their conservation. The original curriculum also included training on 'effective communication skills', but following local requests, was substituted with participatory conservation management planning activities. Trainees were provided with a full set of course materials in Vietnamese, which covered the following subjects:

- Day 1: Values and vulnerabilities of karst and cave ecosystems in a national and regional context
- Day 2: Biodiversity importance and economic and ecological significance of bats (Chiroptera) as a group, and the importance of karst areas for their conservation
- Day 3: Principles and approaches for karst conservation and management, and their application to Ba Be National Park and Kim Hy Nature Reserve
- Day 4: Conservation needs assessment and operational management planning exercises

In course evaluations, participants stated their belief that the course had significantly improved their understanding of issues relating to karst management and bat conservation. Moreover, the enthusiasm of the trainees also ensured that participatory exercises (Day 4) generated valuable information, which provided important guidance for future conservation projects at both sites.

### Conservation Research

Staff from the Ba Be and Kim Hy protected areas formed the backbone of the projects field research team. Participation was on a rotational basis allowing a significantly greater number of staff to benefit from the projects capacity-building works than originally envisaged. Training activities encompassed material assistance (basic field equipment and literature) and practical instruction and mentoring in the following subject areas:

- ▶ Biodiversity survey & population monitoring
- ▶ Karst & Cave ecology and conservation
- ▶ Bat species identification
- ▶ English language skills

Particular emphasis was placed upon providing protected area staff with the skills to continue biodiversity monitoring efforts following project completion. These skills, together with new institutional links which were created by the project, have led to an exciting range of new opportunities for the projects partners to gain support from the wider conservation community in the future.

With assistance from the Harrison Institute (UK), BP and the People, Resources and Conservation Foundation (USA), the project provided intensive training for three Vietnamese students (two MSc students & one BSc student). These students formed a continual and crucial element of the projects field team.

The project is delighted to report that one student (Mr. Dao Nhan Loi) achieved the highest score of his year for his MSc dissertation which focussed on the taxonomy and echolocation behaviour of Vietnamese bats. Loi teaches at a prominent university in northwest Vietnam and is now encouraging students to undertake dissertations on various aspects of bat biology (with three BSc students so far). This ensures that the impact of the projects capacity-building works will continue and it is hoped that this will in time lead to establishment of a new bat research and conservation unit in northwest Vietnam.

Another student (Mr. Vuong Tan Tu) attended the 1<sup>st</sup> SE-Asian Bat Conference in Thailand in May 2007, at which he successfully defended a poster presentation. Since the projects completion, Tu has begun activities to establish an urban bat conservation and community education project in Hanoi city and is currently working on a research paper intended for publication in a Vietnamese scientific journal.

The third project student (Mr. Nguyen Xuan Hung) successfully defended his BSc thesis (which focussed on bat biodiversity at Ba Be National Park) in late 2007. Following graduation, Hung embarked on a conservation career by beginning to work with in-country conservation organisations.

## Project Activities: Awareness Raising

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### Local Awareness

Awareness campaigns to generate community support for conservation of local caves and bat populations were successfully completed at Ba Be National Park and Kim Hy Nature Reserve. With the assistance of a British artist (Ricardo Insua-Cao), participatory processes were undertaken with protected area authorities to develop and distribute a range of high-quality and cost-effective awareness media. These are listed below together with a summary of target audiences and quantities distributed. Hardcopies of project awareness materials will be delivered to the Rufford Foundation in March '08.

Site	Media/ Description	Qty
Kim Hy	<b>2007 Calendar</b> (full colour, A1): ' <i>Bats of Kim Hy Nature Reserve 2007</i> ' - Distributed to local communities, schools and authorities.	1000
	<b>Household Conservation Agreement</b> (A4): Enacted within local communities to improve awareness of and compliance with conservation law, including caves.	6000
	<b>Brochure</b> (full colour, A5, 6 pages): ' <i>Bats at Kim Hy Nature Reserve: An introduction</i> ' - Distributed to local communities, schools and authorities.	5000
	<b>T-shirt</b> : ' <i>Lets keep our bats safe!</i> ' - Distributed to community groups and residents.	160
Ba Be	<b>Brochure</b> (full colour, A5, 6 pages): ' <i>The Caves and Bats of Ba Be National Park</i> ' - Distributed to local communities, schools and authorities.	5000
	<b>2008 Calendar / Poster</b> (full colour, A1): ' <i>A photographic guide to the caves and bats of Ba Be National Park 2008</i> ' - Distributed to local schools, communities and authorities.	1000

Informal discussions were undertaken with local partners in early 2008 to gauge the impact of the above materials upon conservation awareness within local communities and authorities. These collectively

suggest that the project's activities substantially contributed to improving community understanding of the importance of the project area for bat biodiversity and the efforts of local government efforts to conserve these values. As the role of local partners in designing and distributing awareness materials grew decisively throughout the project period, it was evident that everyone involved gained a great deal of practical experience from the projects awareness campaign.

## **Wider Awareness**

The project successfully completed a range of activities to raise wider awareness of the importance of Vietnamese karst areas for bat biodiversity and requirements for conservation management. These included conference presentations, delivery of training events and lectures outside the project area, media articles and TV documentaries, details for which are given below.

Podium and poster presentations were made by the project team at the following conferences:

- ❖ The 1<sup>st</sup> International SE-Asian Bat Conference, Thailand, 2007.
- ❖ The SE-Asian Regional Network for Indigenous Peoples Annual Conference, Vietnam, 2007.
- ❖ The Vietnam Ecological Society Annual Conference, Vietnam, 2007.
- ❖ The Institute of Ecology and Biological Resources Annual Conference, Vietnam, 2007.

Due to outside interest in the projects efforts, the project team were also requested to undertake the following activities:

- ❖ A karst biodiversity survey, a cave conservation assessment and a two-day training event entitled '*Vietnamese Karst & Cave Conservation*' were separately commissioned by the Fauna & Flora International Vietnam Programme and were undertaken in Ha Giang province (located on the Vietnam-China border) in 2007.
- ❖ Lectures on karst and cave conservation were provided at workshops in Hanoi and Ha Giang province in 2007 and 2008 respectively, on behalf of the '*Geopark Project*' managed by the Vietnam Institute of Geology and Mineral Resources (VIGMR).

As the projects discovery of three new bat species to science is believed sufficiently newsworthy to provoke media interest, a press release was prepared for forthcoming distribution by the People, Resources and Conservation Foundation. Significant media interest was already apparent however, such that a heavily illustrated article on the project will appear in the '*Vietnam Review Magazine*', a well known tourism magazine distributed to several countries within the region.

Most notably perhaps, footage for a 30-minute Vietnamese documentary on '*The caves and bats of Ba Be National Park*' was produced in collaboration with Vietnamese television authorities in late 2007. The natural history film is scheduled for broadcast on the national VTV2 channel in April '08 and a subtitled version (English) version will appear on the international VTV4 channel in May '08. Copies of all the above will be delivered to the Rufford Foundation as soon as these become available.

## **Project Activities: Documentation**

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### **Conservation strategies**

As development of conservation strategies awaited completion of the field research in late 2007, this activity represented the major focus of subsequent project activities. Notwithstanding this, activities supporting strategy development began in late 2006 and early 2007 with participatory exercises to

identify conservation threats and potential management responses. Together with subsequent consultations, these provided a range of important guidance for conservation. Following a process of review with the management board of Ba Be, a bat conservation strategy for the national park was finalised in early 2008. As the research program at Kim Hy Nature Reserve generated a significantly larger body of data however, review processes were delayed by the additional data analyses required, with the result that these will conclude in April 2008.

## Reports & Publications

In addition to the above conservation strategies, the following reports and publications were produced by the project team:

Furey, N. & Vuong Tan Tu. 2006. *The bat fauna of the Chau Ca area, Vi Xuyen and Bac Me Districts, Ha Giang Province, northern Vietnam*. Report to the Fauna & Flora International (FFI) Vietnam Programme.

Furey, N. & Vuong Tan Tu. 2007. *Report on a rapid conservation assessment of caves within the Vi Xuyen district, Ha Giang Province and a two-day training event at Ha Giang Forest Protection Department Headquarters*. Report to the FFI Vietnam Programme.

Dao Nhan Loi. 2007. *An identification guide to the bats of Kim Hy Nature Reserve, based on external, craniodental and acoustic criteria*. MSc thesis, Xuan Mai Forestry University.

Nguyen Xuan Hung. 2007. *The bat biodiversity of Ba Be National Park*. BSc thesis, Hanoi National University.

Vuong Tan Tu, Bates, P.J., Furey, N. 2007. *Relationships between echolocation frequency and body size in five species of Vietnamese hipposiderid bats*. Poster presentation, 1<sup>st</sup> International SE-Asian Bat (SEABAT) Conference, Thailand.

Furey, N.M. & Racey, P.A. 2007. *Community composition of bat assemblages in a Vietnamese karst area (Kim Hy Nature Reserve)*. Proceedings of the SEABAT Conference, Thailand.

Furey, N.M., Nguyen Truong Son & Vu Dinh Thong. 2007. *A review of bat research at Ba Be National Park, north Vietnam with important new records*. Proceedings of the Vietnam Ecological Society 2007 Annual Conference.

Csorba, G., Vu Dinh Thong, Bates, P. J., Furey, N. 2007. *Description of a new species of Murina from Vietnam (Chiroptera: Vespertilionidae: Murininae)*. Occasional Papers, Museum of Texas Tech University 268:1-12.

Bates, P.J.J., Struebig, M.J., Hayes, B., Furey, N., Khin Mya Mya, Vu Dinh Thong, Pham Duc Tien, Nguyen Truong Son, Harrison, D.L., Francis, C.M., Csorba, G. 2007. *A new species of Kerivoula (Chiroptera: Vespertilionidae) from SE-Asia*. Acta Chiropterologica, 9(2): 1-15.

Additional manuscripts for which writing is in progress include:

Vuong Tan Tu, Vu Dinh Thong & Furey, N. ---. *Vietnamese Bat Echolocation: A tool for conservation research and management*. Planned for submission to Tap Chi Sinh Hoc (Vietnamese Journal of Biology).

Furey, N., Csorba, G., Bates, P.J., Vu Dinh Thong, Racey, P.A. ---. *Description of a new species belonging to the Murina "suilla-group" (Chiroptera: Vespertilionidae: Murininae) from northern Vietnam*.

Tran Tan Van, Vuong Tan Tu & Furey, N. ---. *Principles and guidelines for sustainable cave management and conservation in Vietnam*. Planned for submission to the Vietnamese Advances in Natural Sciences Journal or Protected Areas Magazine.

Upon completion of the above manuscripts, applied analyses of project data will be undertaken in 2008 to publish a series of papers in peer-reviewed journals, with the specific goal of raising the profile of Ba Be and Kim Hy protected areas within international conservation circles. Finally, the possibility of producing an illustrated identification guide to ‘*The Bat Species of Kim Hy Nature Reserve*’ is being considered, although finances to print and distribute this have yet to be secured.

## Financial Summary

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During the project period (September 2006 to March 2008), total expenditure exceeded £11,500 GBP. As the grant kindly provided by the Rufford Foundation was for £5,000 GBP, the additional >£6,500 GBP was leveraged from other funding sources - most notably the Harrison Institute, Aberdeen University and BP. The vast majority of these additional funds were used to support the projects field research programme and purchase field and laboratory equipment and other consumables. A summary of how the Rufford Grant was spent upon project activities at Ba Be National Park and Kim Hy Nature Reserve is given below. All figures are in GBP.

Expenditure, site / item	Total (GBP)
<b>Field Equipment &amp; Material Assistance</b>	
Ba Be National Park	300
Kim Hy Nature Reserve	355
subtotal	<b>655</b>
<b>Field Research Programme</b>	
Ba Be National Park	295
Kim Hy Nature Reserve	410
subtotal	<b>705</b>
<b>Conservation Training Events</b>	
Ba Be National Park	400
Kim Hy Nature Reserve	550
subtotal	<b>950</b>
<b>Awareness Campaigns</b>	
Ba Be National Park	760
Kim Hy Nature Reserve	910
subtotal	<b>1,670</b>
<b>Conservation Management Planning</b>	
Ba Be National Park	255
Kim Hy Nature Reserve	295
subtotal	<b>550</b>
<b>Miscellaneous</b>	
Translation services	250
Miscellaneous consumables	130
Communications	90
subtotal	<b>470</b>
<b>TOTAL (GBP)</b>	<b>5,000</b>

# Photo Gallery - Conservation Research



*Kerivoula titania*: A new bat species to science discovered by the project at Ba Be



*Murina tiensa*: A new bat species to science discovered by the project at Kim Hy



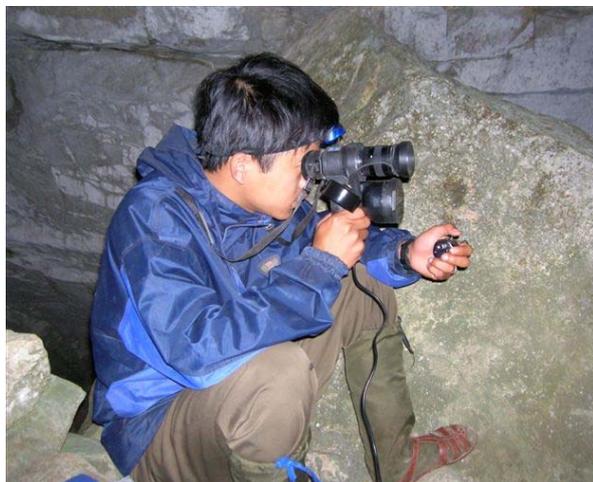
*Murina* sp. nov. : A new bat species to science discovered by the project at Kim Hy



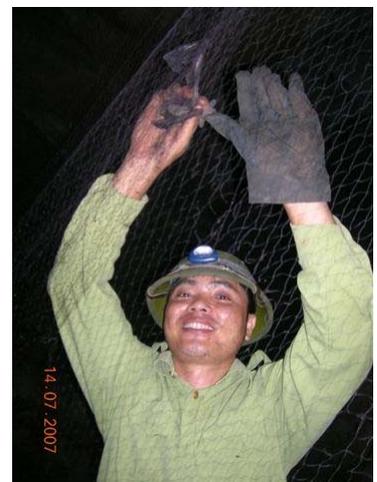
Fruit bat carrying young



Live-trapping at Kim Hy



Cave bat population census at Kim Hy



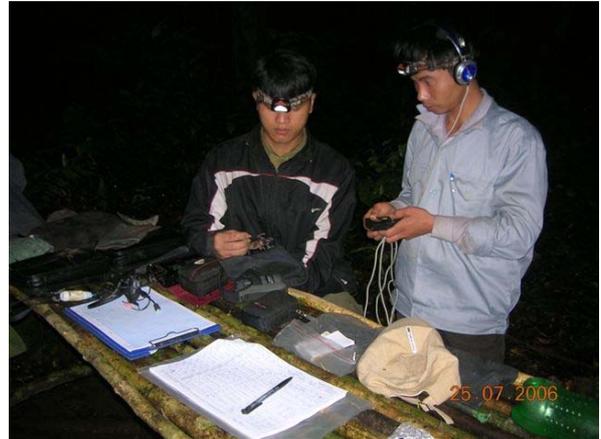
Live-trapping at Ba Be

## Photo Gallery - Conservation Research

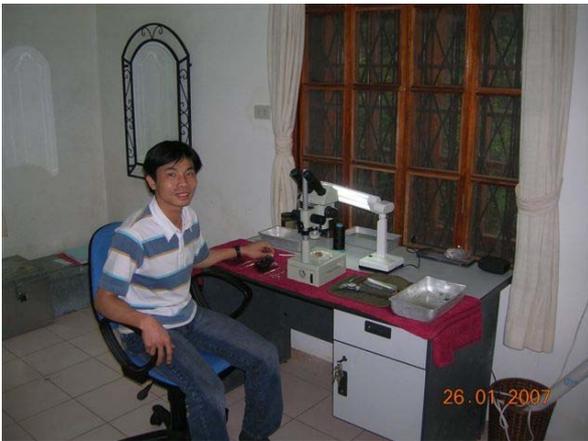
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Processing data in the field at Kim Hy



Processing data in the field at Ba Be



Working in the laboratory at Ba Be



Cave mist netting at Kim Hy



Cave surveys at Ba Be National Park



Dinnertime in the field at Kim Hy Nature Reserve

## Photo Gallery - Capacity building



Karst Conservation Training Event at Ba Be



Karst Conservation Training Event at Kim Hy



Project Students: Nguyen Xuan Hung (left), Vuong Tan Tu (centre), Dao Nhan Loi (right)



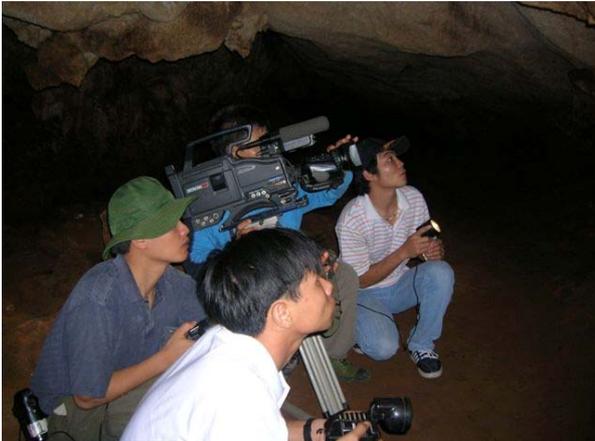
A Kim Hy forest ranger measuring a live bat



Karst Conservation Training Event in Ha Giang



# Photo Gallery - Wider Awareness Raising



Filming in the field for 'The caves and bats of Ba Be National Park' natural history documentary



V. T. Tu presenting project research at the Institute of Ecology and Biological Resources Annual Conference, Vietnam 2007



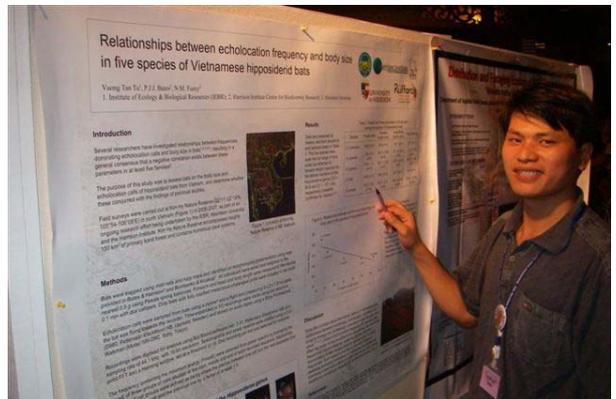
Children handling bats during a urban bat survey in Hanoi city, Vietnam 2008



N. Furey presenting project research at the Vietnam Ecological Society Annual Conference, Vietnam 2007



Neil Furey presenting a paper on Kim Hy Nature Reserve at the SEABAT Conference, Thailand 2007



V. T. Tu defending a poster on *Vietnamese Bat Echolocation* at the SEABAT Conference, Thailand 2007

## Photo Gallery - Miscellaneous

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Participatory management planning activities  
at Ba Be National Park



Participatory management planning activities  
at Kim Hy Nature Reserve



Field team together with Prof. Paul Racey,  
co-chair of the IUCN Chiroptera  
(bat) Specialist Group



N. Furey together with protected area officials  
and local community members  
at Kim Hy Nature Reserve