**Project Update: December 2012**

**Overview:**

Wildlife surveys in Cambodia have revealed the presence of a number of globally and regionally threatened mammals and birds (Walston et al. 2001). Most of these surveys focused on deciduous dipterocarp and lowland semi-evergreen forests. Recently, surveys of hill and montane evergreen forests in Lao PDR and Vietnam have revealed a number of new species and previously little known species (Duckworth 1997; Duckworth et al. 1999; Francis 1999; Groves et al. 1997; Schaller & Rabinowitz 1995; Schaller &Verba 1996; Timmins et al. 1998). It is thought that some of these and other species of conservation concern might also occur in the Phnom Kulen National Park.

The Phnom Kulen National Park (PKNP) is a 39.500 ha protected area in north-western Cambodia, some 40 km north of Siem Reap and the famous temples of Angkor Wat. The national park was designated in 1993 by a Royal Degree of King Norodom Sihanouk. It is officially managed by the Ministry of Environment (MOE). The mountain range with an elevation of up to 500 m is a unique geographical feature in the largely flat lowland landscape of northern Cambodia.

Illegal logging, land clearing for agriculture and wildlife hunting has long been a problem in PKNP. However, as detailed surveys have not been undertaken to date, it is unknown what effect this has had on the wildlife. Most large mammals, such as Asian Elephants and Tigers, have already disappeared from Phnom Kulen, while numerous other globally or regionally threatened species, such as gibbons and other primates, are still known to occur.

Bats (order Chiroptera) are among the most diverse and widespread group of mammals, and are distinguished by their capacity for true flight. More than 1,000 species are known, which are divided into two suborders, the Megachiroptera and Microchiroptera. Almost one third of species feed on nectar or fruit, and these bats play a crucial role in plant pollination and seed dispersal. Bats are the main agents of pollination of certain economically and ecologically important plants (e.g., Cox *et al.*, 1991) and, owing to the ability of many species to carry seeds over long distances, may make a significant contribution to the reforestation of cleared areas (Gorchov *et al.*, 1993). Most of the remaining species are insectivorous and these are thought to be the primary consumers of nocturnal insects (Kunz & Pierson, 1994).

At present there are 62 species of bats known from Cambodia (Gabor *pers. comm*). However, there is a limited knowledge of the exact status and distribution of the great majority of species. Previous surveys have highlighted this lack of knowledge with species new to Cambodia and science having been recorded (Gabor *pers. comm*).

Prior to this survey, there has been little research undertaken on the mammal fauna of Phnom Kulen NP. However other forest areas of Cambodia have been reasonably well studied such as

Seima Forest, Virachey National park, Kirirom National Park, Cardamom Mountains and the Northern plains.

## Methodology:

Camera Trapping:
Automatic camera-traps were placed to maximize the probability of detection for small carnivores and other mammal species. Camera-traps were set at 'optimal' locations such as animal trails and at the bases of large fruiting trees,. Special attention was paid to locations where mammal signs were detected. Traps were left in the forest for 1-2 weeks and set for operation day and night then rotated to other locations.

Mist Netting and Harp Traps:
Seventy denier mist nets and four bank harp traps were used to capture bats. These were of variable lengths and set up across potential flight paths such as paths, streams and clearings. Species requiring identification were collected as voucher specimens and preserved as "wet specimens" in 70% ethanol and injected with 10% formalin. The status and distribution of the bat species in Cambodia was taken from a number of sources including unpublished data of FFI, Royal Phnom Penh University and Gabor Csorba. Nomenclature and systematics follow Simmons (2005). The Royal Phnom Penh University completed all identifications.

Night Spotting:
Transects were walked in suitable areas such as paths and dry riverbeds at different times of the night. Species were found by looking for eye shine using red spectrum hand lights and a 2 million candlepower spotlight.

Signs:
Transects were walked in daytime in suitable habitats looking for opportunistic signs such as mammal tracks and droppings.

## Results:

Bats:
To date more than 400 individuals have been caught, representing 21 confirmed species. One is a new record for Cambodia. New species were still documented even on the last recorded netting night of the survey. A full species list is given in Appendix 1 Table 1.2.

Other mammals:
To date 16 other species of mammal have been recorded through camera trapping, night spotting and diurnal observation work looking for signs/tracks. Five of these are IUCN listed species of conservation concern, two are listed as species under CITES Appendix I and four are

listed as species under CITES Appendix II. A full list of species recorded is given in Appendix 1, Table 1.2 and 1.3.

Key Species accounts:

**Black Giant Squirrel** (*Ratufa bicolor)* IUCN Near-threatened
This species was frequently observed along the main tourist path towards the Kbal Spean Lingas. It is easily distinguished as the largest tree squirrel in the region. This species, although widespread throughout South-East Asia: Myanmar, Thailand, Laos, Vietnam, Cambodia and Peninsular Malaysia, has declined considerably in many areas due to loss and fragmentation of tall forest, as well as hunting. (Francis, 2008)

**Leopard cat** (*Prionailurus bengalensis)*
This species was rarely recorded despite the fact that it is recognised as the most widespread and relatively common small cat in the region (Sunquist and Sunquist, 2002). Listed as CITES APPENDIX II largely due to its trade and use in traditional medicine, the species is stable in many areas and even thriving in some altered habitats including oil palm and sugar cane plantations (IUCN Cats Red List Workshop 2007).

**Bengal slow loris** (*Nycticebus bengalensis*) IUCN Vulnerable
This species was observed twice on separate occasions and different localities during night spotting along forest trails. It occurs throughout South-East Asia and also NE India, Bangladesh and South China. Populations are declining due to loss of forest habitat as well as hunting and trapping for the pet trade (Francis, 2008). During the course of the survey one recently abandoned hunter's camp in Kbal Spean was identified to contain remnants of *N. bengalensis* in the camps fire place.

**Northern Pig-tailed Macaque** (*Macaca leonina*) IUCN Vulnerable
This species was recorded from camera trap pictures and is assumed to be restricted to small areas of forest with the lowest levels of human disturbance where it is known to forage predominantly on the ground but readily climbs trees to forage if disturbed. This species ranges through South-East Asia: Myanmar, Thailand (South to about 8$^{o}$N), Laos, Vietnam and Cambodia (Francis, 2008).

**Pileated gibbon** (*Hylobates pileatus*) IUCN Endangered
This species was only recorded by vocalisations. Arboreal, found typically in tall forest canopy, this species occurs in small family groups. Its distribution is restricted to South East Thailand, South West Laos and Cambodia West of the Mekong River (Francis, 2008). Populations in Cambodia are in severe decline due to habitat destruction through logging and agricultural intensification in remote areas.

**Hog-badger** (*Arctonyx collaris*) IUCN Near-threatened
This species was recorded only once during the survey. This largely nocturnal species is a powerful digger and generally sleeps in burrows by day. Usually found in upland forests as well as plantations, but also in lowland areas in Cambodia (Francis, 2008)it is distributed throughout South-East Asia and also North East India, China and Sumatra.

**Cadorna's pipistrelle** (*Hypsugo cf. cadornae*)
Only one specimen was recorded during this survey. Generally it is found over rivers and pools in dry dipterocarp forest as well as disturbed areas and secondary forest (Francis, 2008). The species distribution is currently described as throughout North Myanmar, North Thailand, Laos and North Vietnam; this survey is the first confirmed record of this species for Cambodia.

## Discussion:

Phnom Kulen NP contains to date nearly 40% of Cambodia's known bat species. Few other sites in Cambodia are known to have a higher bat diversity. Additionally several families of bats recorded from other areas of Cambodia were not recorded during the on going survey. Based on previous research these families accounted for a considerable percentage of the total number of species from other surveyed areas. Additionally the Pteropidae family were largely underrepresented in this survey. This is likely due to the localities picked for trapping.

With the presence of 21 species, one of these being a new record for Cambodia, Phnom Kulen NP is probably an area of high conservation significance for bats. Also with on going research it is likely that new species will be recorded from the park. However, too little is known about the biogeography and status of the bats in Cambodia to determine the relative importance of the reserve's bat fauna in a national and regional context.

Six-teen other mammal species have been confirmed from the park. Five of these are IUCN listed as species of conservation concern. The overall large mammal density is considered to be very low, most likely as a consequence of the high hunting and human activity in the park. However this is also likely reflected by the low number of camera trap days and spotlighting hours conducted to date. Additionally at present the mammal survey of Phnom Kulen should be considered only partly completed, due to time constraints little survey effort was undertaken in the eastern part of the park. This area still has some relatively good areas of intact forest habitat and is also known to have many caves. Thus with a more concentrated survey effort here the overall mammal diversity is likely to increase significantly.

**Table .1.2** Mammal species recorded in Phnom Kulen National Park

| Family/Species | Common Name | IUCN | CITES | Evidence |
|---|---|---|---|---|
| *Hylobates pileatus* | Pileated gibbon | EN | Appendix I | O |
| *Macaca leonina* | Pig-tailed Macaque | VU | Appendix II | CT, |
| *Macaca Fascicularis* | Long tailed Macaque | LC | Appendix II | O,T |
| *Nycticebus bengalensis* | Bengal slow Loris | VU | Appendix I | O |
| *Prionailurus bengalensis* | Leopard cat | LC | Appendix II | CT |
| *Paradoxurus hermaphroditus* | Common palm Civet | LC | | CT |
| *Arctonyx collaris* | Hog-badger | NT | | CT |
| *Herpestes javanicus* | Small Asian Mongoose | LC | | CT,T,O |
| *Hystrix brachyura* | Malayan Porcupine | LC | | CT,T |
| *Sus scrofa* | Eurasian Wild pig | LC | | T |
| *Muntiacus muntjak* | Red Muntjak | LC | | CT,T |
| *Tragulus kanchil* | Lesser Oriental Chevrotain | LC | | CT |
| *Ratufa bicolor* | Black Giant Squirrel | NT | Appendix II | O |
| *Callosciurus finlaysonii* | Variable Squirrel | LC | | O |
| *Menetes berdmorei* | Indochinese Ground Squirrel | LC | | CT,O |
| *Lepus peguensis* | Burmese hare | LC | | CT,O |
| *Cynopterus brachyotis* | Sunda short-nosed fruit bat | | | S |
| *Cynopterus Sphinx* | Greater short-nosed fruit bat | | | S |
| *Eonycteris spelaea* | Cave nectar bat | | | S |
| *Megaderma spasma* | Lesser false vampire | | | S |
| *Megaderma Lyra* | Greater false vampire | | | S |
| *Rhinolophus affinis* | Intermediate horseshoe bat | | | S |
| *Rhinolophus malayanus* | Malayan horseshoe bat | | | S |
| *Rhinolophus shameli* | Shamel's horseshoe bat | | | S |
| *Rhinolophus pusillus* | Least horseshoe bat | | | S |
| *Rhinolophus stheno* | Lesser Brown horseshoe bat | | | S |
| *Hipposideros armiger* | Great roundleaf bat | | | S |
| *Hipposideros larvatus* | Intermediate roundleaf bat | | | S |
| *Hipposideros galeritus* | Cantor's roundleaf bat | | | S |
| *Hipposideros Pomona* | Large-eared roundleaf bat | | | S |
| *Hipposideros cineraceus* | Ashy roundleaf bat | | | S |
| *Myotis cf. annectans* | Hairy-faced myotis | | | S |
| *Tylonycteris cf. pachypus* | Lesser bamboo bat | | | S |
| *Hesperoptenus cf. blanfordi* | Least false-serotine | | | S |
| *Hypsugo cf. cadornae* | Cadorna's pipistrelle | | | S |
| *Kerivoula hardwikii* | Hardwicke's woolly bat | | | S |
| *Miniopterus pusillus* | Small bent-winged bat | | | S |

(S= specimen, CT=Camera trap, T=track/sign, O=observation)