

# A SUMMARY OF THE CONSERVATION STATUS, TAXONOMIC ASSIGNMENT AND DISTRIBUTION OF THE INDOCHINESE SILVERED LANGUR *Trachypithecus germaini* (*sensu lato*) IN CAMBODIA

Jessica E. Moody<sup>1\*</sup>, An Dara<sup>2</sup>, Camille N. Z. Coudrat<sup>3</sup>, Tom Evans<sup>4</sup>, Tom Gray<sup>5</sup>,  
Matt Maltby<sup>6</sup>, Men Soriyun<sup>7</sup>, Nut Meng Hor<sup>7</sup>, Hannah O'Kelly<sup>4</sup>, Pech Bunnat<sup>8</sup>,  
Phan Channa<sup>5</sup>, Edward Pollard<sup>4</sup>, Hugo J. Rainey<sup>4</sup>, Benjamin M. Rawson<sup>9</sup>, Rours  
Vann<sup>8</sup>, Song Chansocheat<sup>2</sup>, Tan SETHA<sup>7</sup>, and Thong Sokha<sup>8</sup>

<sup>1</sup> Department of Mammalogy, Wildlife Conservation Society/Bronx Zoo, 2300 Southern Boulevard, Bronx, New York 10460, USA. E-mail: jmoody@wcs.org

<sup>2</sup> General Department Administration for Nature Conservation and Protection, Ministry of Environment, Phnom Penh, Cambodia. E-mail: daraan@gmail.com; E-mail: s.chansocheat@gmail.com

<sup>3</sup> Department of Anthropology and Geography, Oxford Brookes University, Headington Campus, Gypsy Lane, OX3 0BP, Oxford, UK. E-mail: camillecoudrat@gmail.com

<sup>4</sup> Global Conservation Program, Wildlife Conservation Society, 2300 Southern Boulevard, Bronx, New York 10460, USA. E-mail: tevans@wcs.org

<sup>5</sup> Greater Mekong Cambodia Country Program, World Wide Fund for Nature, Phnom Penh, Cambodia. E-mail: tomnegray@hotmail.com; E-mail: phanchannal@yahoo.com

<sup>6</sup> Cambodia Programme, Fauna and Flora International, Phnom Penh, Cambodia. E-mail: matt.maltby ffi@gmail.com

<sup>7</sup> Department of Wildlife and Biodiversity, Forestry Administration, Phnom Penh, Cambodia. E-mail: n.menghor@gmail.com

<sup>8</sup> Cambodia Program, Wildlife Conservation Society, PO Box 1620, Phnom Penh, Cambodia. E-mail: p.bunnat@gmail.com; E-mail: roursvann@gmail.com

<sup>9</sup> Greater Mekong Program, Conservation International, Hanoi, Vietnam. E-mail: b.rawson@conservation.org

\* Corresponding author

## ABSTRACT

Nine of the ten primate species known to occur in Cambodia are globally Threatened due to habitat loss/fragmentation and direct persecution. One of these, the Indochinese Silvered Langur, *Trachypithecus germaini* (*sensu lato*), has only recently gained the attention of conservationists, having formerly been considered conspecific with the Sundaic Silvered Langur, *T. cristatus*. *Trachypithecus cristatus*, broadly defined, was a widespread species listed as Data Deficient in earlier IUCN Red List assessments. According to more recent assessments, the Sundaic taxa, *T. cristatus* and *T. auratus*, are known to range from peninsular Malaysia throughout the Indonesian archipelago, while *T. germaini* occurs in a much smaller range in south-eastern Thailand, Cambodia, southern and central Lao PDR, and south and central Vietnam. This short paper summarizes existing published information (and some unpublished observations from the authors) on the habitat, distribution, and conservation status of *T. germaini* in Cambodia, which is undoubtedly the global stronghold. We call for increased conservation action for this species in Cambodia, primarily within the context of existing protected area management programs. We also highlight a number of factors that confound assessments of its status and recommend areas for further research.

**Keywords:** taxonomy, habitat, *Trachypithecus margarita*

## INTRODUCTION

Following the end of armed conflict in Cambodia, beginning in the early 1990s, wildlife conservation initiatives began to take place. These started modestly, mainly in the form of survey work (Timmins & Soriyun, 1998; Daltry & Momberg, 2000; Long *et al.*, 2000; Seng, 2001; Timmins & Ou, 2001; Walston *et al.*, 2001; Kong & Tan, 2002). As the forests of Cambodia became safer, more areas of the country were surveyed and protected area management became established (Boonratana, 1999; Davidson, 2006; Bezuijen *et al.*, 2007; Eames, 2007). To date, most significant larger blocks of forest have been surveyed to some extent, and many protected areas declared (Pollard *et al.*, 2007; Rainey *et al.*, 2009; Rawson, 2010; Royan, 2010; Coudrat *et al.*, 2011). Conservation efforts within these reserves have helped to reduce threats to wildlife from human pressures, particularly hunting and habitat loss (Timmins & Ou, 2001; Pollard *et al.*, 2007; Coudrat, 2009; Rainey *et al.*, 2009; Rawson *et al.*, 2009).

Nine of the ten primate species that are known to occur in Cambodia are globally Threatened (IUCN 2011). One of these species, the Indochinese Silvered Langur *Trachypithecus germaini* (Milne-Edwards), has yet to be the focus of any direct conservation action. There is no synthesis concerning the geographic range, distribution, abundance, and ecological characteristics for this species throughout its range, which hampers the ability to develop and implement effective conservation strategies both within and outside of Cambodia (Nadler *et al.*, 2003, 2005; Brandon-Jones *et al.*, 2004; Bezuijen *et al.*, 2007; Pollard *et al.*, 2007; Rainey *et al.*, 2009; Gray *et al.*, 2010; Timmins *et al.*, 2011). Currently, *T. germaini* is classified by the IUCN Red List as Endangered A2cd (Nadler *et al.*, 2008), which implies a past decrease in population size of more than 50% over three generations (estimated to be 36 years). The apparent paucity of recent records, especially in areas outside of Cambodia, and the relative rate of forest conversion, hunting, and wildlife trade in this region (Sodhi *et al.*, 2004) suggests that this species has undergone very significant declines in population size and area of occupied habitat. Recent genetic analyses suggest a species split into *T. germaini* (*sensu stricto*) and *T. margarita* (Elliot) (Nadler *et al.*, 2003, 2005; Roos *et al.*, 2008), which is not currently recognized as a valid taxon by the IUCN Red List pending further taxonomic work (Nadler *et al.*, 2008). For the purposes of this report, all Indochinese Silvered Langur populations will be referred to as *T. germaini* (*sensu lato*).

A synthesis of information on the distribution, abundance, and taxonomic limits of *T. germaini* is urgently needed in order to assess its conservation status in Cambodia. As much of the available information about Silvered Langurs is in survey reports and other informally published formats, it is not readily accessible outside of Cambodia. This paper collates much of the available recent information to provide a more accurate picture of the status and distribution of this species in Cambodia. A more comprehensive analysis is also being prepared which will contain more specific details, photographs, an analysis of historical sources, and expanded supporting data for the statements made herein.

## TAXONOMY

The taxonomic position of Indochinese Silvered Langur populations remains under debate. Recent genetic analyses recommend treating the Indochinese form as two species: *T. germaini* (*sensu stricto*) or Indochinese Silvered Langur (Groves, 2001), and *T. margarita* or Annamese Silvered Langur (Nadler *et al.*, 2005, 2007; Roos *et al.*, 2007, 2008). More evidence is needed to confirm this hypothesis as the existing genetic data include only four samples from Cambodia (two of which are of unknown origin), and no samples from Lao PDR (Nadler *et al.*, 2005; Roos *et al.*, 2008; Tan *et al.*, 2008). Furthermore, phylogenies were reconstructed using only mitochondrial DNA, which may not accurately describe genetic structure within and among populations, particularly for species characterized by a female-philopatric social organization which is typical among the Asian colobines (Melnick & Hoelzer, 1993; Oates & Davies, 1996; Collins & Dubach, 2000; Ballard & Whitlock; 2004; Kirkpatrick, 2007).

The Mekong River, which delineates the eastern or western boundary for several primate species, is speculated to be the taxonomic boundary between *T. germaini* to the west, and *T. margarita* to the east, by Nadler *et al.* (2005, 2007). However, we suggest that the Mekong seems inherently unlikely to be a particularly strong barrier to gene flow, since Silvered Langurs are often found in riverine and coastal forests throughout their range (Daltry & Momberg, 2000; Long *et al.*, 2000; Kong & Tan, 2002; Pollard *et al.*, 2007; Royan, 2010; Timmins *et al.*, 2011) and occupy many of the Mekong channel islands in northern Cambodia (Bezuijen *et al.*, 2007), suggesting a strong ability to cross this particular piece of water. Detailed field observations by the authors of the current review on both sides of the Mekong show that morphological differences in monkeys between these two land areas are less con-

sistent than implied by Nadler *et al.* (2005) and the purported species-level characters may in some cases be attributable to intraspecific variation. This raises further doubts about the taxonomic limits of the two taxa and prevents ready assessment of their distribution. Until this is resolved, field records such as those summarized below cannot sensibly be assigned to either of these two putative taxa.

**DISTRIBUTION AND ABUNDANCE IN CAMBODIA**

Recent field records of the Indochinese Silvered Langur from survey areas throughout Cambodia during the period 1999-2010 are presented in Table 1 and Fig. 1. There are believed to be numerous additional grey literature sources, historical sources, and unpublished records of this species in Cambodia not yet obtained, and so the distribution presented is likely incomplete. Nonetheless, the sources cited do indicate the main features of the status of this species in Cambodia.

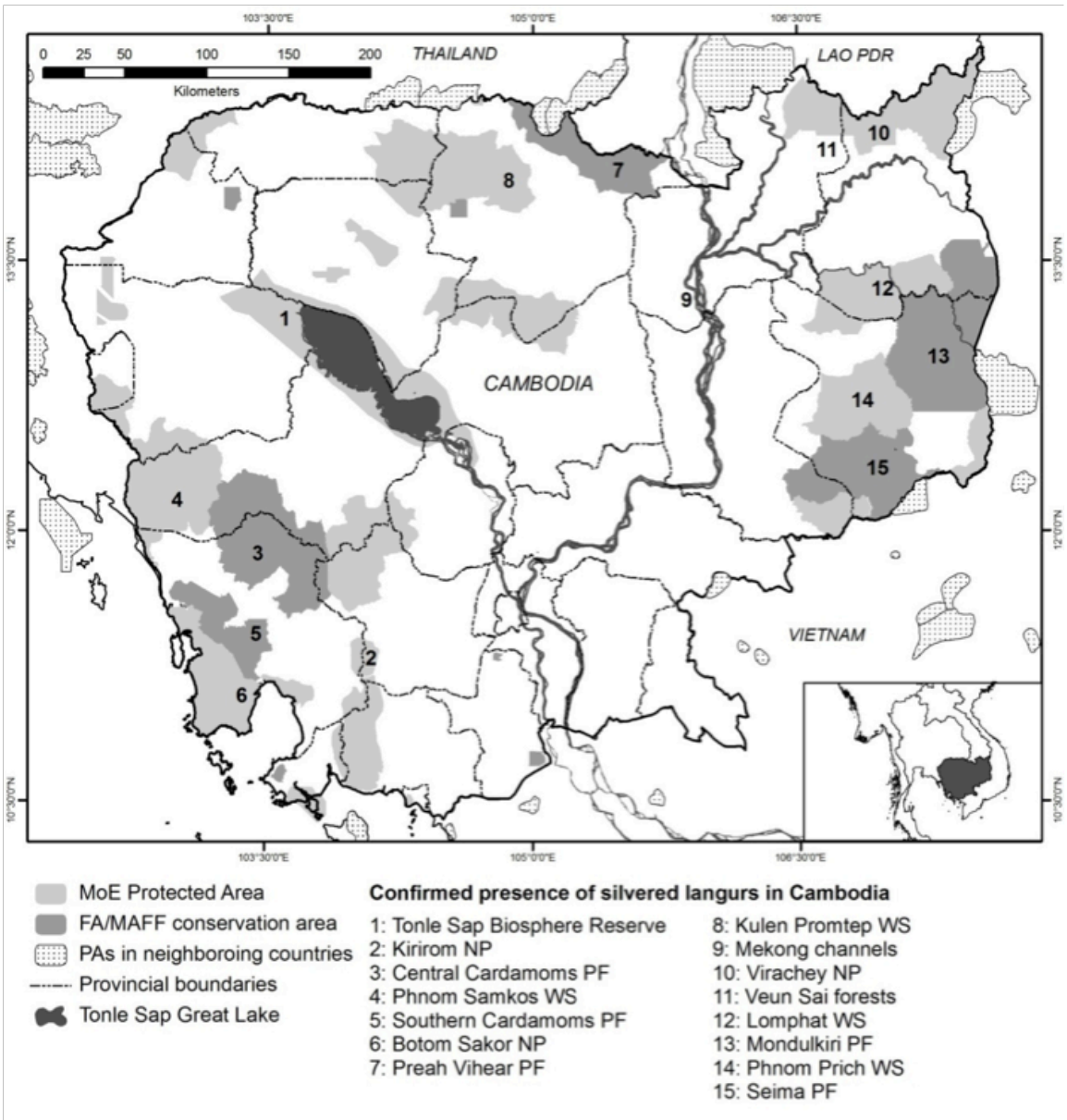


Fig. 1. Map of Cambodia highlighting all protected areas noted in Table 1 with confirmed presence of *Trachypithecus germaini*.

The records comprise a high proportion of the major forest areas covered by wildlife surveys during this period. Distribution ranges from the Cardamom Mountains in the southwest, through the flooded forests of the Tonle Sap Great Lake, along a section of the Mekong River and across the Northern and Eastern Plains landscapes. The Northern Plains comprise sites 7, 8 and surrounding areas on Fig. 1 (essentially Preah Vihear Province and physiographically similar areas of adjacent provinces) whilst the Eastern Plains comprise sites 12-15 and adjacent areas on Fig. 1 (essentially Monduliri Province and physiographically similar areas of adjacent provinces).

### HABITAT USE

In Cambodia, Indochinese Silvered Langurs have been observed in a number of lowland habitats. Probably the greater part of their occupied range is in the Northern and Eastern Plains amongst deciduous dipterocarp forest in evergreen or semi-evergreen forest, mixed-deciduous patches, or riparian strips at around 60-250 m (Pollard *et al.*, 2007; Rainey *et al.*, 2009; authors' pers. obs.). In those areas of the country with higher hill ranges and extensive semi-evergreen and evergreen forests, notably the far northeast, the Monduliri Plateau and the Cardamom range of the southwest, there is an indication that the species is more restricted to riparian areas, and apparently absent over large areas, even in the lowlands (Daltry & Momberg, 2000; Long *et al.*, 2000; Kong & Tan, 2002; Pollard *et al.*, 2007; Royan, 2010; authors' pers. obs.). Along the coast, the species has been recorded from riparian vegetation along river stretches under tidal influence, although not true mangrove vegetation communities *per se* (R. J. Timmins *in litt.*). They also occur in extensive seasonally flooded forest of the Mekong and Tonle Sap floodplains (Davidson, 2006; Bezuijen *et al.*, 2007). The upper altitudinal limit of the species in Cambodia is not known although we are unaware of any records above 450 m.

### CONSERVATION STATUS

Densities are not yet known for any site, but the survey reports cited in Table 1 give a crude guide to relative abundance. Anecdotal evidence suggests that several of the sites support notably high encounter rates (Coudrat, 2009; Rainey *et al.*, 2009) as compared to areas outside of Cambodia. This combination of high densities and large areas of available habitat are in sharp contrast to the current situation in Lao and Vietnam (Nadler *et al.*, 2007; Hoang Minh Duc *et al.*,

2010; Le Khac Quyet *et al.*, 2010; Nadler, 2010; Rawson, 2010; Timmins *et al.*, 2011) and strongly suggests that Cambodia is the global stronghold of the species. The status of the species in Thailand remains unclear.

The main areas with high encounter rates over large landscapes are the deciduous/evergreen forest mosaics of the Northern and Eastern Plains, and at a few sites they can even be described as common, suggesting that these areas in particular may represent a species' stronghold. Given the great extent of suitable habitat in these two landscapes, they likely support the most important populations within Cambodia, and hence globally. A high encounter rate was also recorded over a relatively small survey area in Phnom Samkos Wildlife Sanctuary (Coudrat *et al.*, 2011) suggesting the need for additional surveys to evaluate it as a priority area for the conservation of *T. germaini*.

Threats to the populations in Cambodia are not well studied, although all Cambodian primates are facing severe pressures from habitat loss and hunting (Bezuijen *et al.*, 2007; Pollard *et al.*, 2007; Coudrat, 2009; Rainey *et al.*, 2009; Rawson, 2009, 2010; Rawson *et al.*, 2009; Rawson, 2010; Gray *et al.*, 2010). Deforestation is evidently a threat in the preferred habitats of this species, including large-scale conversion to plantations, small-holder farming, and potentially the construction of dams. Denser forest formations near waterbodies are especially favoured for clearance due to their higher agricultural potential. The extent to which this species is hunted in Cambodia remains poorly known, but there is a generally high hunting pressure on primates for bushmeat wherever they occur and many easily accessible areas of apparently suitable Silvered Langur habitat are not occupied by the monkeys, or are occupied at unnaturally low densities, suggesting these populations have been hunted out. It is not currently reported to have high value as a pet or for medicine (in contrast to *Nycticebus*: for example Nekaris *et al.* [2010]) but the regional market for primate gelatine is strong (R.J. Timmins *in litt.*) and might lead to increased demand in the future. Occasional live specimens have been observed in trade as pets (T. Evans & C. Coudrat, pers. obs.) but this is not believed to be a serious threat. There are also reports that Silvered Langurs may be trapped as 'by-catch' during the collection of Long-tailed Macaques *Macaca fascicularis* or the biomedical trade (WCS data). Given the ease with which langur populations have been depleted in neighbouring countries, and given the significant markets for harvesting of primates, including the gelatine market in Vietnam and China, Silvered Langurs could be extirpated from Cambodia within

**Table 1.** Protected areas in Cambodia with confirmed presence of *Trachypithecus germaini*.

Areas with confirmed presence of <i>Trachypithecus germaini</i> *	Status	Selected references
Tonle Sap Biosphere Reserve	Recorded in Prek Toal and Beung Tonle Chmar core areas	Davidson, 2006
Kirirom NP	Found 'strictly in close proximity to water'; 'patchily distributed'	Kong & Tan, 2002
Central Cardamoms PF	One record from Areng River	Daltry & Momberg, 2000
Samkos WS	Observation and hunted specimen; all observations in lowland evergreen forest	Daltry & Momberg, 2000; Coudrat, 2009; Coudrat et al., 2011
Southern Cardamoms PF	-	FFI field data per M. Maltby
Botum-Sakor NP	Encountered along rivers; reported as 'low density'	Royan, 2010
Preah Vihear PF	Widespread and often encountered in dense forest	Rainey et al., 2009; Moody (pers. obs.), WCS data
Kulen Promtep WS	Reportedly more abundant in dense forest than Long-tailed Macaque, which is itself common in riparian forest	WCS data, Rours Vann (pers. obs.)
Mekong Channels (Kratie to Stung Treng Towns)	Restricted to the more remote stretches, and encounter rates relatively low compared with some other sites.	Bezuijen et al., 2007
Virachey NP	Photo of a hunted animal which shows eye-rings	WWF data
Veun Sai forests	Camera trap photos	B. Rawson (pers. obs.)
Lomphat WS	-	Earnes, 2007
Mondulkiri PF	'very common' with groups of up to 50 individuals observed, in riparian corridors in deciduous dipterocarp and semi-evergreen forest (T. Gray pers. obs.)	Long et al., 2000, several authors (pers. obs.).
Phnom Prich WS	present in riparian and evergreen forest	Timmins & Ou, 2001
Seima PF	Most frequently encountered in riparian forest corridors in deciduous dipterocarp forest but also one record from evergreen forest on the margins of a large natural grassland	Pollard et al., 2007; Walston et al., 2001

\*PF = protected forest; WS = wildlife sanctuary; NP = national park

the century if threats are not controlled (Sodhi *et al.*, 2004; Schipper *et al.*, 2008). Although current threats to the species have been kept largely at bay within some key protected areas, this cannot be taken for granted in the future as this depends upon continued local capacity-building and effective management and law enforcement within these areas, and significant further declines outside protected areas seem inevitable. Given the status of *T. germaini* in other range countries, and the increasing threats within Cambodia, continued support for conservation initiatives within Cambodian protected areas is vital to the long-term survival of the species.

## CONCLUSION

From an examination of readily available published and grey literature records, we suggest that Cambodia retains the largest and healthiest populations of the Indochinese Silvered Langur. However, threats are also apparently high in Cambodia and we recommend action of two kinds.

The most important is to increase conservation attention for this species. This can perhaps best be achieved through increased efforts at the main protected areas in the species' range, most of which lie in Cambodia and many of which already have significant government and external support but all of which face severe pressures. In Cambodia, at least, there is no evidence that this species is especially targeted for trade and so broad measures to reduce habitat loss and bushmeat hunting at these sites should benefit this species as well as many others, as long as they are designed appropriately.

We also note that the design of optimal conservation measures for the Indochinese Silvered Langur should include reliable distributional, ecological, morphological, and genetic data throughout its range. In particular, conservation priorities may need to be revised if two species are confirmed to occur. Genetic analyses should be expanded to include multiple markers as well as autosomal and Y chromosome DNA in order to account for dispersal systems that may not be reflected by mitochondrial DNA alone (Tan *et al.*, 2008), and should attempt to correlate genetic differences with consistent morphological traits, taking account of variability within populations. Most importantly, an improved understanding of the ecology and habitat use of the Indochinese Silvered Langur and an assessment of the threats to its survival are critical to developing better management strategies.

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