Conservation status and needs of François's Langur in Vietnam

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Cover photo: Adult female Francois' Langur / Xu-Jianming

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Abbreviations

CEPF	Critical Ecosystem Partnership Fund
FFI	Fauna & Flora International
FPD	Forest Protection Department
GEF	Global Environment Facility
ha	hectare
IUCN	International Union for Conservation of Nature and Natural Resources
NP	National Park
NR	Nature Reserve
PARC Project	Creating Protecting Areas for Resource Conservation Project
PRCF	People, Resources and Conservation Foundation
VCF	Vietnam Conservation Fund
VND	Vietnamese Dong

SUMMARY

Background

The François' Langur *Trachypithecus francoisi* is a Colobine monkey with a range extending from north-east Vietnam into southern China. In Vietnam its historical range was purported to have extended across the northeastern provinces, from eastern parts of Yen Bai and Lao Cai provinces and south to Tuyen Quang, Thai Nguyen and Lang Son provinces. The species was recently classified as Endangered on the IUCN Red List of Threatened Species and also Endangered in the Vietnam Red Data Book.

François' Langurs belong to a group within the genus *Trachypithecus* sometimes referred to as the *francoisi* group, which appear to be specialists in living in moist tropical and sub-tropical forest on karst limestone mountains. The caves and crevices found on these mountains provide natural shelters, and along with the steep cliff faces, form a protection against predators. François Langur groups are usually polygynous, with one adult male, several adult females, and their immature offspring, and they maintain a territory on the limestone mountains with several caves and crevices used as sleeping sites. Thus, François Langurs are directly associated with the limestone landscapes, which extend through northern Vietnam and southern China. These landscapes have provided some level of protection as these mountains are not generally converted to other land uses, but on the other hand they risk being isolated as islands within a lowland landscape largely converted to agriculture.

The status of this species in Vietnam has never been well documented, but the species has long been considered to be on the edge of extinction in Vietnam. The last time a comprehensive status review was done in 2003, the population was reported to be fewer than 300 individuals in at least 10 fragmented sub-populations, and decreasing as a result of hunting and habitat destruction. In China, the population is estimated to be in the range of 1,600 to 1,900 individuals, across many sites in three provinces, with by far the largest sub-population known from Mayanghe Nature Reserve with about 650 individuals. This report compiles recent field survey reports to assess the current status of the François' Langur in Vietnam and identify priority measures for its survival.

Status of the François' Langur population in Vietnam

Between 2009 and 2011, despite approximately 27 weeks of surveys in northern Vietnam, most of which were focused on François' Langurs, only eight groups of François' Langurs, comprising 47 to 56 individuals, were observed in the wild by wildlife surveyors. Of the ten locations surveyed, the langurs were observed at only three locations: Lam Binh Watershed Protection Forest; Ba Be National Park; and, Than Xa-Phuong Hoang Nature Reserve. Local reports suggest there are more at each location; most significantly at Lam Binh with possibly ten to twelve groups and Than Xa-Phuong Hoang with possibly four or five groups. Compiling all recent realistic local reports and confirmed groups, optimistically there could be 25 to 31 groups of François' Langurs in Vietnam and very roughly 160 to 190 individuals. Of the observed and reported François' Langur groups, there are seven to nine sub-populations. The lack of precise population data means a population decline in Vietnam cannot be directly inferred, but recent evidence from all sites of hunting pressure and local population declines, indicates that the population is declining alarmingly.

Two sites currently stand out as priorities for François' Langur conservation in Vietnam. The largest known sub-population is in Lam Binh Watershed Protection Forest in Tuyen Quang province in karst forest on the south-east bank of the Gam River. At this location five groups have been confirmed

with 28 to 38 individuals and from local reports there may be ten to twelve groups with more than 60 individuals. Recent reports indicate that Than Xa-Phuong Hoang Nature Reserve in Thai Nguyen province may hold at least four scattered groups and the nature reserve staff has been proactive seeking support for conservation of this species.

Among the other potentially important sites, Ba Be National Park has the best-documented population with probably three groups, in a declining population despite high levels of investment in conservation and good tourism opportunities. Sinh Long forest, on the northern side of the Gam River from the Lam Binh watershed protection forest, is reported to maintain three or four groups. One group has been recently recorded at Bac Me Nature Reserve. Groups have also recently been reported by local people in Bat Dai Son Nature Reserve, Du Gia Nature Reserve, Na Hang Nature Reserve and in Trung Khanh district of Cao Bang province. François' Langurs may persist in Kim Hy Nature Reserve, but the level of hunting pressure is so high it is very unlikely they will remain much longer or are already locally extirpated. Given that the home range of François' Langurs is of the order of a few tens of hectares and the large extent of karst limestone mountains in northeast Vietnam, it is feasible that there are other locations with small sub-populations of the species.

From the international perspective, the population of this species in Vietnam is far less viable than in China, where support for its conservation is much more likely to be effective in preventing its extinction. Although the François' Langur ranks among the most threatened primates in Vietnam, based upon the small national population and its high level of population fragmentation, it still could not merit the attention that other highly threatened primates receive in Vietnam, where there are several species, which are endemic and globally Critically Endangered. However, instead much greater in-country attention is needed for this species that is on the brink of national extinction and it is recommended that the François' Langur be classified as **Critically Endangered CR A1cd, C2a** in the Red Data Book of Vietnam.

Threats

Direct reports of langurs being hunted recently are known from nearly every location where the langur was recorded and there was direct evidence of high hunting pressure reported at all sites where reliable information was obtained. At all sites, the species can be expected to have declined based upon known hunting pressure and depressed group sizes. Hunting is the main short-term threat to the survival of the François' Langur in Vietnam.

Other important threats include:

- Selective logging of valuable timber, which is a major issue at priority sites of the species.
- The small and fragmented population of the species in Vietnam, making it more vulnerable. Most of the sub-populations of François' Langurs may no longer be viable.
- Poor protected area management indirectly represents a threat to this species and while most known François' Langur populations are within protected areas, these designated areas have been completely ineffective in protecting their resident François' Langur populations. The most viable population of this species appears to be outside of a formal protected area.

Recommended conservation actions

1. **Focus on Lam Binh Watershed Protection Forest and Than Xa-Phuong Hoang Nature Reserve as the two priority sites** for conservation of this species in Vietnam and develop and implement detailed species conservation action plans. Such a plan has already been developed in Lam Binh, involving consultations with local communities and government stakeholders.
2. **Target awareness raising about the species at key stakeholders,** both within government agencies which are often unaware of the status of this species or their responsibilities to protect it, and among local communities.
3. **Conduct regular patrols and monitoring of langur habitat in priority areas**, preferably with strong involvement of members of local communities.
4. **Conduct further field surveys** to clarify the status and distribution of the species at priority sites and also to identify further locations where viable populations may persist.
5. **Train and build capacity** of the local Forest Protection Departments and protected areas covering most, if not all, sites collectively, focusing on the specific conservation needs of the François' Langur.
6. **Establish research projects** focused on addressing the conservation needs of the species and thus guiding conservation management. Research activities can also have the additional benefit of a benign human presence close to the langur habitat and another way to engage local community involvement in conservation.
7. **Develop eco-tourism (in the truest sense of this expression) close to François' Langur habitat,** where appropriate, drawing from the attraction of a charismatic species living in a dramatic landscape. If done well, this type of tourism would bring a benign presence of visitors to the landscape, which would deter hunters, generate a sense of pride and interest among local people and generate a source of revenue for both conservation and local communities.
8. **Captive breeding and translocation** may be important options in the long-term for genetic management of the small and fragmented national population of langurs.

This report provides much of the basis for a national conservation action for this species. The main benefit of such a plan would be greater stakeholder involvement in protection of this species through identification of clear actions and roles and responsibilities of different stakeholders. However, without strong interest and commitment from key stakeholders a national species conservation action plan would be worthless and a wasted effort. Given the lower conservation priority for the François' Langur in Vietnam compared to some other primates in Vietnam, national sources of funding would need to be identified, rather than relying solely upon international support. This would also demonstrate much needed stronger national support for conservation of this species, before it becomes the first primate species known to be extirpated from Vietnam.

1. INTRODUCTION

The François' Langur *Trachypithecus francoisi* (also known as François' Leaf-eating Monkey, François's Leaf Monkey, Tonkin Leaf Monkey or White Side-burned Black Langur) is a Colobine monkey with a range extending from north-east Vietnam into southern China up to Chongqing Municipality (Figure 1). In Vietnam its historical range was purported to have extended across the northeastern provinces, from eastern parts of Yen Bai and Lao Cai provinces and south to Tuyen Quang, Thai Nguyen and Lang Son provinces (Nadler *et al.*, 2003).

The species was recently classified as Endangered A2cd on the IUCN Red List of Threatened Species from its previous status as Vulnerable (Bleisch *et al.*, 2008) on the basis of what was believed to be at least a 50% decline population size in the past 36 years (i.e. three generations), primarily due to hunting and habitat loss. Its status in Vietnam has never been well understood or documented. Given the unusually high number of globally highly threatened primates in Vietnam and its scarcity, it has neither received as much attention as those more globally attractive primate species nor turned up very often in biodiversity surveys. In 2003, Nadler *et al.* conducted a status review of the François' Langur as a part of a broader conservation status review of leaf monkeys in Vietnam. Based on the few records at the time, that report roughly estimated that the population was fewer than 300 individuals in at least 10 fragmented sub-populations, and decreasing as a result of hunting and habitat destruction.

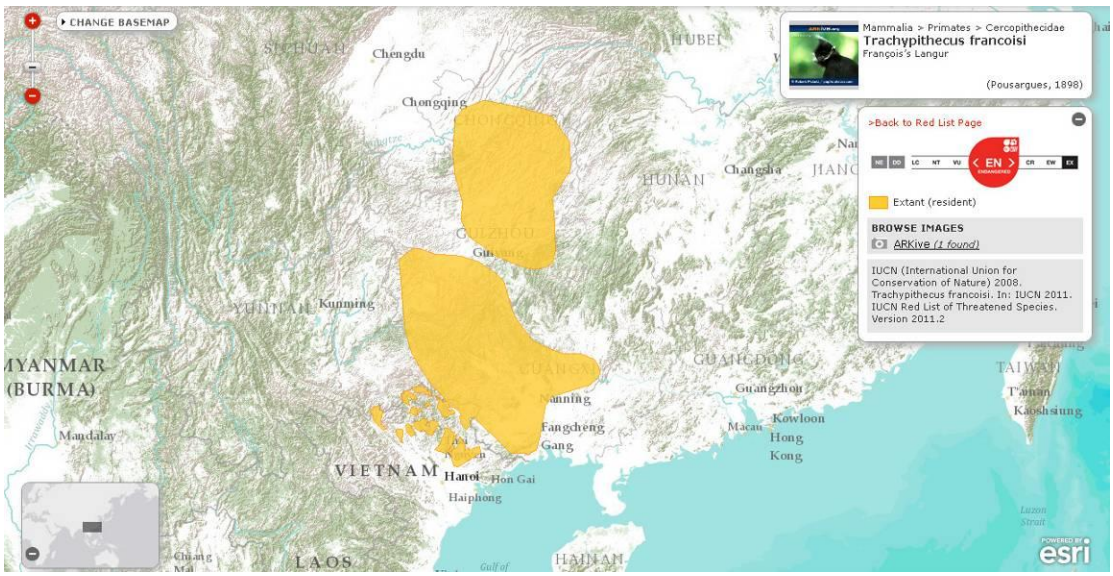

Figure 1: Global distribution of the François' Langur (Map source: www.iucnredlist.org)

In Vietnam the François' Langur is classified as Endangered A1c,d C2a in the Vietnam Red Data Book (Ministry of Science and Technology and Vietnamese Academy of Science and Technology. 2007) and listed under group IB of Decree 32/2006 which means it is *"strictly banned from exploitation and use for commercial purposes, including plants and animals of scientific or environmental value or high economic value, with very small populations in nature or in high danger of extinction".* Legally therefore, it has the highest level of legal protection afforded to any species in Vietnam.

Apart from a few surveys between 2000 and 2004 in the Sinh Long area of Tuyen Quang province, the species received little attention, until 2009, since when surveys and conservation activities have been carried out, particularly by the People Resources and Conservation Foundation (PRCF) and Fauna & Flora International (FFI) with support from the Critical Ecosystem Partnership Fund (CEPF), among others.

This report compiles recent reports on the François' Langur to assess its status and identify priority measures for its survival in Vietnam.

1.1. Methods in developing this status review and conservation strategy

This report draws mainly from surveys conducted by the PRCF, FFI and students of the Forestry University of Vietnam since 2009 at the following locations in northern Vietnam known or suspected to have populations of François Langur:

- Du Gia Nature Reserve, Ha Giang province, 6 weeks, March and April 2009
- Than Xa – Phuong Hoang Nature Reserve, Thai Nguyen province, 4 weeks, March-April 2009
- Kim Hy Nature, Bac Kan province, Cao Vit gibbon survey, 12 days, June 2009
- Ba Be National Park, Bac Kan province, 21 days, February and November 2009
- Xuan Lac Species and Habitat Conservation Area, Bac Kan province, 14 days, May 2010
- Na Hang Nature Reserve (Tat Ke sector), Tuyen Quang province, 15 days, September 2010
- Na Hang Nature Reserve (Ban Bung Sector), Tuyen Quang province, 18 days, October 2010
- Trung Khanh district, Cao Bang province, 14 days, December 2010 and March 2011
- Sinh Long and Lam Binh Forest Areas, Tuyen Quang province, 26 days, December 2010 and May 2011
- Than Xa – Phuong Hoang Nature Reserve, gibbon survey, 4 days, May 2011

Grey and published literature has been reviewed on François' Langur records in Vietnam since the turn of the millennium, drawing from personal contacts with institutions and researchers involved in the field. The Forest Protection Departments of Ha Giang, Cao Bang, Bac Kan, Tuyen Quang, Thai Nguyen and Lang Son provinces were all contacted for any anecdotal or printed reports. Only in Lang Son does neither PRCF nor FFI have any close involvement. Documentation from the Vietnam Conservation Fund (VCF) was consulted including conservation needs assessments and proposals on the website as well biodiversity survey reports from sites, where they could be obtained. The chapter on the François' Langur in the report on the conservation status of leaf monkeys in Vietnam (Nadler *et al*. 2003) was used for comparison with data from a decade ago.

1.2. Taxonomy and description

Trachypithecus francoisi was first described in 1898 by Poursargues in southern Guangxi province, China. Its historical distribution extended throughout much of the karst landscapes of southern China and northern Vietnam. Within the genus *Trachypithecus*, it belongs to a group of closely-related limestone obligate species, sometimes referred to as the *francoisi* group (Nadler *et al.*, 2003) or limestone langurs, most of which are found in Vietnam, with arguably only two taxa found outside Vietnam. The taxonomy is not entirely clear within the group, however despite having the largest range of any other taxon within the group, *Trachypithecus francoisi* is widely recognised as a species (Brandon-Jones *et al.*, 2004) and no sub-populations considered to be genetically distinct on the subspecies level have been identified, although it is suggested that they should be recognised as distinct conservation units (C. Roos, pers. comms.). This species is most closely related to the Cat Ba Langur *Trachypithecus poliocephalu*s, which is only found on Cat Ba Island off the coast of northern Vietnam and the White-headed Langur *Trachypithecus leucocephalus poliocephalu*s, which is only found in a restricted area of Guangxi province, China.

The taxonomy of François' Langur following Groves (2001) is:

Kingdom	*Animalia*
Phylum	*Chordata*
Order	*Primates*
Family	*Cercopithecidae*
Subfamily	*Colobinae*
Genus	*Trachypithecus*
Species	*Trachypithecus francoisi* (Poursargues, 1898)

All the *francoisi* group species are slender monkeys with a long tail that exceeds body length. Their bodies are covered in glossy predominantly black fur with patches of light color, usually white, on parts of the body, mostly around the head, which is topped with a tall pointed crest (Groves, 2001). For the François' Langur, the only area that is not black is a narrow strand of slightly elongated white hair running from the corner of the mouth along the side of the face to the upper edge of the ear pinna. A de-pigmented pubic patch with white to yellowish hairs is designated as a female diagnostic trait (Nadler *et al.,* 2003). As with all *Trachypithecus* infants are born a bright golden color (Figure 2).

Figure 2: François' Langur with infant (Photo by Xu Jianming)

1.3. Ecological characteristics

François' Langurs, along with other species within the *francoisi* group, appear to be specialists in living in moist tropical and sub-tropical forest on karst limestone mountains at elevations up to 1,500m. Karst limestone mountains are characterized by their dramatic forms with steep sides, riddled with crevices and caves, resulting from the chemical erosion of the carbonate rock by water. Each taxon in the *francoisi* group is endemic to a relatively restricted area and their occurrence is strictly associated with limestone mountains and forest.

François Langur groups are usually polygynous, with one adult male, several adult females, and their immature offspring. In relatively large populations in China such as in Mayanghe Nature Reserve,

Guizhou province and Nonggang Nature Reserve, Guangxi province group sizes of up to 13 individuals have been observed (Shuangling Wang *et al.*, 2011; Qihai Zhou *et al.*, 2009a). There the pressure on the species may be lower. In Guangxi province average groups sizes of 5.2. to 7.7 were observed in Fusui Nature Reserve (Gang Hu *et al.*, 2004). By comparison close by in the same nature reserve, for the White-headed Langur group sizes of up to 16 individuals have been observed (Zhaoyuan Li *et al.*, 2003; Zhaoyuan Li & Rogers, 2004; Huang Chengming & Li Youbang, 2005). Natural group sizes remain unclear, as there has probably been hunting pressure on this species throughout its range. These figures, however, can provide comparative data for survey results in Vietnam. According to Vietnamese mammalogists, the group size of Francois' Langur was 20–30 individuals per group (Le Hien Hao, 1973). However, surveys in the 1990s revealed group sizes of only five to fifteen individuals per group (Pham Nhat, 2002).

Males and females reach sexual maturity in five and four years, respectively. Litter size is usually one, and birth intervals for this species are recorded at about 20 months. Solitary males are common, although they sometimes form loose associations (Noel Rowe, 1996). Young babies of Francois' Langur are seen from March to July indicating this time as the breeding season in Vietnam (Pham Nhat, 2002).

François' langurs are diurnal and select ledges of cliffs and caves as sleeping sites, mainly as a means of protection against predators, particularly selecting locations with an open view of the surrounding area for rapid identification of threats (Qihai Zhou *et al.*, 2009a; Huang Chengming *et al.* 2009; Shuangling Wang *et al.*, 2011). Non-human predators, such as medium to large cats and large raptors, are now very few within the range to François' Langurs. They regularly change sleeping sites within their range, perhaps as another part of their defensive strategy. In Mayanghe Nature Reserve it was observed that six to ten sleeping sites were used per group with six nights being the longest stay at any one location and a mode average of two nights (Shuangling Wang *et al*., 2011). At Nonggang Nature Reserve a maximum of four nights spent at any one sleeping site was observed (Zhou Qihai *et al.*, 2009a). Another factor determining selection of sleeping sites has been identified as close proximity to foraging locations, typically the first or last feeding sites of the day, (Zhou Qihai *et al.* 2009a, Shuangling Wang *et al.* 2011) and where food resources are more limited and typically in disturbed habitat, proximity to feeding areas appears to take highest priority (Shuangling Wang *et al*., 2011).

François' Langurs are territorial and range within an area with several sleeping sites. Observations in Mayanghe Nature Reserve estimate home ranges between 56 ha and 119 ha (Shuangling Wang *et al*., 2011) and at Nonggang Nature Reserve of 69.3 ha (Zhou Qihai *et al*., 2009). In Fusui Nature Reserve, the home range of one group was observed to be 19 ha, however, this may have been due to the small group size, initially four individuals, and expanding to seven during the study period (Qihai Zhou *et al*., 2004). The monthly mean daily path lengths was observed to vary though from 341 to 577 m with longer path lengths observed in the dry season, perhaps due to a scarcity of food resources (Qihai Zhou *et al*., 2004). By comparison the home range of the White-headed Langur in Fusui Nature Reserve was observed to vary between 28 and 48 ha (Zhaoyuan Li & Rogers, 2004).

François' Langurs primarily feed on leaves with the remainder of their diet consisting of shoots, fruits, flowers, and bark, Like related Colobines they have specially adapted stomachs and metabolism to digest leaves. Observed preference for leaves over other plant parts varies between about 53% (Qihai Zhou *et al*., 2006) and 90% (Huang C. *et al*., 2008) of total diet with a preference for young leaves. François' Langurs feed selectively on preferred species and not just on the most abundant plant species. In Vietnam, favorite feeding species of François' Langurs have been recorded from the following families: Moraceae, Ephorbiaceae, Arecaceae of which they consume a large amount of fruits and leaves (Pham Nhat, 2002). The climate throughout the range of the

François' Langur is strongly seasonal, being mainly a sub-tropical monsoon climate, and thus diet also varies according to the season (Qihai Zhou *et al*., 2009b).

1.4. Status and distribution in China

The range of the François' Langur in China is much more extensive than in Vietnam, from Guangxi province on the border of Vietnam, through Guizhou province and up to southern areas of Chongqing Municipality. The wild population of François' Langurs in China is also considerably larger than in Vietnam, estimated to be from 1,600 to 1,900 individuals (Fauna & Flora International, 2010), with 1,000 to 1,200 individuals reported from Guizhou province, where more than 650 langurs are known from Mayanghe Nature Reserve (Shuangling Wang *et al.*, 2011). The wild population of François' Langurs in Guangxi province, neighboring Vietnam, is highly fragmented with an estimated 350 to 400 individuals spread across 17 locations, with the largest population of about 80 individuals known from Nonggang Nature Reserve (Fauna & Flora International, 2010). Youbang Li *et al.* (2007) reported a dramatic decline of about 90% of the François' Langur population in Guangxi province, in the decade up to 2002, largely due to hunting. Recent estimates show that that this rate of decline in Guangxi may have stemmed to some extent (Fauna & Flora International, 2010). Chongqing Municipality, at the north of this langur's range, has fewer individuals still with the largest sub-population of about 190 reported from Jinfoshan (Fauna & Flora International, 2010). There are still important information gaps remaining from Francois' Langur records in China, with some of the data either requiring further verification or being updated.

2. Records and status of François' Langurs in Vietnam

2.1. The population of François' Langurs in Vietnam

Between 2009 and 2011, despite approximately 27 weeks of surveys in northern Vietnam, most of which were focused on François' Langurs, only eight groups of François' Langurs, comprising 47 to 56 individuals, were observed in the wild by wildlife surveyors. Of the ten locations surveyed, the langurs were observed at only three locations: Lam Binh Watershed Protection Forest: five groups; Ba Be National Park: two groups; and, Than Xa-Phuong Hoang Nature Reserve: two groups. Local reports suggest there are more at each location; most significantly at Lam Binh with possibly ten to twelve groups and Than Xa-Phuong Hoang with possibly four or five groups. Compiling all recent realistic local reports and confirmed groups, optimistically there could be 25 to 31 groups of François' Langurs in Vietnam (not including reports of solo individuals) and very roughly 160 to 190 individuals. In 2003, Nadler *et al.* reported less than 300, drawing mainly from interview data and gave a range of 97 to 294 individuals. Detailed descriptions of records for each location, where François' Langurs have been surveyed are provided in Annex 1. The lack of precise population data means a population decline in Vietnam cannot be directly inferred, but recent evidence from all sites of hunting pressure and local population declines, indicates that the population is declining alarmingly.

Of the observed and reported François' Langur groups, there are seven to nine sub-populations with perhaps five to twelve groups at Lam Binh and much fewer at other locations. The Vietnamese population of François' Langurs therefore appears to be more highly threatened and smaller than the populations in any of the three provinces where they persist in China.

The sizes of the eight groups observed ranged from two (i.e. not including solitary animals) to eight individuals. Although local people have reported groups of approximately or more than 20 individuals at Na Hang Nature Reserve, Than Xa-Phuong Hoang Nature Reserve and Lam Binh Watershed Protection Forest. If these larger group sizes are taken to be outliers, then taking other

observed and reported groups sizes into account, an average group size is calculated to be 5.4 individuals (n=13), and including these large groups, brings the average group size to 8.1. Compared to data from China (FFI, 2010), average group sizes range from 6.6 in Guangxi province to 8.7 in Guizhou province.

2.2. Important sites for François' Langurs

Table 1 documents all known François' Langur records in Vietnam from the turn of the millennium and where indicated Annex 1 gives detailed descriptions of those records. The sites have been ordered as follows:

1. Priority sites known to have important and potentially viable populations in Vietnam;
2. Potentially important sites, with either a low number of groups or where too little is currently known; and
3. Sites where the langur has probably been extirpated or on the point of being extirpated, given a mixture of the following reported conditions; low numbers, age of the reports and high threats.

Table 1. François' Langur records in Vietnam

Location	Records	Reference
1. Priority sites		
Lam Binh Watershed Protection Forest, Tuyen Quang province	Five groups of 28-38 individuals observed in 2010/11 and reports of up to 22 in one group. Local reports of ten to twelve groups	See annex
Than Xa-Phuong Hoang Nature Reserve, Thai Nguyen province	Two groups observed of five and seven individuals and at least four groups reported between 2010 and 2012.	See annex
2. Potential sites		
Bat Dai Son Nature Reserve, Ha Giang province	Interviews in 2011 suggested the presence of two groups of five to seven individuals each.	See annex
Du Gia Nature Reserve, Ha Giang province	Interviews in 2001 suggested the presence of four to six groups. In 2010, interviews suggested they are still there, but no observations.	See annex
Bac Me Nature Reserve, Ha Giang province	One group observed in 2012	See annex
Sinh Long Forest, Tuyen Quang province	Three or four groups reported, including one group of seven langurs reported in August 2011, but no observations.	See annex
Na Hang Nature Reserve (Tat Ke sector), Tuyen Quang province	Interviews in 2010 reported one group of 17-20 individuals and another solo individual.	See annex
Trung Khanh district, Cao Bang province	One or two groups reported, close to Gulongshan Nature Reserve in China, so possibly part of a large population	See annex
Ba Be National Park, Bac Kan province	Three to four in two or three sub-populations. Two groups observed (2009).	See annex
Kim Hy Nature Reserve, Bac Kan province	One vocalization record from 2009, however, evidence of severe pressures throughout the nature reserve.	See annex

Location	Records	Reference
3. Probably extirpated		
Cham Chu Nature Reserve, Tuyen Quang province	Mixed reports from interviews, with no confirmed records.	See annex
Na Hang Nature Reserve (Ban Bung sector), Tuyen Quang province	No records during recent surveys	See annex
Hoa An district, Cao Bang province	Possibly two animals from local reports in Lung Lua near Ban Chang, Truong Luong commune, mistakenly said to be a gibbon with long tail	Trinh Dinh Hoang, 2001
Hoa An district, Cao Bang province	Local report in Duc Xuan and Ngu Lao communes but probably extirpated	Trinh Dinh Hoang, 2001
Tra Linh district, Cao Bang province	Specimen found in Nieng village, Quang Han commune, but locally reported to be extirpated.	Trinh Dinh Hoang, 2001
Phieng Phat village, Quang Lam commune, Bao Lam district, Cao Bang	Specimen and local report of individuals remaining, close to Du Gia Nature Reserve.	Le Khac Quyet & La Quang Trung, 2001
Ha Lang district, Cao Bang	Specimens from Ban Tao, Kim Loan and Ban Man village, Quang Long commune. About 30 individuals reported, but already extinct in several communes of the district.	La Quang Trung, 2001
South Xuan Lac Species and Habitat Conservation Area, Bac Kan	No records during recent surveys.	See annex
Huu Lien Nature Reserve	Reported as probably extirpated by 2000, however, with local reports in 2002.	See annex

Two sites currently stand out as priorities for François' Langur conservation in Vietnam. The largest known sub-population by far is in Lam Binh district, Tuyen Quang province in karst forest designated as watershed protection forest on the southeast bank of the Gam River, upstream of the Gam River Dam. At this location five groups have been confirmed with 28 to 38 individuals and from local reports there may be ten to twelve groups with more than 60 individuals. PRCF has initiated conservation interventions in collaboration with the Tuyen Quang province and Lam Binh district Forest Protection Departments at this location. Recent reports indicate that Than Xa-Phuong Hoang Nature Reserve in Thai Nguyen province may hold at least four scattered groups. Nature reserve staff has been proactive in approaching FFI for support to establish a program for conservation of this species.

Among the other potentially important sites, Ba Be National Park has the best documented population with probably three groups. However despite high levels of investment in conservation and good tourism opportunities, groups that could be protected have recently been diminished through hunting. Sinh Long Forest, on the northern side of the Gam River from the Lam Binh Watershed Protection Forest, has less karst than Lam Binh and there continue to be local reports of three or four groups, however, there has still not been confirmation from qualified wildlife surveyors. PRCF maintains a presence at this site, through its work in Lam Binh district. One group has been recently recorded at Bac Me Nature Reserve. Groups have also recently been reported by local people in Bat Dai Son Nature Reserve, Du Gia Nature Reserve, the Tat Ke Sector of Na Hang Nature Reserve and in Trung Khanh district of Cao Bang province. The reports in Trung Khanh district may be part of a larger François' Langur population in Gulongshan Nature Reserve in China. Groups may persist in Kim Hy Nature Reserve, but the level of hunting pressure is so high it is very unlikely they will remain much longer or are already locally extirpated.

Given that the home range of François' Langurs is of the order of a few tens of hectares and the large extent of karst limestone mountains in northeast Vietnam, it is feasible that there are other locations with small sub-populations of the species.

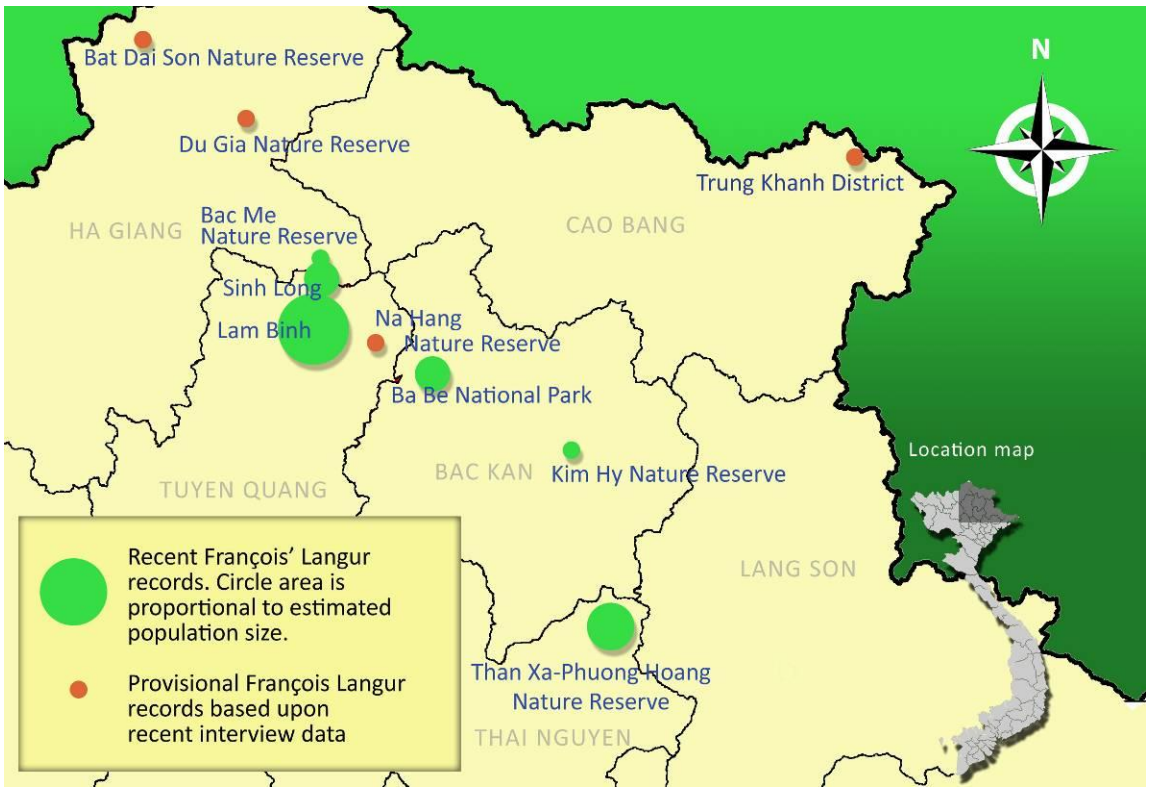

Figure 3. Map of François' Langur Records in Vietnam

2.3. Population fragmentation

An important issue for the François' Langur in Vietnam is population fragmentation, which was already well recognized in Nadler *et al.* 2003. The population in Vietnam is probably spread among eight to ten sub-populations. Table 2 shows approximate distances between sub-populations and nearly all distances are of the order of several tens of kilometers, far beyond expected dispersal distances for François' Langurs, especially given the great fragmentation of forest areas throughout north-east Vietnam.

Table 2. Distances between François' Langur sub-populations (km)

	Lam Binh	Sinh Long	Na Hang	Ba Be NP	Du Gia NR	TX-PH NR
Sinh Long	3					
Na Hang NR (Tat Ke Sector)	12	12				
Ba Be NP	30	20	12			
Du Gia NR	45	40	50	60		
Than Xa-Phuong Hoang NR	100	100	90	70	140	
Trung Khanh	140	130	130	115	150	130

NOTE: All distances are rounded estimates using Google Earth and approximating between the closest known groups.

The neighboring forests of Lam Binh and Sinh Long are now considered to have separate sub-populations since these areas were separated by the reservoir of the Gam River Dam in 2004. The sub-population at Lam Binh is considered to be one, even though there is a road bisecting the sub-population between Khuon Ha and Thuong Lam communes. It is assumed that the distances and obstacles are not too difficult to overcome for there to be the possibility of gene-flow between all groups, however this does require more analysis.

Ba Be National Park is recorded as having a group in the north of the park and two in the south, a linear distance of more than eight km and intersected with small rivers, rice paddy and small roads, so arguably there are two sub-populations there. At Than Xa-Phuong Hoang Nature Reserve, the distance between the furthest reported populations from east to west is about 20km, however the population at this location is still not so well known and there may be sufficient groups in between to allow gene flow.

2.4. Comparison with other endangered primates in northern Vietnam

Northern Vietnam is a global hotspot for highly threatened primates, with six species listed as Critically Endangered on the IUCN Red List, of which four are endemic. The François' Langur therefore vies for conservation attention with several globally and nationally higher priority primate species. The status of the François' Langur still remains one of the most poorly known of the highly threatened primates in northern Vietnam. Only for the Grey Langur (*Trachypithecus phayrei*) are records less clear. Nevertheless, given current knowledge how does the population in Vietnam compare to that of these other primate species? Table 3 below shows the known status of the other highly threatened primates in northern Vietnam compared with the François' Langur. With an estimated 160 to 190 Francois's Langurs, there are likely still more individuals than the Cat Ba Langur (*Trachypithecus poliocephalus*) and Western Black Crested Gibbon (*Nomascus concolor*), and its national population is similar to the endemic Tonkin Snub-nosed Monkey (*Rhinophithecus avunculus*) and endemic Delacour's Langur (*Trachypithecus delacouri*). However, like several species, the François' Langur population is fragmented and the size of the largest sub-population is one of the smallest for any of these species, and compares to the largest sub-populations of the Cat Ba Langur and Western Black Crested Gibbon in Vietnam.

Most of these highly threatened primates have been receiving support from the international conservation community. After a decade or more of conservation attention, this has resulted in a documented halt in decline and potential increase of the primate population at several sites, notably for the Cat Ba Langur, Cao Vit Gibbon, Delacour's Langur at Van Long Nature Reserve and Tonkin Snub-nosed Monkey at Khau Ca Species and Habitat Conservation Area. Long-term, site-based and species-focused conservation programs have been shown to be essential for the recovery of these species. To date, the François' Langur has not received this level of attention, although PRCF has recently initiated just such a program at Lam Binh.

The range of the François' Langur in Vietnam overlaps considerably with the Tonkin Snub-nosed Monkey. There are at least six sites where the two species are known to have co-existed in the recent past: Du Gia Nature Reserve, Ba Be National Park, Cham Chu Nature Reserve, Na Hang Nature Reserve, Than Xa-Phuong Hoang Nature Reserve and Kim Hy Nature Reserve. Of these sites, only in Na Hang Nature Reserve and Than Xa-Phuong Hoang Nature Reserves is there a chance that both species are still present. The historical range of the Cao Vit Gibbon also overlapped considerably with the François' Langur (Rawson *et al.*, 2011), however this species appears to have been extirpated from all locations other than its last remaining stronghold.

Table 3. Status of the most threatened primates of northern Vietnam (ordered by number of individuals)

Species	IUCN Red List	No. of locations	Population	Current site-based species conservation efforts
Cat Ba Langur [1] ***T. poliocephalus***	CR	1	60 to 70 individuals, but some isolated groups	More than 10 years continuous support
Western Black Crested Gibbon[2] *N. concolor*	CR	1 and another non-viable	64 to 70 individuals in 22 to 24 groups	More than 10years continuous support at one site
Cao Vit gibbon ***N. nasutus***[3]	CR	1	110 individuals in 19 groups	Continuous support since 2003
François' Langur *T. francoisi*	EN	6 to 8	<200	Since 2010 in Lam Binh district
Tonkin Snub-nosed Monkey ***R. avunculus***[4]	CR	5 or 6	< 200 individuals; more than 100 at Khau Ca	Continuous support in Khau Ca since 2002
Delacours' Langur[1] ***T. delacouri***	CR	1 and others scattered	< 200 individuals; 100 to 120 in Van Long NR	More than 10 years continuous support
Grey Langur[1] *T. phayrei*	EN	unknown	unknown	At one location under the umbrella of the western black crested gibbon.
Northern White-cheeked Crested Gibbon[2] *N. leucogenys*	CR	9	About 190 groups	None

References: [1] Nadler 2010, [2]Rawson *et al.,* 2011, [3]Insua-Cao *et al.,* 2010, [4] Insua-Cao pers. comm.
Notes: **Bold** indicates that the species is endemic to Vietnam
IUCN Red List categories (www.iucnredlist.org): CR: Critically Endangered; EN: Endangered

It has already been noted above that a much larger and more viable population of François' Langur survives in China, This reflects a similar status to the Western Black Crested Gibbon, for which there are about 1,100 to 1,300 individuals in China (Rawson *et al.*, 2011). Nationally these are two of the most threatened species, yet from international perspective conservation efforts are better focused in China for survival of the species.

Vietnam already has an alarming number of primate populations, which should be global conservation priorities, including the four endemics of northern Vietnam, and range-restricted species further south such as the Critically Endangered and endemic Grey-shanked Douc. Therefore, where resources are limited globally the François' Langur population in Vietnam should not receive the same level of international attention as those higher priority species. However, instead much greater in-country attention is needed for this species that is on the brink of national extinction.

From a national perspective, the François' Langur should be classified as **Critically Endangered CR A1cd, C2a** in the Red Data Book of Vietnam rather than Endangered based upon an estimated decline of at least 80% in the last three generations, i.e. from a population of at least 1,000 45 years ago, a severely fragmented population of fewer than 250 mature individuals, and fewer than 50 mature individuals in any one sub-population.

3. CONSERVATION THREATS

3.1. Hunting

Direct reports of langurs being hunting recently are known from nearly every location where the langur was recorded and there was direct evidence of high hunting pressure reported at all sites where reliable information was obtained. This report documents 36 individual langurs being hunted since 1999, i.e. about 15% of the current estimated population, and 18 individuals since 2009, and this is likely to be just a fraction of the off-take. Most alarming is the eight and four individuals being hunted in Lam Binh in 2010 and 2012 respectively and records of 25 individuals being killed there since 2001. That such a large population remains there despite this onslaught is testimony to the potential of this site nationally for conservation of this species. There were no reports of an entire group of François' Langurs being blocked in a cave and the whole group being captured, as has been reported in China (Youbang Li *et al.*, 2007), however that is not to say it is hasn't happened. At all sites with significant information, the species can be expected to have declined based upon known hunting pressure and depressed group sizes. This decline is nearly always corroborated by the perceptions of local people during interview surveys.

There have been a few reports of Francois' Langurs being traded. In July 2012, in Lam Binh district, four hunters were caught trying to sell fresh carcasses for 2 million VND each (about 100 USD) and dried bones for 5 million VND per kg (about 250 USD) (Mike Dine pers. comm.). In 2010, at Ba Be National Park, 1,250,000 VND per kg (about 75 USD) was paid for each of three langurs hunted (Nurick & Dine, 2012). A decade ago, wildlife trade surveys around Na Hang, Ba Be and Cho Don districts (Tuyen Quang province, and Bac Kan provinces), at the heart of the range of the Francois' Langur, indicated widespread wildlife hunting in general (Nguyen Xuan Dang *et al.*, 2003, Nguyen Quang Truong *et al.,* 2003) and poor, although not insignificant, links to broader wildlife trade networks. François' Langurs were not reported directly in the wildlife trade, although a price of 300,000 to 400,000 VND per kg (about 25 to 30 USD at the time) was reported. A demand for monkeys was reported to process them into glue and balm, and while François' Langurs are not explicitly linked to this demand in the reports it may be insinuated. All primates are targeted for this practice in Quang Binh province (Roberton, 2004).

In the Lam Binh Watershed Protection Forest, local villagers go to great efforts to reach langur sleeping sites for the collection of "monkey blood", a bizarre mixture of langur bodily waste (Figure 4). Although this collection would not harm the langurs themselves collection would disturb any animals present. In Guangxi, François' Langurs were deliberately targeted to use the bones to make *Wu-yuan* wine (Youbang Li *et al.* 2007). Due to the type of habitat François' Langurs live in, which takes considerable effort to access, hunting cannot be entirely opportunistic. The drivers leading people to hunt them need to be investigated. For example, what exactly triggered local people of a village in Ba Ba National Park to one day decide to hunt three individuals of a local group which had been known to be there for many years?

Figure 4. Bamboo ladders used to access langur caves in Lam Binh (Photo: Thach Mai Hoang)

3.2. Habitat degradation and availability of habitat

Limestone mountains have limited uses, with extremely steep slopes, poor soils and very porous rock leading to dry conditions, there are few options to convert them to other land uses. Instead the degradation of the forest undergoes a series of stages from selective logging of precious timbers, cutting trees for less valuable wood such as for fuel wood, and once the vegetation is low enough, finally to the land being used only for livestock grazing on the less steep lower slopes. The limestone forests of northern Vietnam are often the last remaining patches of natural forest within the landscape, because they are less readily exploited. This works in favor of protection of the François' Langur. Nevertheless at priority sites for the species, selective logging is a major issue and especially noted for Than Xa-Phuong Hoang Nature Reserve and the Lam Binh forest (Figure 5).

Figure 5. Evidence of logging in Lam Binh. Left: Cut timber ready for transportation. Right: Winch for dragging logs through the forest. (Photos: Thach Mai Hoang)

3.3. Small and fragmented populated size

The population of François' Langurs in Vietnam is small and highly fragmented. Small sub-populations are at risk of immediate local extirpation as a result of natural and human causes such as adverse weather conditions, fires, disease outbreaks, skewed sex ratios leading to loss of

reproductive potential, inbreeding depression and a sudden pulse of hunting pressure. Adverse climate change impacts would be exacerbated by the small size and fragmentation of the sub-populations. Some, if not most, of the sub-populations of François' Langurs may no longer be viable. In this light, understanding the potential connectivity between the groups at Than Xa-Phuong Nature Reserve and within the Lam Binh Forest is crucial for survival of the species in Vietnam.

3.4. Poor protected area management

Most known or suspected François' Langur populations are within protected areas. Remarkably (or not) designation of a protected area appears to have little impact on protecting François' Langur populations therein. Ba Be National Park has lost langurs in a prominent location close to a ranger post and a village hosting tourists, despite years of conservation investment and capacity building. To say this loss of individuals of a flagship species was careless would surely sound flippant. Kim Hy Nature Reserve has undergone an onslaught of illegal logging and gold mining within its strict protection zone and if any langurs remain, they would surely be among the most innovative or just the most lucky of individuals. The protected areas where Francois' Langurs reside are clearly entirely ineffective in meeting their conservation objectives.

The area with highest concentration of François' Langurs in Vietnam is in the watershed protection forest at Lam Binh, i.e. not a formally designated protected area for the purpose of biodiversity conservation. A proposal to gazette the area as a species and habitat conservation area was submitted in 2004, however momentum was lost to formally designate this area as part of Vietnam's protected area network.

4. Recommended Conservation actions

As a species, the François' Langur and its habitat have some advantages in that they are closely associated with limestone outcrops and don't require protection of vast swathes of lowland forest, which is either attractive for the weight of timber it offers or the use of its land for other purposes. Further, the marginal use of forest on limestone means that protection of François' Langur habitats need not impinge too heavily on local livelihoods and conservation efforts can be concentrated on areas around sleeping sites. As a result *in-situ* protection of François' Langurs may be relatively cheap, compared to other primate species. However, the benefits of living on limestone are counterbalanced by how limestone mountains are often easily isolated and access to adjacent forested areas is cut off.

4.1. Focus on priority sites

Currently the Lam Binh Watershed Protection Forest and Than Xa-Phuong Hoang Nature Reserve are the two priority sites for conservation of this species in Vietnam. It is beyond the scope of this report to proscribe detailed recommendations for these two sites. A Species Conservation Action Plan has been developed for the Lam Binh Watershed Protection Forest by FFI and PRCF (FFI, 2012). This involved consultations with local communities and government stakeholders, drawing from results of langur surveys, analysis of threats and community derived solutions for actions to balance both conservation and livelihoods. The plan is pending approved by Tuyen Quang province at the time of writing. A similar species-focused conservation action plan should be developed for the population in Than Xa-Phuong Hoang Nature Reserve. Invariably, the site-based primate conservation projects implemented elsewhere in Vietnam, which appear to be delivering successful results, have involved long-term commitment and close involvement from outside organizations with patrolling and monitoring as key components.

It would usually be argued that gazettement of Lam Binh and Sinh Long as a protected area would be critical for conservation of this species, however, the current state of protected area management in Vietnam falls well below par for fulfilling its defined roles. Indeed, the protected area system in its current form provides constraints on having real negotiations with local communities to involve them as meaningful partners in conservation and often encourages investment in deleterious activities that bare no relationship to conservation. While protected area gazettement for the area would be preferable, establishing conditions on the ground, especially among local stakeholders, for effective conservation to begin with is what is really needed, and should be achieved prior to protected area gazettement.

4.2. Awareness raising

Awareness raising on the status and protection of the François' Langur could have a significant impact, because there may be low economic demand for it, it is not reported as being a pest, its habitat has limited economic value and it is clearly recognizable and charismatic. Yet awareness raising needs to be targeted at the most significant stakeholders who have the greatest potential to impact the species in the future.

Local government agencies with some responsibility for wildlife protection are often unaware of the status and threats to the François' Langur in their area of jurisdiction, or what their responsibilities are for its protection. Key agencies to be targeted are the Forest Protection Department, protected areas, the Provincial and district Offices of Natural Resources and Environment and the environment police[1]. The list need not stop there; other government agencies may include tourism departments, agriculture and rural development, local government propaganda offices and relevant mass organizations.

Local communities need to be brought on side to support conservation of their local François' Langur groups. Awareness raising should raise pride in the presence of the local groups, emphasize the loss if they were to be locally extirpated (especially if they offer tourism potential) and clearly present the national protected status of the species and sanctions for hunting them. Overall the primary aim of awareness raising should be to stop local people from hunting François' Langurs. In Lam Binh, the efforts which local people go to for collection of "monkey blood" makes the situation more complex and a deeper analysis of local perceptions and attitudes to the François' Langur there is required.

A conservation focused awareness raising program should be locally appropriate (e.g. tailored to local customs and understandings in local languages). Given the critical status of the François' Langur at all sites, any awareness raising should be targeted at forest users, particularly hunters, and raise general support for conservation of the species to create peer pressure in the local community so hunting this species is deemed unacceptable. The Youth Union and schools would be suitable agencies to engage to raise interest in long-term support for conservation of the François' Langur. Further, it is important to target the local commune authorities that with greater levels of awareness are in a position to offer greater levels of political support for conservation actions with communities.

[1] A recently established arm of the provincial police force tasked to support the various environmental agencies within each province

4.3. Patrolling and monitoring

Regular patrols and monitoring of langur habitat is an essential part of a species-focused primate conservation program and appears to have been one of the main factors behind the apparent success of other primate conservation projects in northern Vietnam. Patrolling should be conducted for enforcement purposes, monitoring threats and also to monitor the François' Langur groups themselves. Whether these two aspects, enforcement and biological monitoring, can be combined is arguable, however, given the critical status of the species at all locations, enforcement should be prioritized where resources are limited.

Involvement of local communities in patrolling is recommended and has been quite effective at primate conservation sites where both FFI and PRCF have been operating in northern Vietnam. This approach enables use of local knowledge (both of the landscape and society) and promotes local ownership of conservation of the species. This should be balanced with involvement of the appropriate local government agencies (usually the Forest Protection Department and protected area) in conducting and managing patrolling activities. These government agencies should also feel a sense of local ownership and have the jurisdiction to enforce law and promulgate and implement local regulations.

Enforcement patrols should target critical habitat areas for the species e.g. sleeping sites and caves and adjacent forest areas and trails accessing these areas.

Community-based monitoring of the local langur population could also include researchers, particularly if it is part of a university research program. This information will guide and supplement regular population censuses, provide updates on threats to identified groups and further be used to guide enforcement patrols to critical areas used by individual groups. In addition, there should be a focus on obtaining greater levels of detail on the demography of individual groups, their preferred habitat and sleeping sites, home ranges, diet etc.

Community-based patrolling requires long-term funding at levels that are competitive with other incomes that may be derived locally, proficient training of patrollers and well-managed reporting and responses from the involved government agencies.

4.4. More field surveys

The status of the François' Langur in Vietnam still remains poorly understood in a number of important areas, particularly Lam Binh Watershed Protection Forest, Than Xa-Phuong Hoang Nature Reserve and some sites listed as potential areas in Table 1.

Of the two priority sites, more fieldwork is required to clarify the status of the population in Than Xa-Phuong Hoang Nature Reserve as a starting point for identifying focal areas to target conservation activities. Lam Binh and Sinh Long forest areas have been relatively well surveyed recently, however, the information available is still not complete and a full census activity is required to establish a population baseline for longer term monitoring of conservation effort effectiveness and performance. With time and more systematic monitoring and data collection by local people, PRCF seeks to define a more accurate 'real time' understanding of the population of the langur in this area.

Of the potential sites, the highest priority areas for surveys are:

- Parts of Du Gia Nature Reserve and adjacent areas in Cao Bang province that have never been well surveyed;

- Bat Dai Son Nature Reserve;
- Bac Me Nature Reserve;
- The gorge area of the Nang River within the Tat Ke Sector of Na Hang Nature Reserve where there are unconfirmed reports of a group of up to 20 animals; and,
- Other areas in Ha Giang.

4.5. Training and capacity building

General training and information materials for staff of the local Forest Protection Departments and protected areas could have a widespread impact on conservation of the species, addressing François' Langur populations at most, if not all, sites in one go. Training should be focused on the specific needs of the François' Langur, rather than trying to resolve all protected area capacity building issues. It should as a minimum address the ecology of the species, monitoring techniques, communications with local stakeholders and the status of the species. It should try to raise pride and interest among trainees with the most committed individuals invited to act as "champions" for the species and give presentations and training to their counterparts.

4.6. Research

Research should be focused on addressing the conservation needs of the species and thus guide conservation management, particularly focused on drivers of threats, market demand for the animals and their parts, home ranges, frequency and number of visits to sleeping caves, feeding ecology, social behavior and group demographics. Research on genetic variability will be important for long-term genetic management of these small fragmented sub-populations.

Research can have several direct conservation benefits. The regular presence of researchers may act as a deterrent to hunters and build up a clearer overall picture of the threats facing the species at that location. It also provides a positive way to engage people from the local community in conservation of the species. Research on community perceptions and behavior towards François' Langur conservation will directly benefit awareness raising and conservation education actions.

The François' Langur has not been the subject of any ecological research projects in Vietnam, beyond field surveys. China has several examples of good research sites for this species and its close relative, the White-headed Langur, including at Fusui, Chongzuo and Nonggang Nature Reserves in neighboring Guangxi province. Ecological research on the Cao Vit Gibbon in Bangliang Nature Reserve next to Trung Khanh has been guiding strategic conservation interventions and gives a good example of how results of primate ecological research (in this case gibbons) directly informs conservation management (Peng-fei Fan *et al.* 2011).

Than Xa-Phuong Hoang Nature Reserve could be an important potential research site, being located close to Thai Nguyen University of Agroforestry and could easily be served by researchers in Hanoi.

4.7. Eco-tourism

François' Langurs offer good potential for tourism. The attractions are clear; a charismatic species living in a dramatic landscape, which limestone mountains invariably offer. It should follow the principles of best practice in eco-tourism; bringing a benign presence of visitors to the landscape, which would deter hunters, generating a sense of pride and interest among local people and generating revenues which both support conservation and diversify livelihood options within the local community. The risks if done badly are further environmental degradation to a sensitive

landscape, disturbance to the langurs, little or no benefit to local communities and a poor tourism experience; the opposite of what eco-tourism should promote, and what is so often called eco-tourism in Vietnam. The challenge would be to find accessible groups, which can easily be seen and ensure that the community understands the long-term economic values and benefits from nature-based tourism as an alternative to hunting.

Than Xa-Phuong Hoang Nature Reserve has potential, due to its close proximity to Hanoi allowing day trip visitors. The long distance from Hanoi and other significantly large urban areas to Lam Binh district means langur watching would need to be part of a multi-day package of tourism attractions. Lam Binh may have that potential with an impressive landscape and the newly created reservoir. Ba Be National Park unfortunately represents an example of where the potential mutual benefits of linking the François' Langur with tourism have been mindlessly squandered and were never developed. Van Long Nature Reserve provides a better example of a site for langur watching on limestone in Vietnam, similarly Chongzuo and Fusui Nature Reserves, close by in Guangxi, China.

4.8. Captive breeding / translocation

With such a small and fragmented population, even under the best protection the Francois' Langur population in Vietnam may be on a downward spiral towards extinction. In the long-term direct interventions to genetically manage the population may be necessary, either through captive breeding and reintroduction or translocation of wild groups. These are expensive measures, which require long-term planning, and a high level of specific technical expertise. Any reintroduction of primates into the wild, should follow strict protocols following international guidelines, e.g. IUCN, which are open and transparent to scrutiny to ensure that the best interests of the animals in question and the species are paramount. Since the current priority is protection of groups and habitat, no detailed proscriptions are given here, nevertheless there are already national examples of such measures being taken for other species, which could provide important lessons in the future, e.g. plans for translocation of Cat Ba Langurs, release of Delacour's Langurs in Van Long Nature Reserve and gibbons in Dong Nai Nature Reserve, and establishment of a semi-wild enclosure for release of Ha Tinh Langurs at Phong Nha-Ke Bang National Park. Close by in Guangxi, the Wuzhou breeding center for Francois Langurs may also provide valuable lessons and experience.

4.9. A national François' Langur conservation action plan

This report provides much of the basis for a national conservation action for this species, with an updated review of the status of the species, initial analysis of threats and some proposed conservation actions. A national François' Langur conservation action plan is a logical next step. The main benefit of such a plan would be greater stakeholder involvement in protection of this species through identification of clear actions and roles and responsibilities of different stakeholders. Yet without strong interest and commitment (political and financial) from national and provincial government and in particular the Forest Protection Department and protected areas, a national species conservation action plan would be worthless and a wasted effort. A François Langur conservation action plan has already been prepared for the priority site of Lam Binh and a similar detailed plan is a higher priority for Than Xa-Phuong Hoang Nature Reserve.

Any national François' Langur conservation action plan should also identify realistic sources of funding for activities. Given the lower conservation priority for the François' Langur in Vietnam compared to some other primates in Vietnam or the François' Langur in China, national sources of funding would need to be identified, rather than relying solely upon international support. This would also demonstrate much needed stronger national support for conservation of this species, before it becomes renowned as the first primate species known to be extirpated from Vietnam.

5. REFERENCES

Anon (2009) *Conservation needs assessment: Du Gia Nature Reserve, Ha Giang province.* Ministry of Agriculture and Rural Development, Forest Sector Development Project, Vietnam Conservation Fund, Hanoi, Vietnam.

Ba Be National Park (2001) *Operational Plan for Ba Be National Park, Bac Kan province (Period 2001-2005)*. Bac Kan Provincial People's Committee and Ba Be National Park, Bac Kan, Vietnam.

Bezuijen, M.R., Potess, L.F., Quan Van Tue, Trinh Thang Long, Nguyen Hung Manh & Insua-Cao, P., (2004). *Development of the François' Langur Species and Habitat Conservation Area, Tuyen Quang province, Viet Nam.* PARC Project VIE/95/G31 and Forest Protection Department Tuyen Quang, Government of Viet Nam (FPD) / UNOPS / UNDP / Scott Wilson Asia-Pacific Ltd., Hanoi, Vietnam.

Bleisch, B., Nguyen Manh Ha, Le Khat Quyet, L. & Long Yongcheng (2008) *Trachypithecus francoisi*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. Downloaded from www.iucnredlist.org on 29 May 2012.

Brandon-Jones, D., Eudey, A. A., Geissmann, T., Groves, C. P., Melnick, D. J., Morales, J. C., Shekelle, M., & Stewart, C.-B. (2004) *Asian Primate Classification.* International Journal of Primatology, Vol. 25, No. 1, February 2004 (C° 2004)

Dong Thanh Hai, Do Quang Huy, Luu Quang Vinh, Nguyen Duc Manh, Nguyen Hai Ha, Ngo Duy Bach and Vu Duc Kham (2006) *A survey of distribution and population of the Tonkin snub-nosed monkey (Rhinopithecus avunculus) in Cham Chu Nature Reserve*. Forest University of Vietnam, Xuan Mai, Hanoi, Vietnam

Dong Thanh Hai. (2009) *Final Project Report: Survey of Population Status of François' Langur (Trachypithecus francoisi) at Ba Be National Park*. People Resources and Conservation Foundation (PRCF) and Ba Be National Park, Hanoi, Vietnam.

Dong Thanh Hai & Vu Tien Thinh (2010). *Primate Status Survey at South Xuan Lac Species and Habitat Conservation Area, Bac Kan province*. Fauna & Flora International/People, Resources and Conservation Foundation/Centre for Plant Conservation, Hanoi, Vietnam.

Fauna & Flora International (2010) *Report on workshop on conservation status of the François' Langur (Trachypithecus francoisi) 29 to 30 June 2010, Nanning, Guangxi.* Fauna & Flora International China Programme, Nanning, Guangxi, China.

Fauna & Flora International (2012). *Species Conservation Action Plan: Local-based conservation of Francois' Langur (Trachypithecus francoisi) at the Lam Binh Forest Area, Tuyen Quang province, Vietnam*. Editors: Uli Streicher and Michael Dine. Fauna & Flora International and People Resources and Conservation Foundation, Ha Noi, Vietnam.

Frontier Vietnam (1997) Hill, M., Hallam, D. and Bradley, J. (eds) *Ba Be National Park: Site description and conservation evaluation*. Frontier Vietnam Environmental Research Report 10. Society for Environmental Exploration, UK and Institute of Ecology and Biological Resources, Hanoi. Vietnam. Downloaded from http://www.frontier-publications.co.uk on 19 July 2012

Frontier Vietnam (2002a) Hardiman, N., Canh, L.X., & Fanning, E. (eds.) *Kim Hy Proposed Nature Reserve: Biodiversity Survey and Conservation Evaluation. Frontier-Vietnam Forest Research Programme Report No. 24*. The Society for Environmental Exploration, London, UK and the Institute of Ecology and Biological Resources, Hanoi, Vietnam. Downloaded from http://www.frontier-publications.co.uk on 19 July 2012

Frontier Vietnam (2002b) Furey, N., Le Xuan Canh, & Fanning, E. (eds) *Huu Lien Nature Reserve: Biodiversity Survey and Conservation Evaluation 2000. Frontier Vietnam Environmental Research Report 21.* Society for Environmental Exploration, UK and Institute of Ecology and Biological Resources, Hanoi. Downloaded from http://www.frontier-publications.co.uk on 19 July 2012

Gang Hu, Xin Dong, Yi Wei, Ying Zhu and Xihuan Duan (2004) *Evidence for a decline of François' langur Trachypithecus francoisi in Fusui Nature Reserve, south-west Guangxi, China.* Oryx, 38(1), 48–54 DOI: 10.1017/S0030605304000080

Geissmann, T. & Vu Ngoc Thanh (2001). *Preliminary results of a primate survey in northeastern Vietnam, with special reference to gibbons*. Asian Primates 7 (3-4): 0-4.

Geissmann, T., Vu Ngoc Thanh, Dine, M. C., and Tu Minh Tiep (2009). *Results of a gibbon survey in the Kim Hy Nature Reserve (Bac Kan province) in northeastern Vietnam*. People Resources Conservation Foundation (PRCF), Vietnam Programme, Hanoi, Vietnam.

Groves, C. (2001). Primate Taxonomy. Smithsonian, USA.

Huang Chengming & Li Youbang (2005) *How does the white-headed langur (Trachypithecus leucocephalus) adapt locomotor behavior to its unique limestone hill habitat?* Primates (2005) 46:261–267. DOI 10.1007/s10329-005-0130-3

Huang, C., Wu, H., Zhou, Q., Li, Y. & Cai, X. (2008) *Feeding strategy of François' Langur and White-headed Langur at Fusui, China.* American Journal of Primatology, 70: 320–326. DOI 10.1002/ajp.20490

Huang Chengming, Li Ming & Wei Fuwen (2009) *Sleeping site use by Trachypithecus francoisi at Nonggang Nature Reserve, China.* International Journal of Primatology (2009) 30:353–365 DOI 10.1007/s10764-009-9348-z

Insua-Cao, P., Yan Lu, Nguyen The Cuong, and Nong Van Tao. 2010. How transboundary cooperation and field-based conservation have led to improved hope for survival of the eastern black gibbon (Nomascus nasutus) on the Vietnam-China border. Pages 263-270 in T. Nadler, B. Rawson, and Van Ngoc Thinh, editors. *Conservation of Primates in Indochina*. Frankfurt Zoological Society and Conservation International, Hanoi, Vietnam.

La Quang Trung (2001) Primate focussed survey in Ha Lang district, Cao Bang province. Fauna & Flora International Indochina Programme, Hanoi, Vietnam.

Le Dinh Duy (2010) *Đánh giá tình trạng quần thể Voọc đen má trắng (Trachypithecus francoisi) ở khu bảo tồn thiên nhiên Thần Sa - Phượng Hoàng - Thái Nguyên. Assessment of the status of the population of the François' langur (Trachypithecus francoisi) at Than Sa – Phuong Hoang Nature Reserve, Thai Nguyen.* National Forestry University, Hanoi. Vietnam (In Vietnamese)

Le Hien Hao (1973). *Thú kinh tế miền Bắc Việt Nam (Economic value mammals of northern Vietnam).* Nhà xuất bản Khoa học và Kỹ thuật (Scientific and Technical Publishing House), Hanoi, Vietnam (In Vietnamese).

Le Khac Quyet (2001). *Exploratory survey of wildlife in Ha Giang province*. Fauna & Flora International Indochina Programme, Hanoi, Vietnam.

Le Khac Quyet & La Quang Trung (2001). *A preliminary survey of primates in Cao Bang province*. Fauna & Flora International Indochina Programme, Hanoi, Vietnam.

Le Khac Quyet (2007) *Kết quả điều tra khu hệ thú tại hai xã: Tùng Vài (huyện Quản bạ) và Ngọc Linh (huyện Vị Xuyên), tỉnh Hà Giang. A survey of mammals in two communes, Tung Vai (Quan Ba district) and Ngoc Linh (Vi Xuyen district), Ha Giang province*. Fauna & Flora International Vietnam Programme, Hanoi, Vietnam. (in Vietnamese)

Le Manh Hung & Nong The Dien (2005). *Conservation Needs Assessment: Ba Be National Park, Ba Be district, Bac Kan province*. Downloaded from www.vcf.org.vn on 31 May 2012

Le Trong Trai, Eames, J. C., Kuznetsov, A. N., Nguyen Van Sang, Bui Xuan Phuong, Monastyrskii, A. L. (2001) *A biodiversity survey and assessment of the Dong Phuc, Ban Thi-Xuan Lac and Sinh Long areas, Tuyen Quang and Bac Kan provinces, Vietnam.* Creating Protected Areas for Resource Conservation using Landscape Ecology (PARC) Project VIE/95/G31&031, Government of Viet Nam (FPD)/UNOPS/UNDP/Scott Wilson Asia-Pacific Ltd., Hanoi, Vietnam.

Le Trong Trai, Le Manh Hung, Ha Van Tue, Trinh Viet Cuong, Nguyen Truong Son, Pham Duc Tien & Bui Xuan Phuong (2004a) *A biodiversity survey of the proposed François' Langur Species and Habitat Conservation Area, Tuyen Quang province, northern Viet Nam*. Unpublished report prepared by BirdLife International in Indochina for the PARC Project. PARC Project VIE/95/G31 and Forest Protection

Department Tuyen Quang, Government of Viet Nam (FPD) / UNOPS / UNDP / Scott Wilson Asia- Pacific Ltd., Hanoi, Vietnam.

Le Trong Trai, Eames, J.C., Nguyen Duc Tu, Furey, N.M., Kouznetsov, A.N., Monastyrskii, A.L., Dang Ngoc Can, Nguyen Truong Son, Nguyen Van Sang, Nguyen Quang Truong & Bui Xuan Phuong (2004b) *Biodiversity report on the Ba Be / Na Hang Conservation Complex*. Creating Protected Areas for Resource Conservation using Landscape Ecology (PARC) Project VIE/95/G31&031, Government of Viet Nam (FPD)/UNOPS/UNDP/Scott Wilson Asia-Pacific Ltd., Hanoi, Vietnam.

Long, B., & Le Khac Quyet (2001) *An initial assessment of conservation requirements for Cham Chu, Tuyen Quang province including mammal and bird diversity surveys*. Fauna & Flora International Indochina Programme, Hanoi, Vietnam.

May Si Luan (2009) *Primate survey in Du Gia Nature Reserve*. Student thesis from Vietnam Forestry University, Hanoi, Vietnam (in Vietnamese)

Ministry of Science and Technology and Vietnamese Academy of Science and Technology (2007) *Vietnam Red Data Book. Part 1. Animals*. Science and Technology Publishing House, Hanoi (In Vietnamese)

Momberg, F., & Fredricksson, G. (2003). *Primate Recuperation and Management Plan for the Ba Be - Na Hang Area.* Fauna & Flora International Viet Nam Programme for Creating Protected Areas for Resource Conservation using Landscape Ecology (PARC) Project VIE/95/G31&031, Hanoi, Vietnam.

Nadler, T., Momberg, F., Nguyen Xuan Dang & Lormée, N. (2003) *Vietnam primate conservation status review 2002. Part 2: Leaf monkeys*. Fauna & Flora International-Vietnam Program and Frankfurt Zoological Society, Hanoi.

Nadler, T. (2010) Status of Vietnamese primates – complements and revisions in *Conservation of Primates in Indochina* (eds. Nadler. T., Rawson, B. M. and Van Ngoc Thinh) Frankfurt Zoological Society and Conservation International, Hanoi, Vietnam

Nguyen Manh Ha & Trinh Viet Cuong (2004) *Survey on the status and distribution of threatened primates in three protected areas in north Viet Nam: South Xuan Lac and François' Langur Species & Habitat Conservation Areas and the Dau Dang area of Ba Be National Park (Bac Kan and Tuyen Quang provinces).* PARC Project VIE/95/G31 and Forest Protection Department Bac Kan, Government of Viet Nam (FPD) / UNOPS / UNDP / Scott Wilson Asia-Pacific Ltd., Hanoi, Vietnam (unfinished report)

Nguyen The Cuong & Nguyen Van Truong (2011). *François' Langur (Trachypithecus francoisi) prelimitary survey in Trung Khanh district, Cao Bang province.* Fauna & Flora International Vietnam Programme, Hanoi, Vietnam.

Nguyen Van Truong & Luu Tuong Bach (2011) *Survey of primates focussed on gibbons in Than Sa-Phuong Hoang Nature Reserve, Vo Nhai district, Thai Nguyen province.* Fauna & Flora International Vietnam Programme / Conservation International, Hanoi, Vietnam.

Nguyen Xuan Dang, Nguyen Van Sang, Truong Van La, Ngo Xuan Tuong & Nguyen Quang Tuong (2003) *Evaluation of the wildlife trade in Ba Be and Cho Don districts*. PARC Project VIE/95/G31&031, Government of Viet Nam (FPD) /UNOPS/UNDP/Scott Wilson Asia-Pacific Ltd., Hanoi, Vietnam.

Nguyen Quang Truong, Nguyen Van Sang, Ngo Xuan Tuong & Nguyen Truong Son (2003) *Evaluation of the wildlife trade in Na Hang district.* PARC Project VIE/95/G31&031, Government of Viet Nam (FPD) /UNOPS/UNDP/Scott Wilson Asia-Pacific Ltd., Hanoi, Vietnam.

Noel Rowe (1996). *Pictorial Guide to the Living Primates. Pongonias Press, East Hampton, New York, USA*.

Nurick, R., & Dine, M., (2012) Protected Areas and Conservation landscapes: the case of Ba Be National Park, Vietnam. In: Merson, Brown and Cooney (Eds). *Environmental strategies for a crowded world: Case studies of conservation and sustainable use for the Asia Pacific region* University of New South Wales Press, Sydney, Australia.

Peng-Fei Fan,Han-Lan Fei, Scott, M. B., Wen Zhang, Chang-Yong Ma (2011) *Habitat and food choice of the critically endangered cao vit gibbon (Nomascus nasutus) in China: Implications for conservation*. Biological Conservation 144 (2011) 2247–2254. DOI 10.1016/j.biocon.2011.05.016

Pham Nhat (2002) *Thú linh trưởng của Việt Nam (Primates of Vietnam).* Nhà xuất bản Nông nghiệp, Hà Nội, Việt Nam(Agriculture Publishing House), Hanoi, Vietnam. (in Vietnamese)

Qihai Zhou, Chengming Huang, Youbang Li and Xiangwen Cai (2004) *Ranging behavior of the François' Langur (Trachypithecus francoisi) in the Fusui Nature Reserve, China*. Primates Volume 48, Number 4 (2007), 320-323, DOI 10.1007/s10329-006-0027-9

Qihai Zhou, Chengming Huang, Ming Li & Fuwen Wei (2009a) *Sleeping site use by Trachypithecus francoisi at Nonggang Nature Reserve, China.* International Journal of Primatology (2009) 30:353–365. DOI 10.1007/s10764-009-9348-z

Qihai Zhou, Zhonghao Huang, Xiansheng Wei, Fuwen Wei and Chengming Huang (2009) *Factors influencing interannual and intersite variability in the diet of Trachypithecus francoisi.* International Journal of Primatology, Volume 30, Number 4 (2009), 583-599, DOI 10.1007/s10764-009-9362-1

Rawson, B. M, Insua-Cao, P., Nguyen Manh Ha, Van Ngoc Thinh, Hoang Minh Duc, Mahood, S., Geissmann, T. & Roos, C. (2011) *The Conservation Status of Gibbons in Vietnam.* Fauna & Flora International/Conservation International, Hanoi, Vietnam.

Roberton, S. (2004) *An assessment of the threats to the biodiversity of Phong Nha-Ke Bang National Park, Quang Binh province, Vietnam*. Fauna & Flora International Vietnam Programme, Phong Nha-Ke Bang and Hanoi, Vietnam.

Shuangling Wang, Yang Luo and Guofa Cui (2011) *Sleeping site selection of Francois Langur (Trachypithecus francoisi) in two habitats in Guizhou, China.* Primates (2011) 52:51–60. DOI 10.1007/s10329-010-0218-2

Thach Mai Hoang (2011a). *Survey Report of Francois Langur (Trachypithecus francoisi) in the Sinh Long and Lam Binh Forest Areas of Na Hang and Lam Binh districts, Tuyen Quang province.* People Resources and Conservation Foundation and Fauna & Flora International, Hanoi, Vietnam.

Thach Mai Hoang (2011b) *Primate survey prioritising Tonkin Snub-Nosed Monkey (Rhinopithecus avunculus) and Francois Langur (Trachipythecus francoisi) in Na Hang Nature Reserve, Tuyen Quang province.* People Resources and Conservation Foundation, Hanoi, Vietnam.

Tordoff, A. W., Vu Van Dung, Le Van Cham, Tran Quang Ngoc and Dang Thang Long (2000) *A rapid field survey of five sites in Bac Kan, Cao Bang and Quang Ninh provinces, Vietnam.* BirdLife International Vietnam Programme, Hanoi, Vietnam.

Tordoff, A. W., Tran Quoc Bao, Nguyen Duc Tu & Le Manh Hung, EDS. (2004) *Sourcebook of existing and proposed protected areas in Vietnam. Second edition*. BirdLife International in Indochina and the Ministry of Agriculture and Rural Development, Hanoi, Vietnam.

Trinh Viet Cuong, Nguyen Quang Hung, Tran Duc Luong, Nguyen Thien Tao, Nga Xuan Tuong (date unknown) *Đánh giá nhanh các loài quan trọng thuộc Khu bảo tồn thiên nhiên Bắc Mê huyện Bắc Mê, tỉnh Hà Giang Rapid survey in Bac Me Nature Reserve, Ha Giang province*, Ha Giang province Forest Protection Department, Ha Giang, Vietnam (in Vietnamese)

Trinh Dinh Hoang (2001) *Report on Eastern black crested gibbon (Nomascus sp. Cf. nasutus) and other primates in Hoa An and Tra Linh districts, Cao Bang province*. Fauna & Flora International Indochina Programme, Hanoi, Vietnam.

Trinh Dinh Hoang (2002) *Survey for eastern black crested gibbon (Nomascus sp. Cf. nasutus) in Huu Lien Nature Reserve, Huu Lung district, Lang Son province*. Fauna & Flora International Indochina Programme Hanoi, Vietnam

Tuyen Quang Forest Protection Department (2004) *Proposal for establishment of the Francois Langur Species and Habitat Conservation Area, Na Hang district, Tuyen Quang province.* Tuyen Quang Forest Protection Department, Tuyen Quang, Vietnam.

Wolters, S. (2004) *Technical Report (1). Tonkin Snub-nosed Monkey Conservation Project – Reassignment and Restructuring.* Tonkin Snub-nosed Monkey Conservation Project Westfälische Gesellschaft für Artenschutz e. V. (WGA). (Westphalian Society for Species Conservation), Munster, Germany.

Youbang Li, Chengming Huang, Ping Ding, Zheng Tang & Wood, C., (2007) *Dramatic decline of Francois Langur Trachypithecus francoisi in Guangxi province, China.* Oryx, 41(1), 38–43. DOI 10.1017/S0030605307001500.

Zhaoyuan Li, Yi Wei & Rogers, E., (2003) *Food choice of White-headed Langurs in Fusui, China.* International Journal of Primatology, Vol. 24, No. 6, December 2003

Zhaoyuan Li & Rogers, E., (2004) *Habitat quality and activity budgets of White-headed Langurs in Fusui, China.* International Journal of Primatology, Vol. 25, No. 1

ANNEX. INDIVIDUAL SITE RECORDS

Priority sites for the François' Langur in Vietnam

Sinh Long Forest Area and Lam Binh Watershed Protection Forest

Location: Lam Binh and Na Hang districts, Tuyen Quang province
North to South: UTM 2502500 – UTM 2482700 (N 22°35'27" - S 22°27'56"); and,
West to East: UTM 527300 – UTM 541300 (W 105°14'55" - E 105°26'19").
Area: 16,760 ha
Year of last record: 2011
Year of last survey: 2011
No. of groups and individuals:
In Lam Binh, 5 groups with 28 individuals directly observed and local reports of 10 to 12 groups with more than 60 individuals.
In Sinh Long, up to three groups reported by local informants.

The Lam Binh Watershed Protection Forest and the Sinh Long Forest Area lie in the north of Tuyen Quang province, adjacent to Na Hang Nature Reserve in the east and just south of Bac Me Nature Reserve in Ha Giang province. In 2001, under the GEF-funded PARC[2] Project, the area was identified as having a significant area of natural forest and a number of species of conservation concern including the François' Langur, (Le Trong Trai *et al.,* 2001). That project culminated with a proposal to establish the François' Langur Species and Habitat Conservation Area in 2004 covering 15,350 ha (Tuyen Quang Forest Protection Department, 2004). The area is bisected by what is now an inundation area of the Gam River, resulting from a hydropower dam constructed downstream in Na Hang Nature Reserve and completed in 2004. Previously the entire area was part of Na Hang district until 2011 when reforms to the administrative boundaries led to the establishment of Lam Binh district on the south-western side of the Gam River[3].

The area is considered to have three distinct forest regions (Le Trong Trai *et al*., 2001, Thach Mai Hoang, 2011a and Dine, pers. comm. 2012):

1. Nhoi (forest area of Nhoi, Chuot, Chu and Nghiu Lai: approx. 3,000 ha) in Khuon Ha commune, Lam Binh district;
2. Ban Cai (forest area of Ban Cai, Na Phuong and Khau Dao: approx. 4,000 ha) in Thuong Lam commune, Lam Binh district; and
3. Sinh Long forest (9,760 ha), to the north of the site: includes forest from Xuan Tan commune (Lam Binh district) and Sinh Long commune (Na Hang district).

The Nhoi and Ban Cai forests, in the Lam Binh Watershed Protection Forest, are adjacent, but separated by a valley with a road running along it. The Sinh Long forest, in Na Hang district, lies north of the Gam River and the consequent reservoir resulting from the Na Hang Dam.

[2] Creating Protected Areas for Resource Conservation using Landscape Ecology, a GEF-funded project running from 1999 to 2004, which covered Ba Be National Park, Na Hang Nature Reserve and the surrounding landscape.
[3] Prime Ministerial Resolution 07/NQ-CP Dated 28 January 2011

The forest areas of Nhoi and Ban Cai in Lam Binh district appear, from surveys (not detailed census activities) to have the larger populations of François' Langur and certainly the most confirmed records of François' Langur in Vietnam. The areas are dominated by a forested landscape of dramatic karst limestone mountains, thus providing suitable habitat for the François' Langur. These mountains are interspersed with lowland areas, which are usually cultivated.

Two decades ago, Ratajszcak *et al.* (1992, quoted in Nadler *et al.,* 2003) reported the presence of the langur in this area from interviews and specimens. Surveys in 2003 observed at least 23 individuals in the Nhoi area, with local people reporting 35-44 individuals (Le Khac Quyet, 2003, quoted in Trai *et al.,* 2004a). In May 2004, at least 12 individuals were recorded in the Nhoi region and 4-5 individuals in the Ban Cai region (Nguyen Manh Ha & Trinh Viet Cuong, 2004). During three days in July 2004, a group of four individuals were regularly seen by a survey team in the morning and late afternoon, at the same limestone cliff in the Nhoi area and local people reported at least three groups of 12-14 individuals occurring there, although a decline since 2003. Langur skulls gave evidence of hunting locally (Le Trong Trai *et al.*, 2004a).

More recently, during two surveys conducted in May 2010 and December 2011, five groups were observed in the Nhoi and Ban Cai areas, with group sizes ranging from four to eight (Thach Mai Hoang, 2011a). Twenty-eight animals (including two infants in one group) were directly observed with ten more estimated to be accompanying them. A local guide reported that the group with eight individuals has been seen to have up to 20 individuals. Sixteen sleeping sites, including 24 caves were also recorded. A compilation of interview data between December 2010 to May 2011 reports 12 groups in the area with more than 60 individuals (Thach Mai Hoang, 2011a). This figure was further validated by a participatory 3D-mapping exercise conducted in December 2012 with 30 participants from seven local villages, which revealed the possible presence of 10 groups in the area (M. Dine pers. comm., 2012).

North of the Gam River, the topography of the Sinh Long Forest is dominated by a mountain ridge rising up to 1,475m (Le Trong Trai *et al*., 2001) and it is only along this ridge where there may be suitable limestone habitat for the François' Langurs (Nguyen Manh Ha & Trinh Viet Cuong, 2004). There have only been direct observations of two groups during surveys in this area, with most records being from interview data. In 2001, two groups were reported by local villages of 10 and 20 to 25 individuals in the Sinh Long area (Le Trong Trai *et al*. 2001), the first near Phieng Ten village close to Na Hang Nature Reserve and the latter along the mountain ridge in the area formerly known as the Duc Xuan. In 2003, two groups were observed and interview data suggested four to five groups totalling 20 individuals resided there (Le Khac Quyet *et al*. quoted in Momberg & Fredricksson, 2003). No groups were observed in this area during surveys in December 2010 and May 2011 (Thach Mai Hoang, 2011a). During those surveys local people reported two or three groups in the Xuan Hoang, Xuan Tan and Xuan Tien forests, and one group of seven to ten individuals had been seen in August 2010 near Ben Phat village, Xuan Tan commune. A sleeping site was visited in December 2010 following these reports, yet no evidence of recent use by François' Langurs was gathered. In August 2011 there was a further report to PRCF staff from local informants of the group in the vicinity of Ban Phat village.

Despite the apparently small numbers of groups and individuals, the population in the Lam Binh Watershed Protection Forest is clearly the most viable population of François' Langurs known in Vietnam. The Gam River reservoir represents an unsurpassable barrier to any remaining langurs in the Sinh Long Forest. Survey methods and efforts were variable and occasionally hampered by rain, so it isn't feasible to assess population trends with much hope of accuracy, although a general population decline can be inferred from the number of reports of hunting and impressions given by local people.

Trai *et al.* 2004 concluded that there was already a decline from 2003, based mainly on reported hunting pressures (four animals were reported as being hunted in 2003 during interviews) and there has been sufficient direct evidence of individuals being killed. Trai *et al* (2001) reported an individual being caught in Con Lon commune in April 2001, possibly from the Phien Ten group of François' Langurs. Nguyen Manh Ha and Trinh Viet Cuong (2004) collected bones of at least four langurs killed by hunters between 2001 and 2004 and reported that a hunter from Lung Miai village had trapped four langurs in May 2004 in the Mac Rao-Phe Luong area. Informants indicated, during interviews conducted during May 2011, that they knew of eight François' Langurs being hunted during the previous year (Tu Minh Tiep (PRCF), pers. comm., 2012). In July 2012 four langurs were hunted within the Lam Binh Watershed Protection Forest, leading to the arrests of four hunters in possession of evidence, with further investigations underway at the present time.

Hunting is a major threat to the François' Langurs and Thach Mai Hoang provides plenty of evidence of the hunting pressure on all fauna (Thach Mai Hoang, 2011a). The people relocated from Xuan Tan and Xuan Tien villages to Na Lau village, close to Ban Cai, as a result of the dam reservoir regularly conduct hunting parties with François' Langur as one of the target species, often in teams of up to ten people (with rifles) accompanied by hunting dogs. They often spend more than ten days living and hunting inside the forest and after detecting a group of monkeys, drive the group into an ambush with dogs and kill them *en mass*. Gunshots were regularly heard during surveys and all households appeared to own at least one gun. Of special concern was the discovery of a well organized hunting camp with bamboo cages used to temporarily store animals poached by hunters. There are no doubt more unreported incidents and with such low numbers any level of hunting is bound to have dramatic impacts on the population.

A bizarre local tradition practiced in the Nhoi area is the collection of "monkey blood" (huyết lình in Vietnamese) as a traditional medicine (Thach Mai Hoang 2011a). This is purported to be a mouth-watering mixture of menstrual fluids, afterbirth, urine and faeces left in the caves by the langurs. However, the exact content of "monkey blood' is unknown and the likelihood of a component being menstrual fluid is unlikely as female François' Langurs don't menstruate. The great efforts of local people to scale the limestone cliffs using bamboo ladders to collect this delicacy is an indication of how it is valued, purported to be in excess of USD 1,000/kg. This practice could also lead to cave entrances being blocked and entire langur groups being trapped and captured. Whether a regular source of "monkey blood" would continue to be valued over a one-off capture of a group of langurs remains unclear.

Logging has also been recognized as a priority threat to the langurs in the area due to its destruction of their habitat (Thach Mai Hoang 2011a). Logging of selective hardwood species (particularly *Markhamia stipulate*, *Garcinia fagraeoides* and *Burretiodendron hsienmu*) is well organized with locally made winches and paths with wooden rollers established to facilitate transportation of heavy logs (see Figure 5). Some of the logging appeared to be for domestic use, and it is not reported how much would be intended for trade.

Other lower order threats to the langurs in the area come from the disturbance of forest from collection of non-timber forest products, fuel wood collection, agriculture in valley bottoms and suppression of regenerating habitat from livestock grazing.

The forest area of Nhoi, Chuot, Chu and Nghiu Lai which covers nearly 3,000 ha appears to support sufficient contiguous habitat for the minimum of five groups which have been recorded there. Some low lying valley areas are cultivated, however they are effectively surrounded by forest on the limestone hills. This area is cut-off from the Ban Cai area and the intervening valley, road and other

human activities may impede dispersal between the two areas, although little is known about the dispersal capacity of these langurs. The Gam River reservoir is unsurpassable and sub-populations on either side should be considered as totally separate.

At the time of the most recent surveys, law enforcement was clearly ineffective (Thach Mai Hoang 2011a).

Conservation measures

It was under the PARC Project that the conservation value of the area, particularly for the François' Langur became well established (Le Trong Trai *et al*. 2001). This led to further surveys and conservation planning activities for a proposal to establish a species and habitat conservation area in 2004. A few direct conservation measures were taken under the project in anticipation of establishing the protected area, including ranger training, establishing a sinking fund for patrols, preparing an operational management plan and preparation of awareness raising materials (Bezuijen *et al*., 2004). There followed a lapse in activities until in 2010, PRCF with support from FFI and funding mainly from the Critical Ecosystem Partnership Fund initiated conservation activities focused on the François' Langur, beginning with surveys and consultations with local stakeholders, including government and seven villages. This led to preparation of a Species Conservation Action Plan (SCAP) focused on the Lam Binh Watershed Protection Forest Area which is expected be approved by the provincial government in the second half of 2012 (Michael Dine, pers. comms., 2012).

Since December 2011 PRCF has commenced implementation of 'on-ground' activities including:

- A participatory 3D mapping exercise carried out with participants from eight local villages from (Thuong Lam and Khuon Ha communes)
- Preparing a secondary school education curriculum covering local biodiversity/environment and François' Langur conservation;
- Conducting awareness raising activities with the Khuon Ha and Thuong Lam Youth Unions and two local secondary schools; and
- Community-based François' Langur group monitoring activities.

The SCAP process is strongly oriented towards involvement of local communities in conservation of the François' Langur and the action plan itself includes the following areas of activity:

1. Improved forest management and governance, including establishment of multi-stakeholder committees, clear zoning, conservation agreements with local communities and provision of formal land tenure to local communities;
2. Improved law enforcement, including establishing patrols, developing informer networks, incentive schemes and enforcement of sanctions;
3. Awareness raising;
4. Community development, including energy efficiency models or alternatives for local communities, fuel wood and tree plantations, establishing self-help groups, vocational training; and
5. Regular monitoring of the François' Langur and studies on the ecology of the species.

Than Xa-Phuong Hoang Nature Reserve

Location: Vo Nhai district, Thai Nguyen province
105°51'05''-106°08'38'' E and 21°45'12''-21°56'30'' N
Area: 11,220 ha
Year of last record: 2012
No. of groups and individuals: At least four groups

Than Xa-Phuong Hoang Nature Reserve was established in 2009 to protect its limestone forest ecosystem, which covers much of the area. Early records for the François' Langur in the area go back to 1998 when Geissmann and Vu Ngoc Thanh (2001) were informed of the presence of the langur, although there was no direct evidence and there was high hunting pressure and much mining at the time. From 12 to 27 March and 10 to 22 April 2009, two areas of the nature reserve were surveyed for the presence of the François' Langur (Le Dinh Duy, 2010). Twelve individuals were observed in two groups; one group of five near Trung Thanh village in Thuong Nung commune and one group of seven in Kim Son village of Than Xa commune, with altogether about five groups reported in these two communes based upon local interviews.

In May 2011, there were consistent local reports during another survey of a group close to the Kim Son ranger station and two groups in Thuong Nung commune. Two individuals were also reported to have been recently shot (Nguyen Van Truong & Luu Tuong Bach, 2011). During an FFI survey in March 2012, interviews reported one large group of 20 to 30 individuals in Nghinh Tuong commune in the far east of the nature reserve close to Bac Kan province (Nguyen Van Truong (FFI) pers. comm., 2012). This area has a rich habitat with few impacts from local people. Tonkin Snub-nosed Monkey is also reported to persist in the area although Cao Vit Gibbons are probably recently extirpated (Nguyen Van Truong & Luu Tuong Bach, 2011). All surveys report on-going pressure from hunting and logging in particular. Local interviews report a decline in François' Langurs from 25 or more before 2000, to 20 in 2005 and 14 in 2009 in Kim Son hamlet, Than Xa commune (Le Dinh Duy, 2010).

The nature reserve staff has been proactive in the conservation of this species. They have requested FFI for support, which led to recent short surveys. FFI staff was impressed with proactive awareness raising for this species using readily available visual materials, often photocopied (Simon Mahood pers. comm., 2011). A recent grant from the Vietnam Conservation Fund (VCF) included capacity building for nature reserve staff, further surveys for the langur, and involvement of local communities in protected area management as three main objectives. With potentially the second highest number of François' Langurs in Vietnam, this nature reserve is nationally a high priority site for conservation of this species in Vietnam. The commitment, interest and demonstration of initiative of the nature reserve staff are encouraging, but threats from hunting appear to be high and now it is critical to halt an in irreversible decline in the population of this species at this site.

Potential important areas for François' Langur

Bat Dai Son Nature Reserve

Location: Bat Dai Son, Can Ty and Thanh Van communes, Quan Ba district, Ha Giang province
23°04'–23°11' N and 104°54'-105°02' E
Area: 10,648 ha
Year of last record: 2011
Year of last survey: 2011
No. of groups and individuals: Two groups of 5-7 individuals reported from interviews

Bat Dai Son Nature Reserve was established in 2000 covering 10,648 ha, of which the dominant vegetation is limestone forest, distributed at middle elevations. It contains a composition of quite unique flora with a high proportion of Sino-Himalayan elements, including a high diversity of conifer species and a recently discovered conifer species endemic to Vietnam (Tordoff *et al.*, 2004). In August 2011, an interview with local hunters by Thach Mai Hoang reported two groups of François' Langurs with five to seven individuals living in a limestone area named "Nui Co Tien" in the nature reserve. However, no follow-up field survey has since been conducted.

Du Gia Nature Reserve

Location: Yen Minh, Bac Me and Vi Xuyen districts, Ha Giang province
22°48'30''-22°58'00'' N and 105°3'00''-105°20'30'' E
Area: 11,795 ha
Year of last survey: 2009
No. of groups and individuals: From 2001, four to six groups of three to seven individuals

Du Gia Nature Reserve was established in 1994[4] and its boundaries recently revised to cover an area of 11,795 ha[5] (Anon, 2009). It supports lowland evergreen forest, lower and upper montane evergreen forest, and limestone forest (Tordoff *et al.*, 2004). From 4 March to 15 April 2009, François' Langur surveys were carried out in two areas in the centre and north-east of Du Gia Nature Reserve and no langurs were observed, although local reports continued to affirm that they exist in low numbers, along with Grey Langurs (*Trachypithecus phayrei*), which also weren't observed (May Si Luan, 2009). In 2001, four to six groups of three to seven individuals were suggested to still be present in the nature reserve and in 1999 a hair sample was collected from a shot animal (Le Khac Quyet, 2001). Recently, this species was also reported from local interviews to be present in the nature reserve during biodiversity surveys funded by the Vietnam Conservation Fund in neighboring Bac Me district (Trinh Viet Cuong *et al.*, date unknown). This area has been poorly surveyed and no surveys for primates have been conducted in the eastern section of the nature reserve, close to where there were previously records of François' Langur in Cao Bang province.

[4] Decision No. 647/QD-UBND dated 24/11/1994 of the People's Committee of Ha Giang province
[5] Decision No. 2104/QD-UBND dated 01/8/2007 of the People's Committee of Ha Giang province

Bac Me Nature Reserve

Location: Bac Me district, Ha Giang province
22°38'-22°47' N and 105°08'-105°25' E
Area: 27,800 ha
Year of last survey: 2012
No. of groups and individuals: One group of ten individuals

Bac Me Nature Reserve was established in 1994 covering an area of 27,800 ha including limestone forests (*Tordoff et al.* 2004) and located in south-eastern Ha Giang province, close to the Sinh Long forest area in Tuyen Quang province. In July 2012, a biodiversity survey recorded one group of seven to ten individuals (Le Khac Quyet pers. comm.). This is the first record of Francois' Langur in Bac Me Nature Reserve. A previous biodiversity survey to the nature reserve did not record this species (Trinh Viet Cuong *et al.*, date unknown).

Other records in Ha Giang

In 2006, one captured François' Langur was observed in Vi Xuyen district by Thach Mai Hoang, reportedly from Ngoc Linh commune Figure 6. A short follow-up interview and field survey in that commune at the end of 2010 reported that it may not have been present in the local forests for about 20 years (Le Khac Quyet, 2007). The provenance of the captured François' Langur was never clarified, but indicates there may have been other unknown populations of the species in Ha Giang at the time.

Figure 6: Caged François' Langur in Vi Xuyen district, Ha Giang province, April 2006 (Photo by Thach Mai Hoang)

Na Hang Nature Reserve

Location: Na Hang district, Tuyen Quang province
22°16'-22°31' N and 105°22'-105°29' E
Area: 22,401.5 ha
Year of last survey: 2010
No. of groups and individuals: One reported yet unconfirmed group with 17-20 individuals and one other individual reported in 2010

The Critically Endangered and endemic Tonkin Snub-nosed Monkey was rediscovered in Na Hang district in 1992, leading to the nature reserve being established in 1994 to protect this species. From 1999 to 2004 the nature reserve was a focal site of the GEF-funded PARC Project, which provided considerable investment and from 1998 to 2004 the "Tonkin Snub-nosed Monkey Conservation Project", supported by Munster Zoo (Wolters, 2004) implemented activities to protect this flagship species. Unfortunately during these projects a hydropower dam was constructed in the middle of the nature reserve, with considerable consequent impact, especially from an increase in demand for wildlife from dam workers. The nature reserve includes a mixture of forest on limestone mountains and some remaining low land areas. It is divided into two separate sectors, Tat Ke and Ban Bung, which are now further separated by the reservoir to the Na Hang Dam.

A field survey for primates was conducted during September and October 2010 by PRCF, with fifteen days spent in the Tat Ke Sector and eighteen days in the Ban Bung Sector. Four groups of Tonkin Snub-nosed Monkeys were observed, but no François' Langur. Inevitably as they are likely to be found in different habitats, surveys focused on the one are less likely to record the other. In the Tat Ke sector there were nevertheless local reports of 17-20 François' Langurs in the Den and Dan Deng areas (Nang River) in August 2009 and an individual seen in the Ta Pet Area in early September 2010 (Thach Mai Hoang, 2011b). All interviewees in the Ban Bung sector and staff from Na Hang Nature Reserve stated that they had never observed François' Langurs (Thach Mai Hoang, 2011b).

Hunting remains a threat throughout the area and a continuous decline of the Tonkin Snub-nosed Monkey has been documented since the species was first rediscovered there in 1992 (Nadler, 2010).

Trung Khanh district

Location: Cao Bang province
Year of last survey: 2011
No. of groups and individuals: Possibly two groups reported near the border with China

Trung Khanh district lies on the border with Guangxi province in China and is characterized by a landscape of flat or gently undulating, usually cultivated, land interspersed with dramatic *fengling* karst mountains. It is the home of the Critically Endangered Cao Vit Gibbon (*Nomascus nasutus*) and during implementation of project activities to conserve this species, FFI staff often heard reports of François' Langurs being seen close to the Chinese border. In December 2010 and March 2011 rapid

surveys were conducted in communes throughout Trung Khanh district, mainly using interviews to determine the presence of François' Langurs (Nguyen The Cuong & Nguyen Van Truong, 2011). Macaques were often reported, gibbons in the past, but rarely the François' Langur. Local reports indicate possibly two locations with langurs, Lung Nua, near Lung Nam village with one langur recently reported, and Lung Cum near Dai Trang village with a group of about seven, both in Phong Dinh commune. This is an area of karst mountains close to the Chinese border extending into Gulongshan Nature Reserve, where two groups are reported (FFI, 2010).

Ba Be National Park

Location: Ba Be district, Bac Kan province
Area: 7,608 ha
Year of last record: 2009
Year of last survey: 2009
No. of groups and individuals: Two to five groups with about 13 to20 individuals

Ba Be National Park was established in 1992 and its significance for the François' Langur has long been recognised (Ba Ba National Park, 2001). The most recent surveys of the François' Langur were carried out in 2009, over 21 days between 13-26 February and 16-22 November 2009 (Dong Thanh Hai, 2009). The surveys covered four locations where the langur could potentially occur: Dau Dang, Keo Cap, Pac Ngoi, and Ta Han, all within Ba Be National Park and covering about 60% of its area. Only two groups of two and four individuals respectively were seen near Pac Ngoi, although the group sizes may be larger and another group was reported in the area by local villagers. A group of six to thirteen animals is likely to exist in Dau Dang area, based on local reports although not seen during the surveys. This is consistent with previous reports going back to 1999 (Nguyen Manh Ha & Trinh Viet Cuong, 2004; Le Trong Trai *et al.* 2004b). The group is perhaps protected by the sheer cliff face at the northern edge of the escarpment next to the Nang River. At one other location in the Ta Han area an individual was reported to have been seen in April 2009 by a local villager (Dong Thanh Hai, 2009).

In 1996, Frontier Vietnam only recorded one group of four to five langurs close to Nam Giai village, whether it was part of the same group which inhabits the forest close to the Nang River is unclear (Frontier Vietnam, 1997). No langurs were seen in other locations where it had previously been described leading the Frontier Vietnam survey team to conclude that the population had already declined considerably since then. They have been recorded close to Puong Cave in 1994 (Kemp *et al.*, 1994, quoted in Nadler *et al.*, 2003), however, there have been no records at that location since.

Dong Thanh Hai (2009) reported hunting was still occurring with guns in 2009 and local reports of one individual being trapped the previous year. In 2010, a local villager reported seeing three animals being sold for VND 1.5 million (about US$ 75) each at Pac Ngoi village (Nurick & Dine, 2012). Several reports indicate on-going hunting a decline from Hill et al. 1996 to the most recent Dong Thanh Hai (2009). The shooting of three individuals, representing 15 to 25% of the national park's population and in close proximity to a national park ranger station in 2010, does not bode well for the survival of the species at this site.

The groups at Dau Dang (and perhaps a group near Ta Han) and Pac Ngoi lie in the north and south of the national park respectively, separated by a linear distance of eight kilometers. The area in

between is a patchwork of agricultural and forested mountains and would require the most determined langur to cover the distance and traverse the cultivated lands, streams and road which would interrupt its passage.

The group at Dau Dang seems to be protected by its location, although difficult to observe. The groups in the south of the park remain under threat from hunting, despite being in close proximity to an operational ranger station and located in a protected area that has received a high-level of investment in conservation.

Ba Be National Park is among the top national parks in Vietnam in terms of the level of conservation investment it has received, particularly from the international community and most notably from 1999 to 2003 during the GEF-funded PARC Project. A suite of conservation measures have been implemented, yet the demise of the François' Langur, a flagship species for the national park, appears almost inevitable. A conservation needs assessment prepared by the national park's director and a consultant in 2005 identified conservation of the population of François' Langur as one of three priorities for the national park (Le Manh Hung and Nong The Dzien, 2005) and addressing hunting as the priority issue. In 2009, PRCF supported Ba Be National Park define a conservation action plan for the François' Langur (Dong Thanh Hai, 2009), however the national park has shown no interest in implementing it and their denial of the langurs being recently hunted has deterred further involvement of PRCF and some donor support to this site. The outlook for the species at Ba Be National Park is poor.

Kim Hy Nature Reserve

Location: Na Ri district, Bac Kan province
22°10.40''-22°18.20''N and 105°54.25''-106°18.40''E
Area: 15,461 ha
Year of last survey: 2009
No. of groups and individuals: Possibly three groups, one group observed in 2009

The plan for establishing Kim Hy Nature Reserve was approved in 1998, and a management board established in 2003 for the 15,461 ha protected area, of which 7,104 ha is limestone karst (Tordoff *et al.,* 2004).

The presence of the François' Langur in Kim Hy Nature Reserve was reported from interviews surveys in 1999 (Tordoff *et al.*, (2000) and 2001 (Frontier Vietnam, 2002a; Geissmann & Vu Ngoc Thanh, 2001). Two groups were heard in 2001 in the Cout valley (Geissmann & Vu Ngoc Thanh, 2001) and four and three groups were observed during two separate surveys by FFI in the same year (Frontier Vietnam, 2002a).

The most recent record of the species in Kim Hy Nature Reserve occurred in 2009 when vocalizations of one group of François' Langur were recorded with video and audio from three listening posts during a gibbon survey (Geissmann *et al.*, 2009). Also during the survey, one interviewee reported that there were still two groups with a total of about 15 individuals in the center of the nature reserve's core zone. There might be additional groups or individuals in other parts of the nature reserve, however, this is both unconfirmed and unlikely, as the forest outside the center of the core zone is believed to be more degraded. Prior to the field survey, one interviewee presented a jar of

rice alcohol with the foot and hand of a langur obtained two month earlier. Hunting, logging and gold mining activities was intense leading the survey team to conclude that with little conservation action, it is likely that the species will be extirpated in this nature reserve before long.

Sites where the François' Langur is likely already extirpated

Cham Chu Nature Reserve

Location: Ham Yen district, Tuyen Quang province
22°4'25"-22°21'30" N and 104°53'27''-105°14'16'' E
Area: 15,935 ha
Year of last survey: 2006
No. of groups and individuals: None confirmed, one group reported during interviews in 2006.

This nature reserve was established in 2001 with one of its target species for protection being the Tonkin Snub-nosed Monkey. It covers over 15,000 ha of forest mainly on limestone karst.

No surveys have reported observations of the François' Langur. The most recent survey was in 2006 for the Tonkin Snub-nosed Monkey, when neither that species nor the François' Langur were observed during 6 weeks of field work. That there were no observations of the Tonkin Snub-nosed Monkey either indicates that there has been a general decline in primate populations in this nature reserve. There were local reports of 15 François' Langurs in the Khau Sang area, but three had been killed by hunters from Ban Hiep village in 2005 (Dong Thanh Hai *et al.*, 2006).

In 2001, six weeks spent in 2001 during an FFI survey did not record any observations of François' Langur although there were significant records of the Tonkin Snub-nosed Monkey. villagers reported three or four groups of François' Langur around Luong Pang and that five years earlier they have been common in an area called Dan Khao where the survey team saw a group of unidentified primates (Long & Le Khac Quyet, 2001). The survey team also concluded there had been a recent decline in the population of the François' Langur, which was easier to hunt than the Tonkin Snub-nosed Monkey.

It seems very unlikely that this species still persists in Cham Chu Nature Reserve.

South Xuan Lac Species and Habitat Conservation Area

Location: Cho Don district, Bac Kan province
Area: 1,788 ha
Year of last survey: 2010
No. of groups and individuals: Probably extirpated

This protected area was established in 2003 under the PARC Project and lies adjacent to the Ban Bung sector of Na Hang Nature Reserve (see above). Twelve days of surveys were conducted in May 2010, but neither François' Langurs nor Tonkin Snub-nosed Monkeys were recorded (Dong Thanh Hai & Vu Tien Thinh, 2010). A small group of Tonkin Snub-nosed Monkeys have been confirmed ranging into the protected area from Na Hang Nature Reserve during surveys and from photos taken by from patrollers (Thach Mai Hoang, 2011b; Michael Dine pers. comm., 2012). The most recent reports of François' Langurs are from interviews south of the current protected area in Lung Ly area, Ban Thi commune in 2001, a couple of years after an animal had been shot (Le Trong Trai *et al*., 2001), and again in 2004 (Nguyen Manh Ha & Trinh Viet Cuong, 2004).

Huu Lien Nature Reserve

Location: Huu Lung district, Lang Son province
21°37'-21°45' N and 106°19'- 106°26' E
Area: 10,640 ha
Year of last survey: 2002
No. of groups and individuals: Probably extirpated

Huu Lien Nature Reserve was established in 1986 for the conservation of its limestone forest and musk deer (*Moschus berezovskii*). From April until September 2000, Frontier-Vietnam conducted extensive surveys of the biodiversity of the nature reserve. The survey team concluded that the François' Langur was probably extirpated, given high levels of hunting at the time and that local people reported the species had previously been targeted for hunting but had not been seen for many years (Frontier Vietnam, 2002b). In 2002, a six-day interview survey near the nature reserve by FFI targeting gibbons concluded that a few individuals species may still be present based upon local reports (Trinh Dinh Hoang, 2002), but this is less likely to be reliable than the more prolonged survey time spent by Frontier.