

Conservation of Lao Langur *Trachypithecus laotum* in Phou Hin Poun National Protected Area, Khammouane Province, Laos



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I. INTRODUCTION

The Lao langurs (*Trachypithecus laotum* Thomas, 1921) are folivorous, arboreal and diurnal non-human primate species, they are leaf-eating monkeys are closely associated with forests in limestone or karst environments, but also associated with non-limestone rock outcrops on steep or precipitous mountain slopes. They normally spend their times eating the young tree leaves and bamboo in the day times and return their own sleeping-sites/roosting cave in the evening. They are endemic to Lao PDR and known from Khammouane and Bolikhamxai in the central part of the country. Recently, the *T. laotum* was categorized as Endangered by IUCN and listed on Appendix II of the Convention on International Trade of Endangered Species of Wild Fauna and Flora as well as under protection by Lao Wildlife and Aquatic Law.

The project “Conservation of Lao Langur *Trachypithecus laotum* in Phou Hin Poun National Protected Area (PHP-NPA), Khammouane, Laos” was funded by The Rufford Foundation and managed by Lao Wildlife Conservation Association in Lao PDR. The project was implemented by a Master student at Vietnam National University of Forestry and the staffs from Provincial Agriculture and Forestry Office and six District Agriculture and Forestry Offices in Khammouane together with local villagers from June 2020 to May 2020. The objectives of this project are to 1) provide information about species distribution and conservation status; 2) train protected area staffs about wildlife mapping, data collection and field survey; and 3) promote local people’s awareness on wildlife conservation in Phou Hin Poun National Protected Area. In addition, the results from this project will be reported to Department of Forestry and Provincial Agriculture and Forestry Office in Khammouane and shared with organizations implementing the projects in the same area. Our data and information from this project will be useful for writing a master thesis topic at Vietnam National University of Forestry.

II. METHODS

2.1. Interview

From 27 July to 1 August 2020, six District Agriculture and Forestry Offices (DAFO) of Hinboun, Khounkham, Nakai, Yommalath, Mahaxay and Thakhek district were visited and their 14 (2 female) staffs and 17 villagers including three from Ban Natan (Nakai district), six from Ban Konglor (Khounkham district), three from Ban Buamlou, one from Ban Bo Neng and four from Ban Kuankacha (Hinboun district) were interviewed. The standardized interviews were conducted with the above-mentioned persons for determining the eventual presence of primates in their monitored area, using also photos of the various primate species potentially occurring in the area, uploaded on a smartphone, for facilitating the process. We showed the photos of the following species: Lao langur (*T. laotum*), Black langur (*Trachypithecus ebenus*), Southern white-cheeked gibbon (*Nomascus siki*) and Stump-tailed macaque (*Macaca arctoides*) and Assamese macaque (*Macaca assamensis*). During the interviews, we used the local names for each species, that were: Lao langur = Khoung, Black langur = Khong, Gibbon = Tha nee, Assamese macaques = Ling Kang = Stump-tailed macaque = Ling Nar Daeng. Each interviewee was asked of ten consistent questions (see Annex 1).

We spent about two hours for interviewing DAFO staff in each district, villagers were interviewed at survey camps. We did not ask for the age of the respondents. All eight DAFO interviewees in three districts (Khounkham, Nakai and Hinboun) correctly identified the Lao langur but two DAFO persons in Yommalath correctly identified another species (*T. ebenus*) but thought that *T. laotum* and *T. ebenus* belonged to same species. Two DAFO staff in Thakhek incorrectly identified the langurs, but correctly identified the gibbon, and two other staff in Mahaxay did not know the Lao langur at all. All villagers correctly identified the Lao langur, but they also knew and described correctly its vocalization sound and its sleeping sites, and identified some plants species that are eaten by the langurs. The field survey teams were established to identify the survey areas in each district based on recommendations from the staffs from IUCN Laos, interview results and historical records of the species from previous surveys conducted in Phou Hin Poun National Protected Area prior this field survey.

2.2. Surveys

Our survey team conducted the surveys mainly in the central part (Total Protection Zone) and few locations that are located outside of the Phou Hin Poun National Protected Area boundary and divided the survey area into four sectors: 1) Konglor-Natan, 2) Konglor, 3) Buamlou and 4

Kuankacha sites (Figure 1) in order to observe the langurs and record their sites of presence, group size and threats.

Twenty-one transects were developed based terrain accessibility and water availability and used the local existing trails as the transects. We walked along the 18 trials that are inside and on the edge of the NPA and 3 trails at Konglor-Natan site that are outside of the NPA (see Figure 2); the length of each trail walked is summarized in the Table 2. Our team walked slowly and quietly along the trails from about 7:00 to 11:30 AM (except Trail 3 and Trail 6 walked around 13:30 to 17:00 PM). For each sector we conducted from 2 to 10 trails.

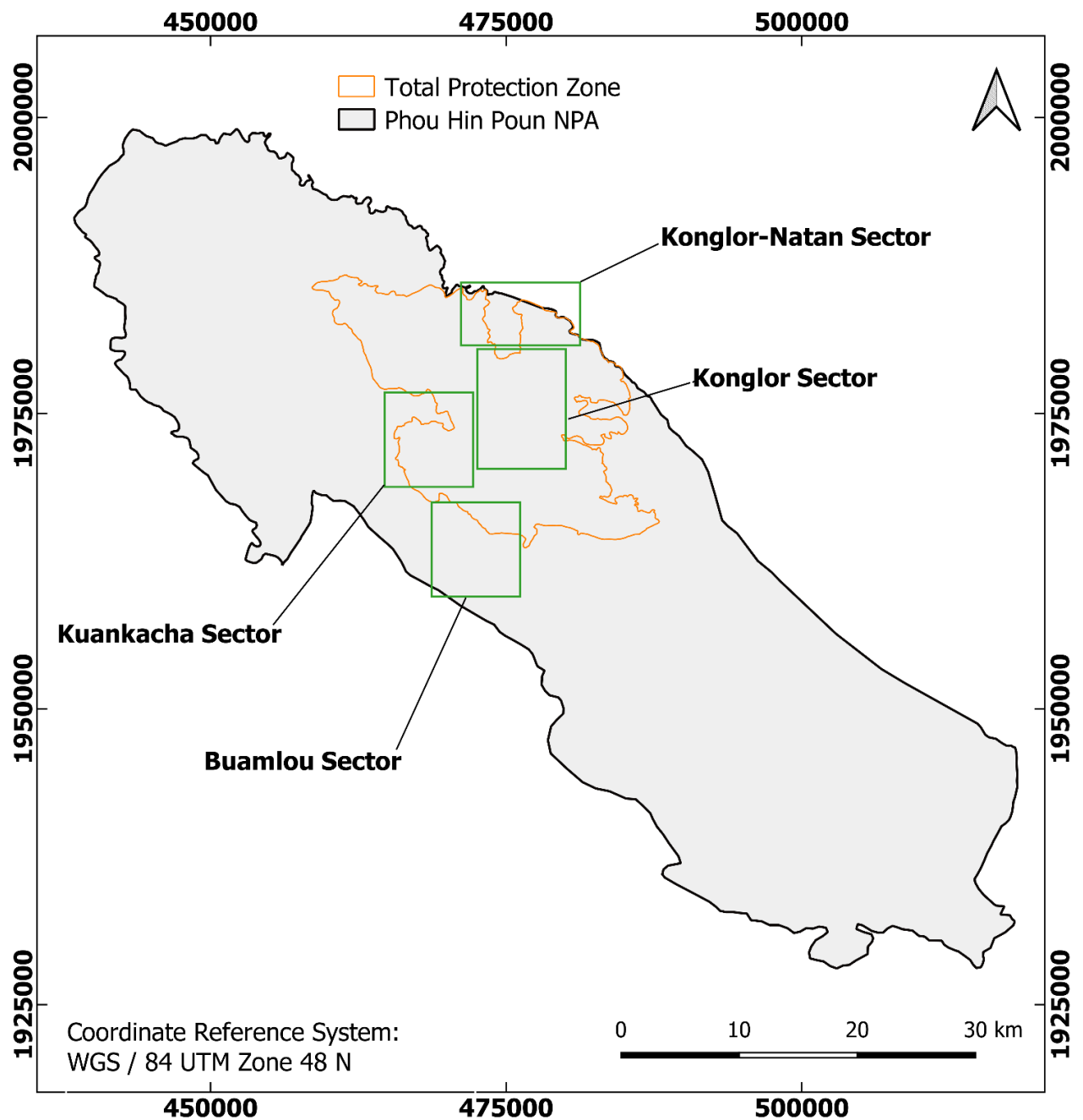


Figure 1: Lao langur survey area in Phou Hin Poun National Protected Area

For each observed group, we recorded the number, sex, and age of the various individuals, as well as the GPS coordinates, the altitude of the sighting spots, the time of sightings, and the estimated distance from the observers.

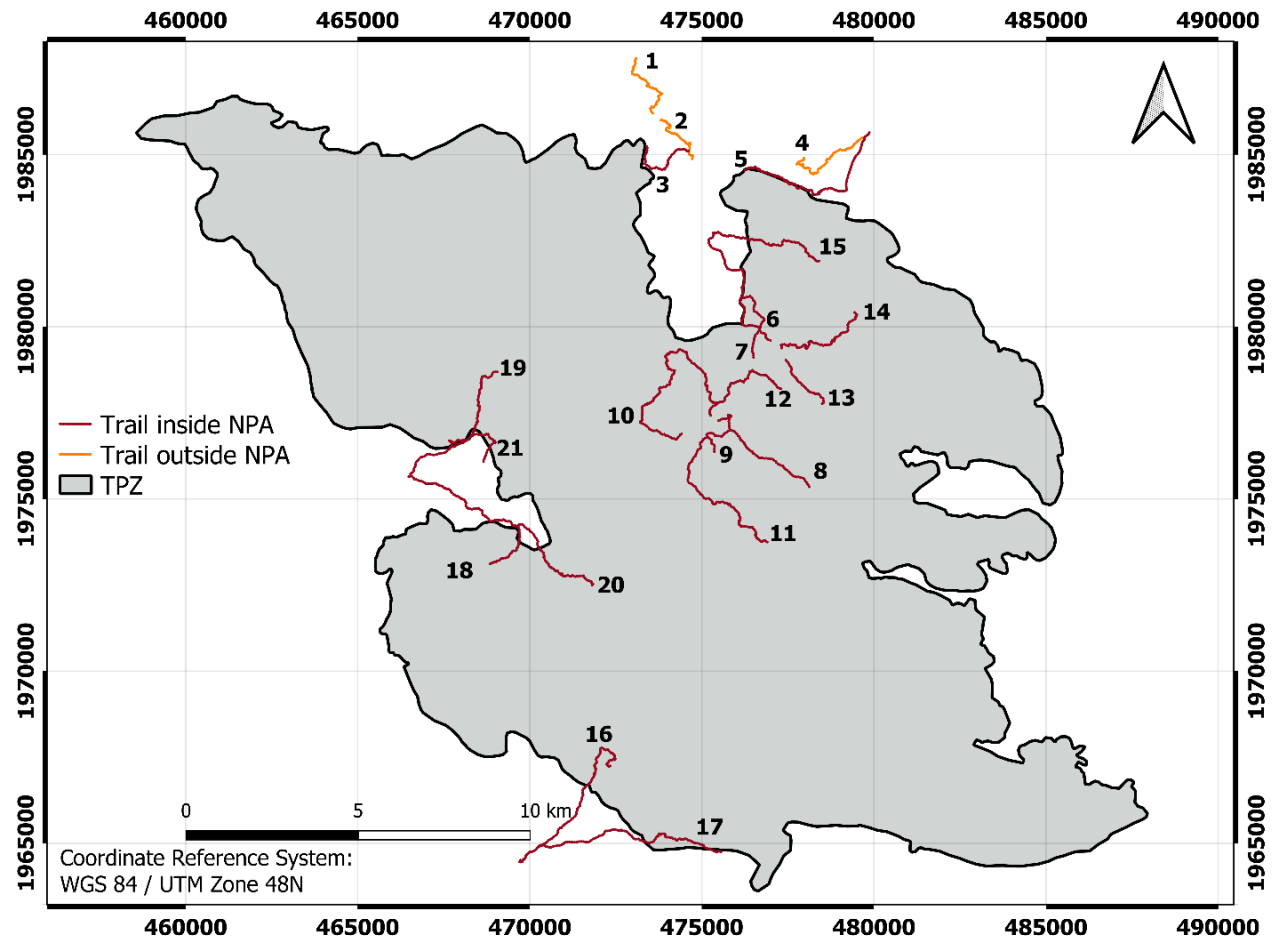


Figure 2: Total Protection Zone (TPZ) and trails walked at four sectors (Konlor-Natan, Konglor, Buamlou and Kuanka-cha)

2.3. Team

The field survey team consisted of 18 people including 1 main researcher, 1 person from Provincial Agriculture and Forestry Office, 4 from DAFO and 12 villagers.

Sector	Team
Konglor-Natan	<u>Trail 1-3:</u> Johnny, Lianphet, Kongla and 2 village rangers from Ban Konglor <u>Trail 4-5:</u> Johnny, Lianphet and 2 villagers from Ban Natan

Sector	Team
Konglor	<u>Trail 6:</u> Johnny, Lianphet, and 2 villagers from Ban Konglor.
	<u>Trail 7:</u> Johnny, Lianphet, Kongla, Kalason and 3 village rangers from Ban Konglor
	<u>Trail 8-9:</u> Johnny, Lianphet, Kongla, and 5 villagers from Ban Konglor
	<u>Trail 10:</u> Johnny, Lianphet, and 2 villagers from Ban Konglor
	<u>Trail 11:</u> Kongla, and 3 villagers from Ban Konglor
	<u>Trail 12:</u> Johnny, Lianphet, Kongla, and 5 villagers from Ban Konglor
	<u>Trail 13:</u> Johnny, Lianphet and 2 villagers
	<u>Trail 14:</u> Kongla, 3 villagers from Ban Konglor
	<u>Trail 15:</u> Johnny, Lianphet, Kongla and 5 villagers from Ban Konglor
Buamlou	<u>Trail 16:</u> Johnny, Lianphet, Balame, and 3 villagers from Ban Buamlou (Khampoun (DAFO), Peter Brakels from IUCN and rangers joined the team)
	<u>Trail 17:</u> Johnny, Lianphet, Balame, and 3 villagers from Ban Buamlou
Kuankacha	Two teams:
	<u>Trail 18:</u> Johnny, Lianphet, and 3 villagers from Ban Kuankacha
	<u>Trail 19:</u> Balame, Khampoun and 3 villagers from Ban Kuankacha
	<u>Trail 20:</u> Johnny, Lianphet, and 3 villagers from Ban Kuankacha
	<u>Trail 21:</u> Johnny, Lianphet, and 3 villagers from Ban Kuankacha

2.4. Time table

In the PHP-NPA almost no water is available for survey teams to drink in the dry season. It is challenging to conduct field survey in dry season, so our team started this fieldwork in wet season (July to October). Unfortunately, the team have faced some difficulties to deal with undesirable weather condition. We were unable to do continuous survey the langurs between August to October as planned because of the heavy rain. It seems to be very dangerous to walk on karst areas, we had to postpone our working schedule and could continue the field surveys in December 2020. The activities are outlined in Table 1.

Table 1: Working schedule

Date	Activity
25-26 May 2020	Hanoi, Vietnam to Vientiane, Laos
27 May 2020	Stay in Vientiane
28 May 2020	Meeting in Department of Forestry (MAF) to discuss about field survey permission
29 May 2020	Vientiane to Thakhek, Khammouane
01 June – 26 July 2020	Working with PAFO team to discuss survey and review related papers
27 July – 01 August 2020	Interview DAFO staffs in six districts: 1) Hinboun, 2) Khounkham, 3) Nakai, 4) Yommalath, 5) Mahaxay and 6) Thakhek
02 – 12 August 2020	Preparing field equipment and planning field survey with team
13 August 2020	Thakhek to Ban Konglor (Camp 1)
14 August 2020	<u>Trail 1:</u> Tham Huator
15 August 2020	<u>Trail 2:</u> Konglor Cave
	<u>Trail 3:</u> Pong Ta Thid Pha
16 August 2020	Ban Konglor to Thakhek

Date	Activity
26 August 2020	Thakhek to Ban Konglor (camp 1)
27 August 2020	<u>Trail 1: Tham Huator</u>
28 August 2020	<u>Trail 3: Poug Ta Thid Pa</u>
29 August 2020	Ban Konglor to Thakhek
04 September 2020	Thakhek to Ban Natan (Camp 2)
05 September 2020	<u>Trail 4: Kouan Xon</u>
06 September 2020	<u>Trail 5: Pha Tung</u>
07 September 2020	Ban Nata to Thakhek
23 November 2020	Thakhek to Ban Konglor
24 November 2020	Ban Konglor to Lath Tae (Camp 3) <u>Trail 6: Pha Soung</u>
25 November 2020	Camp 3 to Ang Nam Ta Ngon area (Camp 4) <u>Trail 7: Pha Hom</u>
26 November 2020	Camp 4 to Phou Hon Khuarn and return camp <u>Trail 8: Phou Hon Khuarn</u>
27 November 2020	Camp 4 to Ang Nam Ta Ngon and return camp <u>Trail 9: Ang Nam Ta Ngon</u>
28 November 2020	Two teams: <u>Trail 10: Phou Khar and return camp</u> <u>Trail 11: Nong Ka Pard and return camp</u>
29 November 2020	Camp 4 to Ang Khee Ther area (Camp 5) <u>Trail 12: Huay Lurk</u>
30 November 2020	Two teams: <u>Trail 13: Ang Khee Ther</u> <u>Trail 14: Phou Hai</u> Return to Ban Konglor (Camp 1)
01 December 2020	Camp 1 <u>Trail 1: Tham Huator</u>
02 December 2020	Ban Konglor to Kouan Dig (Camp 6) <u>Trail 15: Kouan Dig</u>
03 December 2020	Camp 6 to Ban Konglor <u>Trail 15: Kouan Dig</u>
04 December 2020	Ban Konglor to Hinboun district
05-06 December 2020	Weekend
07 December 2020	Ban Buamlou to Nam Pa Kun (Camp 7)
08 December 2020	Camp 7 to Kouan Pang (Camp 8) <u>Trail 16: Kouan Pang</u>
09 December 2020	Camp 8 to Ban Buamlou <u>Trail 16: Kouan Pang</u>
10 December 2020	Ban Buamlou to Phou Muang Khai (Camp 9) <u>Trail 17: Phou Muang Khai</u>
11 December 2020	Camp 9 to Ban Buamlou <u>Trail 17: Phou Muangkhai</u>
12-13 December 2020	Weekend in Hinboun district
14 December 2020	Two teams: Ban Kuankacha to Kouan Khaen (Camp 10) and Nam Xaeng (Camp 11)
15 December 2020	Two teams: (Team 1 go to Camp 10 and Team 2 go to Camp 11) Camp 10 to Kouan Phai <u>Trial 18: Kouan Phai</u> Camp 11 to Hew Nam <u>Trail 19: Hew Nam</u>
16 December 2020	Camp 10 to Kouan Or <u>Trail 20: Kouan Or</u> Back to Ban Kuankacha
17 December 2020	Ban Kuankacha to Pha Luang <u>Trail 21: Pha Luang</u> Ban Kuankacha to Thakhek and briefly report to PAFO
22 December 2020 – 06 January 2021	Khammouane, Laos to Hanoi, Vietnam
07-30 January 2021	Data analysis and mapping
01-28 February 2021	Writing report

III. RESULTS

3.1. Interviews

Information about occurrence and threats of Lao Langurs were obtained from six District Agriculture and Forestry Office staffs in Hinboun, Khounkham, Nakai, Yomalath, Mahaxay and Thakhek districts (see Table 2). The DAFO staffs were asked to identify the primate species such as Lao langur, Black langur, Gibbon and Macaque. The result showed that interviewees in Hinboun, Khounkham and Nakai confirmed that Lao langur presences, but interviewees in Yommalath and Thakhek only unconfidently confirmed that the Lao langur inhabit in their districts, both Lao langur and black langur are suspected to occur in both districts. DAFO staffs confirmed that no Lao langurs occur in Mahaxay district.

Table 2: Species occurrence and threats from interview result

District	Village	Occurrence	Threats	Population	Interviewees
Hinboun	Ban Pheepaeng	<i>T. laotum</i> , <i>N. siki</i> , <i>Macaque sp.</i>	Hunting/ poaching	Decreased	DAFO staff
	Ban Huana	<i>T. laotum</i> , <i>N. siki</i> , <i>Macaque sp.</i>	Hunting/ poaching	Unknown	DAFO staff
	Ban Buamlou	<i>T. laotum</i> , <i>N. siki</i> , <i>Macaque sp.</i>	Hunting/ poaching	Unknown	DAFO staffs; villagers
	Ban Kuankacha	<i>T. laotum</i> , <i>N. siki</i> , <i>Macaque sp.</i>	Hunting/ poaching mining	Decreased	Villagers
	Ban Bo Neng	<i>T. laotum</i> , <i>Macaque sp.</i>	Hunting/ poaching	Decreased	Villagers
Khounkham	Ban Konglor	<i>T. laotum</i> , <i>N. siki</i> , <i>Macaque sp.</i>	Hunting/ poaching/logging	Decreased	DAFO staffs; villagers
	Ban Or	<i>T. laotum</i>	Hunting	Decreased	DAFO staffs
	Ban Kateup	<i>T. laotum</i> , <i>N. siki</i> , <i>Macaque sp.</i> , <i>serow sp.</i>	Hunting	Unknown	Villagers
Nakai	Ban Natan	<i>T. laotum</i> , <i>Macaque sp.</i>	Poaching	Decreased	DAFO staffs
	Ban Kuam Sam	<i>T. laotum</i>	Unknow	Unknown	DAFO staffs
	Ban Vanghin	<i>T. laotum</i>	Unknow	Unknown	DAFO staffs
Yommalath	Ban Kuanphan	<i>T. ebenus</i> , <i>Macaque sp.</i> , maybe <i>T. laotum</i>	Hunting	Unknown	DAFO staffs
Thakhek	Ban Doi	<i>T. laotum</i> , <i>N. siki</i> , maybe <i>T. ebenus</i>	Hunting	Decreased	DAFO staffs
	Ban Phalaem	<i>T. laotum</i> , <i>N. siki</i> , maybe <i>T. ebenus</i>	Hunting	Decreased	DAFO staffs

Ban = Village; DAFO = District Agriculture and Forestry Office; Number of interviewees (31 persons): 14 DAFO staffs + 17 villagers

3.2 Field survey

The field surveys were carried out in the central part of the PHP-NPA from 13 August to 17 December 2020. Konglor-Natan, Konglor, Buamlou and Kuankacha sites were visited and 21 trails walked with total survey track length of 64.1 km. The length of each trail walked is summarized in Table 3 and Lao langur encountered on each trail are compiled in Table 4.

Table 3: Lengths (in km walked) of each trail during this survey

Trails	Length (Km)*
<i>Sector: Konglor-Natan</i>	<i>14.9</i>
Trail 1: Tham Huator ¹	3
Trail 2: Konglor Cave ¹	2.5
Trail 3: Poug Ta Thid Pha	2.6
Trail 4: Kouan Xone ¹	3.5
Trail 5: Pha Tang	3.3
<i>Sector: Konglor</i>	<i>32.8</i>
Trail 6: Pha Soung	2.3
Trail 7: Pha Hom	2.9
Trail 8: Phou Hon Khuarn	3.3
Trail 9: Ang Nam Ta Ngon	2.5
Trail 10: Phou Khar	4.2
Trail 11: Nong Ka Pard	5.8
Trail 12: Huay Lurk	3
Trail 13: Ang Khee Ther	4
Trail 14: Phou Hai	2.1
Trail 15: Kouan Dig	2.7
<i>Sector: Buamlou</i>	<i>5</i>
Trail 16: Kouan Pang	3.1
Trail 17: Phou Muang Khai	1.9
<i>Sector: Kuankacha</i>	<i>11.4</i>
Trail 18: Kouan Phai	1.9
Trail 19: Hew Nam	2.9
Trail 20: Kouan Or	3.9
Trail 21: Pha Luang	2.7

*Length is calculated based on the tracking tool of the GPS – Only one way is included in the calculation (Double count of trail walked on the way back is not included); ¹ Trials are outside of the Phou Hin Poun National Protected Area

Konglor-Natan sector

Trail 1: We surveyed along this trail two times. Our first walk encountered two troops of Lao langur in August 2020. The first troop (2 adult individuals) was sighted under the tree canopy

in the karst forest hill at Tham Kuay. The second troop was observed at Tham Huator while they were feeding and sitting on the rock. We recorded 2 adult females, one adult male and two sub-adults (1 male) in this area. We resurveyed along this trail in September and recorded a Lao langur troop with only 3 members were feeding at Tham Huator. We sighted two adults and one sub-adult and also recorded a troop of Assamese macaques with five individuals at the same site. We also recorded two individuals of Endangered snakes (*Trimeresurus truongsonensis*) along this trail.

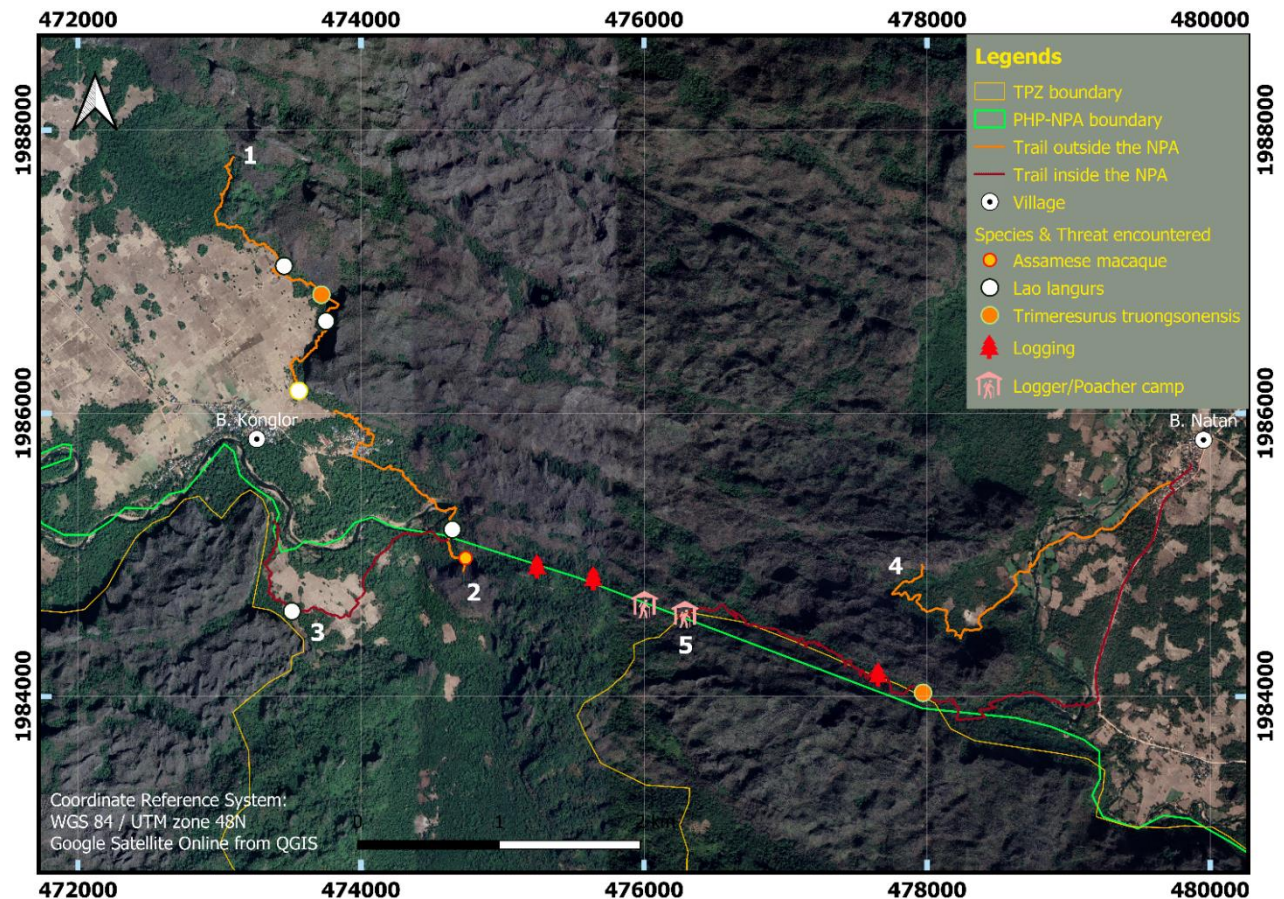


Figure 3: Trails walked with locations of the Lao langurs encountered at Konglor-Natan Sector

Trail 2: We surveyed only in the morning at Konglor cave due to undesirable weather conditions. A langur group was encountered close to the Konglor cave. We sighted one adult male, two adult females and one sub-adult while they were eating leafs on trees, and also recorded a group of Assamese macaques (5 individuals) moving to their sleeping-sites.

Trail 3: We surveyed at Pong Ta Thid Pha area in Konglor village and walked along the Total Protection Zone boundaries of the reserve. Due to heavy rain, we have temporally stopped walking and continued when rain was easing. A langur troop with 2 adult males and one adult female was recorded on trees at cliffs and their sleeping site in this area.

Trail 4: We conducted the survey at Kuan Xone area in Natan village of Nakai district and no langurs were detected during the trail walk. Villagers reported that the Lao langurs inhabited in this site in the past and a troop of 12 langurs near their village were hunted by hunter two years ago.

Trail 5: We used a tourism trail start from Natan to Konglor and surveyed in Pha Tang area. There were no langurs were detected along this trail but the logging of valuable tree species was observed. One Endangered snake (*Trmeresurus truongsoneensis*) snake was recorded from this trail

Konglor Sector

Trail 6: One old sleeping site was found one troop with four langurs was sighted at Pha Soung area.

Trail 7: There were no langurs detected along this trail. Some evidences related to selective logging in karsts and poaching were observed. For example, many camps with trashes (energy drink cans, coffee, dry noodle, etc.) are distributed in the area and a box of gun bullet was found. This evidence indicated that local people regularly access inside the Total Protection Zone for poaching the wild animals and logging the valuable tree species.

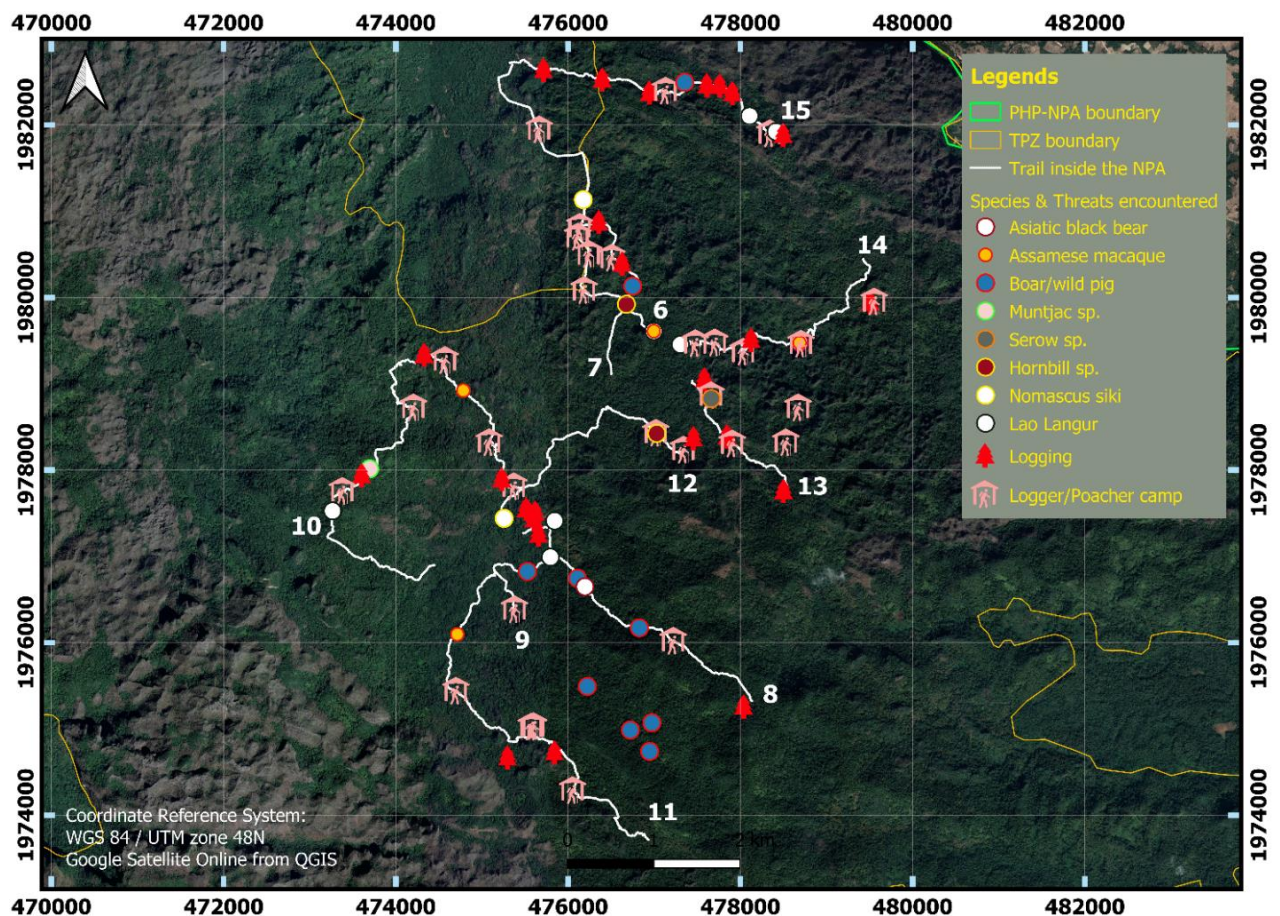


Figure 4: Trails walked with locations of the Lao langurs encountered at Konglor Sector

Trail 8: We only heard the voices from a group of Lao langurs near Phou Hon Khaurn area. The langur called three times and they were quiet far from us, so we could not determine their group size.

Trail 9: A group with six individuals and five Assamese macaques were sighted in the morning close to Ang Ta Ngon area. The langurs and macaques were feeding in the same trees. We also found a fresh-sleeping site near Nong Ka Pard area.

Trail 10: We found bamboo on the ground close to the Phou Phaeng area, the langurs eat bamboo as food. Eight Assamese macaques were recorded and an old sleeping site of Lao langur found along this trail; a Lao langur call was heard at Phou Phaeng area.

Trail 11: There were no detections of the Lao langur on this trail. We have seen two big camps with hunting tools such guns, snare, bullets.

Trail 12: There were no langurs found along this trail.

Trail 13: We recorded a group of the langur (3 individuals) at Ang Khee Ther area while they were moving in the morning.

Trail 14: We found no langurs on this trail.

Trail 15: Our team visited Kuan Dik. We heard a group of the langurs calling in early morning at our camp and a group of langurs with five individuals was observed while they were feeding in this site.

Buamlou Sector

Trail 16: Our team visited Kuan Pang in Ban Buamlou, Hinboun district. Two troops of Lao langur were detected; we heard the first troop called in the morning at our camp and second groups called in the afternoon at Kuan Pang. We also heard voices of the gibbon and the scratch mark of the Asia black bear in the site.

Trail 17: We only heard a group of langur's calls near Phou Mounghai area and one fresh sleeping site. On the way back from this Phou Mounghai we heard another langur call near Nam Pa Kan stream.

Kuankacha Sector

Trail 18: Our team camped at Kuan Khaen and surveyed at Kuan Phai area. There were no any langurs but we heard their call early morning at our camp.

Trail 19: We visited Hew Nam area but we detected no langurs on this trail.

Trail 20: Our team surveyed at Kuan Or area and found no langurs at this area.

Trail 21: Our team visited Pha Luang and found only an old sleeping site and heard a group of gibbons calling.

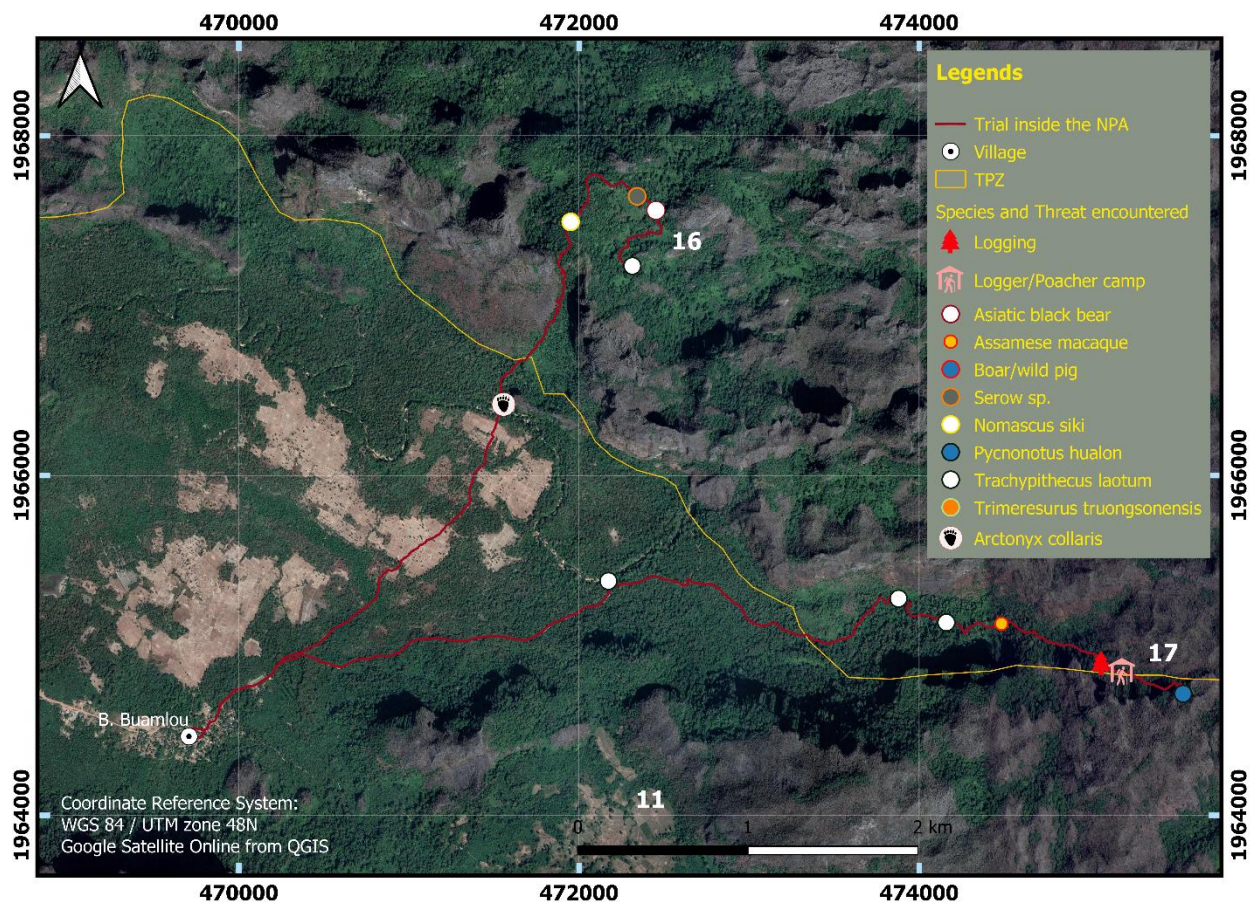


Figure 5: Trails walked with locations of the Lao langurs encountered at Buamlou Sector

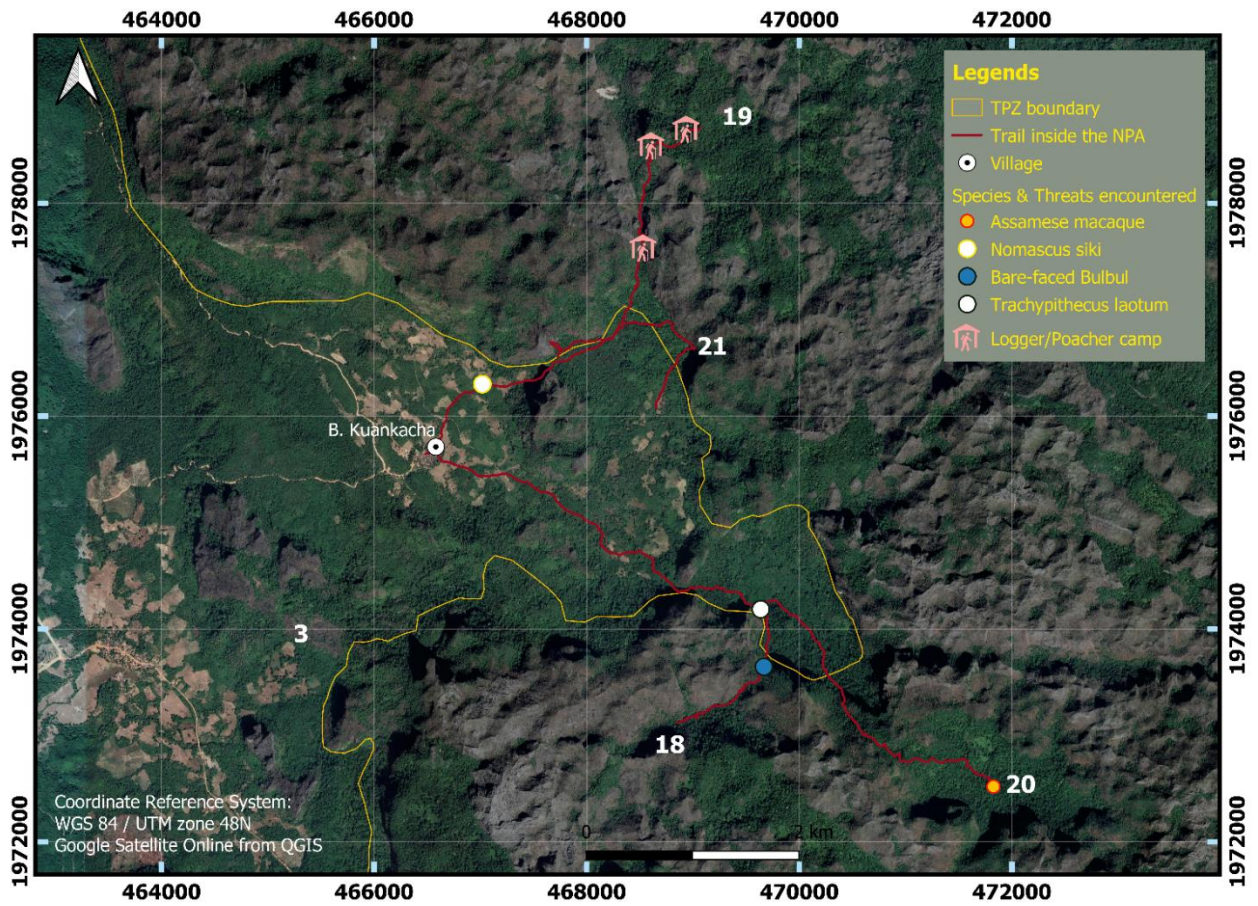


Figure 6: Trails walked with locations of the Lao langurs encountered at Kuankacha Sector

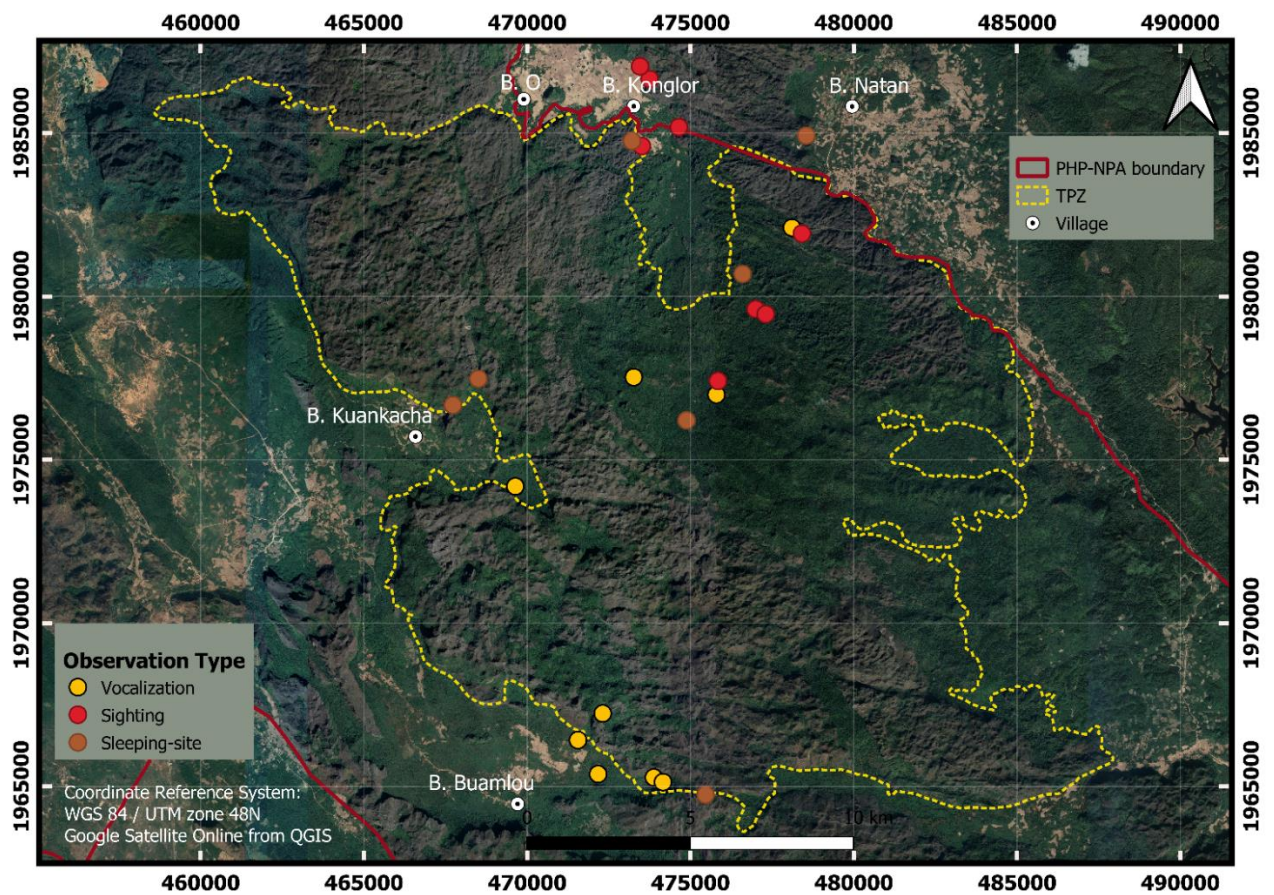


Figure 7: All observation locations of *T. laotum* from the survey

3.2.1 Encounter rate

We calculated the encounter rate of the langur group counted divided by total length in each sector (The length of the trail and number of langur groups recorded from Trail 1, 2 and 4 that are outside the Phou Hin Phoun National Protected Area boundary is included for the calculation) (See Table 3)

Table 3: Lao langurs encountered/detected on trails walked in each sector

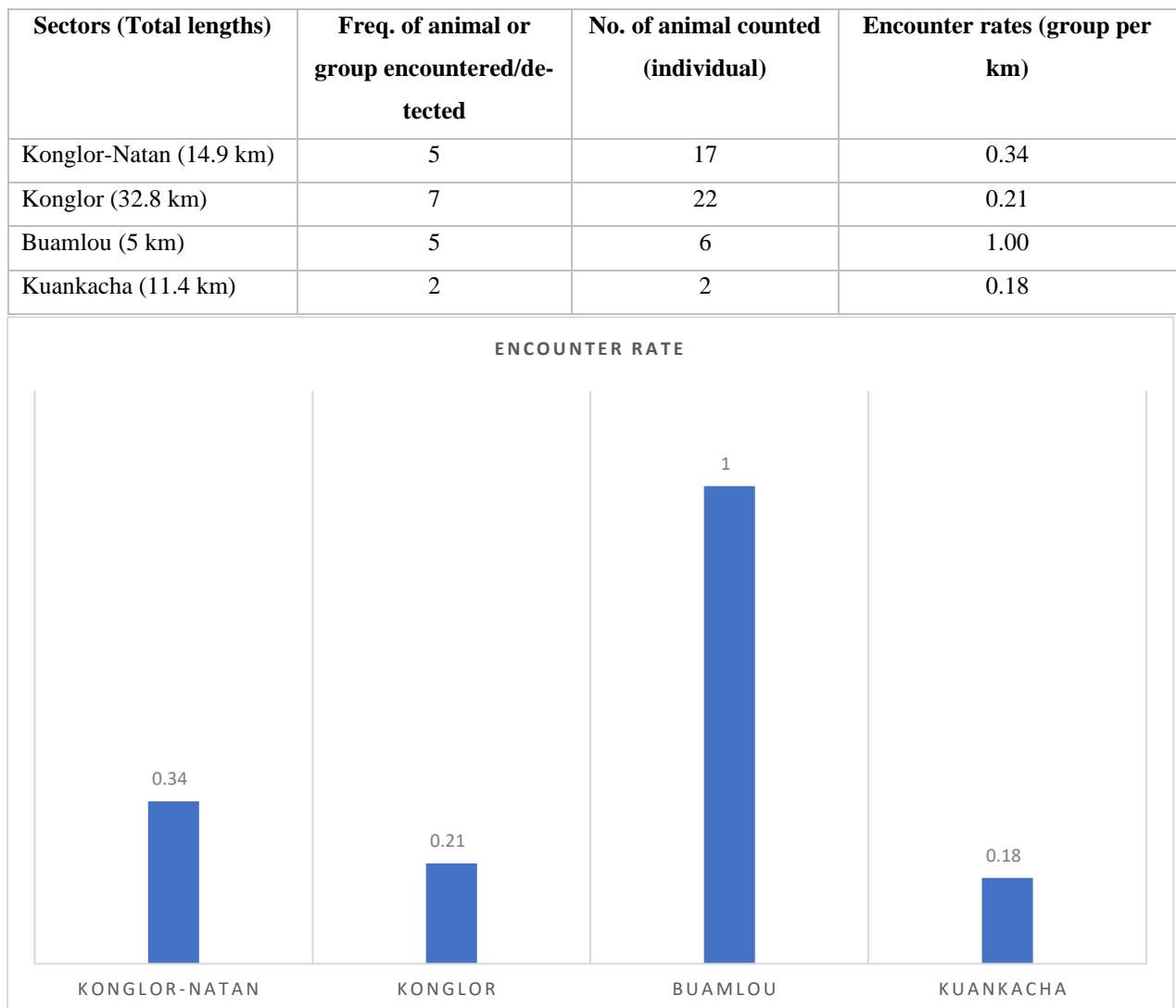


Figure 8: Chart showing the encounter rate (group/km) of the Lao langur in each sector

3.2.2 Group Size

In total, we counted nine groups (35 individuals) of *T. laotum* during this survey. We recorded 24 adults (both female and male), 10 sub-adults (both female and male) and one juvenile (see Table 4).

Table 4: Group size of *T. laotum* recorded during this survey

Gr. no.	Location	Coordinate (GPS)		Adults	Sub-Adults	Juveniles	Infants	Group size
		WGS 84 UTM Zone 48 N						
1	Tham Kuay	473753	1986651	2	0	0	0	2
2	Tham Huator	473457	1987041	3	2	0	0	5
3	Near Konglor cave	474646	1985180	3	1	0	0	4
4	Poung Ta Tid Pha	473512	1984602	3	0	0	0	3
5	Tham Huator	473753	1986651	2	1	0	0	3
6	Pha Soung	476995	1979610	2	2	0	0	4
7	Ang Nam Ta Ngon	475844	1977413	4	2	0	0	6
8	Ang Khee Ther	477304	1979456	2	1	0	0	3
9	Kuan Dik	478413	1981923	3	1	1	0	5
Total				24	10	1	0	35

3.2.3 Threats

Logging

Logging in karst areas was found in four sectors. We recorded large numbers of valuable tree logging of Black and White Ebony – *Diospyros embryopteris* (Mai Moon) and other hardwood species from Konglor-Natan and Konglor sites. On-going logging of Merbea - *Azelia xylocarpa* (Mai Tae Khar), and Indian rosewood - *Dalbergia Cultrata* (Mai Kham Phii) was mainly found at Konglor site where is far from the village. Many trails, camps and trashes (energy drink cans, cigarettes, etc.) were also distributed inside the Total Protection Zone. For example, two camps (about 7-8 sleeping bags in each camp) close to Nong Ka Pard area were observed along the Trail 11; four large trees of *Diospyros embryopteris* were felt and four ladders were constructed to move the *Diospyros embryopteris* trees out of the limestone forest at Konglor site to target villages of Nakai district. Logging tools were also found at camps. We found a chainsaw with engine oil and gas at a camp near Phou Hai area while walking along the Trail 14. Loggers cut *Diospyros embryopteris* trees and *Dalbergia Cultrata* trees close to our survey camp at Ang Ta Ngon area.

Poaching/hunting

Villagers reported that guns, snares and traps are used to hunt the animals in Phou Hin Poun National Protected Area. We had few evidences of *T. laotum* during field survey.

Ban Natan: A villager reported that a poacher killed a group (12 individuals) of Lao langurs by gun close to primary school two years ago (probably in 2018). A decade ago, the langurs could be observed easily when they were feeding on the cliffs near the village, but now it is hard to see them because villagers normally poached them and their population decreased. The photos of the langurs hunted in this village was taken from a local villager (see Figure 9 on the right).

Ban Konglor: Large number of camps and evidence of wild animal hunting in this area were recorded. We found two guns with bullets at a camp along the trail 11 at Nong Ka Pard area, an important area for poachers/loggers due to water sources. A villager participated this survey reported that he and his friends had stayed in the protected area for many months searching for agarwood tree and other valuable trees and killed at least 500 individuals of primate species including langurs, macaques, gibbon and lorries in Phou Hin Poun National Protected Area between 2000 to 2010. He also reported that his friends also killed just above 200 individuals of these primates. In addition, our team confirmed that Lao Langurs (see Figure 9 on the left) were kept at a tiger zoo in Khamkheut district, Borlikhamxay province to attract tourists/visitors.

Ban Buamlou: Villagers reported that Lao Langur meat is consumed in families and their bones normally was sold for approximately 80,000 Kip (about 9 USD)/kg to some Vietnamese shops in Ban Songhong. We found a claw (see Figure 10) of the Hog badger (*Arctonyx collaris*) near our camp (Trail 16) at the Nam Pa Kan river, the Hog badger mostly was taken (poached) from Kuan Pang. In addition, our team heard a sound of gunshot on the way back from Kuan Pang (Trail 16), observed a pick truck with big ice box parking at a villager house, and noticed four people were carrying bag packs and walk to the protected area, they may go to the forest for wild animal hunting.



Figure 9: Hunting/poaching evidence (left: langurs from natural habitats are kept at a zoo in Khamkheut district, Bolikhamxay province; right: two Lao Langur killed in Ban Natan)



Figure 10: Evidence of poaching, the Hog Badger claw found near survey camp at the Nam Pa Kan river, Ban Buamlou, Hinboun district. (Photo by: Peter Brakels)

Ban Kuankacha: Our survey team found two guns in Kuankacha sector. One gun at a camp along the trail 19 and another was found on the way back from Kuan Khaen. These guns were confiscated by protected area rangers.

Mining

There are iron (Fe) extraction companies located in Hinboun district. An Iron extraction company (called Bor Hin Mark Lek in Lao) is observed during this survey. The company is implementing the iron extraction activities on their sites close to Ban Kuankacha and build a new road for trucks to access the mining site. Villagers from Ban Kuankacha reported that the mining site is located very close to boundaries of Total Protection Zone of Phou Hin Poun National Protected Area (see Figure 11) and this mining activities make loud sound and might disturb the animals in the area.

Habitat fragmentation

Roads and trails were developed to access villages inside and surrounding the Protected Area caused the habitat fragmentation of Lao langur. Increasing population pressure is expected to increase smallholder farming areas in the future. However, mining and logging inside the protected area are expected be main drivers to habitat loss.



Figure 11: The new road is built to access the mining site in the northwest of Kuankacha village that very close to the Total Protection Zone boundary based on Google satellite images.

IV. CONCLUSION AND RECOMMENDATION

The project was carried out in PHP-NPA from August to December 2020. Our team spent 37 days for field survey with 32 participants (PAFO, DAFO and local people) involved the project activities. We walked 64.1 km along 18 transects are inside and on the edge of the TPZ and 3 transects are outside the NPA (total 21 transects) and recorded 35 individuals in 9 troops. The highest encounter/detection rate of the Lao langur dominated to Buamlou site (a group per km), Konglor-Natan site (0.34 group/km), Konglor site (0.21 group/km), Kuankacha site (0.18 group/km) respectively. Some of protected area staffs and rangers involved in the project were selected and trained how to use the field survey equipment (rangefinder, binocular, GPS, data collection).

Poaching and selective logging in karsts are the main existing threats to the PHP-NPA. Konglor site was the best accessible area for local people. Logging of valuable tree species and poaching the wild animal largely was found on the trails inside the Total Protection Zone. This site is regularly visited by poachers/loggers because its terrain is easier to access and contains water

source, large numbers of wild animals, and valuable trees. Many poachers/loggers often enter the area for poaching, logging and collecting of non-timber forest product both during the dry and wet season.

We suggest that central forest or TPZ of the PHP-NPA should be the most priority area for key species conservation in this reserve. It contains suitable habitat for Lao Langur, Southern white-cheeked gibbon, Asiatic black bear, hornbills, muntjac sp., deer, wild pig, sun bear, serow, macaque sp., probably black langur and rare flora species such *Diospyros embryopteris*, agarwood *Aquilaris*, Dragon's blood *Dracaena sp.*, rosewood - *Dalbergia Cultrata*, etc.

To save the remaining Lao langur population in PHP-NPA, there are still a lot of work to be done by the protected area management, especially in Khammouane Province. Currently, IUCN provides technical and financial support for the protected area staffs to conserve the protected area biodiversity and effective management in Phou Hin Poun National Protected Area. We believe that further researches on population and ecology of this endangered langur should be conducted to provide better understanding about species and aid conservation.

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Annex 1: List of the ten questions forming the standardized questionnaire for the various interviewees at the survey area

1. Are there any monkeys in PHP-NPA?
2. How many species?
3. Do you know or have you seen the Lao langur (=Khounng) at your site?
4. How does the Lao langur look like? [showing the photo after this time in case of clearly correct description of the species].
5. Where did you see them?
6. Have you seen Lao langur in the past?
7. Are there many Lao langur individuals still found in the forest in your area?
8. Based on your experience, Lao Langur increased or decreased in abundance at your site during the years of your surveys? That is, can you compare past and present abundance of Lao langur at your site?
9. [if the interviewee noticed a decline of species' abundance] Why did the Lao langur decrease?
10. What do you do with Lao langur in case of capture?

Annex 2: Field notes

Site	Trail	Surveyor	Date	Species/Threats	Time	Detection	Distance (m)	GPS Point		Elev (m)	Individuals	Remark
								Easting	Northing			
Konglor-Natan	1	Johnny+Lianphet+Kongla+2 villagers	14.08.2020	<i>Trachypithecus laotum</i>	11:02	See	200	473753	1986651	181	2	In the Tham Kuay/ Ban Konglor
Konglor-Natan	1	Johnny+Lianphet+Kongla+2 villagers	14.08.2020	<i>Trimeresurus truongsongensis</i>	11:28	See	1	473720	1986838	185	2	Near Tham Kuay/Ban Konglor
Konglor-Natan	1	Johnny+Lianphet+Kongla+2 villagers	14.08.2020	<i>Trachypithecus laotum</i>	14:10	See	185	473457	1987041	209	5	In the Tham Huator/Ban Konglor
Konglor-Natan	1	Johnny+Lianphet+Kongla+2 villagers	14.08.2020	<i>Trachypithecus laotum</i> rooting cave	15:00			473009	1987486			
Konglor-Natan	2	Johnny+Lianphet+Kongla+2 villagers	15.08.2020	<i>Trachypithecus laotum</i>	11:27	See	62.4	474646	1985180	208	4	Near Konglor Cave/Ban Konglor
Konglor-Natan	2	Johnny+Lianphet+Kongla+2 villagers	15.08.2020	Assamese macaque	12:07	See	105	474739	1984978	198	5	Near Konglor Cave/Ban Konglor
Konglor-Natan	3	Johnny+Lianphet+Kongla+2 villagers	15.08.2020	<i>Trachypithecus laotum</i>	15:58	See	127	473512	1984602	175	3	Poung Ta Tid Pha/Ban Konglor
Konglor-Natan	3	Johnny+Lianphet+Kongla+2 villagers	15.08.2020	<i>Trachypithecus laotum</i> rooting cave	16:31			473208	1984756			
Konglor-Natan	1	Johnny+Lianphet+Kongla+2 villagers	27.08.2020	<i>Nomascus siki</i>	6:03	heard	~400	473560	1986159	~250	1	In the Tham Huator/Ban Konglor
Konglor-Natan	1	Johnny+Lianphet+Kongla+2 villagers	27.08.2020	Assamese macaque	7:00	See	192	473457	1987041	185	6	In the Tham Huator/Ban Konglor
Konglor-Natan	1	Johnny+Lianphet+Kongla+2 villagers	27.08.2020	<i>Trachypithecus laotum</i>	12:16	See	192	473457	1987041	185	3	In the Tham Huator/Ban Konglor
Konglor-Natan	4	Johnny+Lianphet+2 villagers	05.09.2020	<i>Trachypithecus laotum</i> rooting cave	12:03			478547	1984922			
Konglor-Natan	5	Johnny+Lianphet+2 villagers	06.09.2020	<i>Trimeresurus truongsongensis</i>	9:49	See	2	477971	1984026	359	1	In tourism trail from Ban Natan
Konglor-Natan	5	Johnny+Lianphet+2 villagers	06.09.2020	Logging of <i>Diospyros embryopteris</i>	10:22			477657	1984153			
Konglor-Natan	5	Johnny+Lianphet+2 villagers	06.09.2020	Logger/poacher camp	12:33			476295	1984575			
Konglor-Natan	5	Johnny+Lianphet+2 villagers	06.09.2020	Logger/poacher camp	12:55			476009	1984645			
Konglor-Natan	5	Johnny+Lianphet+2 villagers	06.09.2020	Logging of <i>Diospyros embryopteris</i>	13:21			475645	1984833			
Konglor-Natan	5	Johnny+Lianphet+2 villagers	06.09.2020	Logging of <i>Diospyros embryopteris</i>	13:40			475248	1984917			

Site	Trail	Surveyor	Date	Species/Threats	Time	Detection	Distance (m)	GPS Point		Elev (m)	Individuals	Remark
								Eastings	Northings			
Konglor	6	Johnny+Lianphet+Kongla+Kalason+5 rangers	24.11.2020	Logger/poacher camp	10:50			475673	1981942			
Konglor	6	Johnny+Lianphet+Kongla+Kalason+5 rangers	24.11.2020	Logger/poacher camp	13:48			476146	1980813			
Konglor	6	Johnny+Lianphet+Kongla+Kalason+5 rangers	24.11.2020	Logging of <i>Afzelia xylocarpa</i>	14:07			476363	1980870			
Konglor	6	Johnny+Lianphet+Kongla+Kalason+5 rangers	24.11.2020	<i>Trachypithecus laotum</i> rooting cave	14:32			476595	1980687			
Konglor	6	Johnny+Lianphet+Kongla+Kalason+5 rangers	24.11.2020	Logger/poacher camp	14:50			476516	1980456			
Konglor	6	Johnny+Lianphet+Kongla+Kalason+5 rangers	24.11.2020	Logging of <i>Diospyros embryopteris</i>	15:02			476634	1980387			
Konglor	6	Johnny+Lianphet+Kongla+Kalason+5 rangers	24.11.2020	Boar/wild pig	15:23	See	27	476749	1980133	375	2	
Konglor	6	Johnny+Lianphet+Kongla+Kalason+5 rangers	24.11.2020	Hornbill sp.	15:27	heard		476677	1979922		1	In Phasoung/Ban Konglor
Konglor	6	Johnny+Lianphet+Kongla+Kalason+5 rangers	24.11.2020	<i>Trachypithecus laotum</i>	15:59	See	105	476995	1979610	349	4	In Phasoung/Ban Konglor
Konglor	6	Johnny+Lianphet+Kongla+Kalason+5 rangers	24.11.2020	Assamese macaque	15:59	See	71	476995	1979610	349	2	In Phasoung/Ban Konglor
Konglor	7	Johnny+Lianphet+Kongla+Kalason+5 rangers	25.11.2020	<i>Nomascus siki</i>	5:29	heard	~650	476176	1981135	~401	3	In the Lath Tae area/Ban Konglor
Konglor	7	Johnny+Lianphet+Kongla+Kalason+5 rangers	25.11.2020	Logger/poacher camp (Fire)	8:21			476120	1980698			
Konglor	7	Johnny+Lianphet+Kongla+Kalason+5 rangers	25.11.2020	Logger/poacher camp (Fire)	8:56			476250	1980499			
Konglor	7	Johnny+Lianphet+Kongla+Kalason+5 rangers	25.11.2020	Logger/poacher camp	9:18			476195	1980080			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	<i>Nomascus siki</i>	5:17	heard	~700	475257	1977441	~455	2	In the Ang Nam Ta Ngon/Ban Konglor
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Boar/wild pig nest	7:36			475632	1976976			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	<i>Trachypithecus laotum</i>	7:51	heard	~300	475795	1976991	~477	1	In the Phou Hon Khuarn area
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Boar/wild pig	8:07	heard	~50	476109	1976746			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Logger/poacher	8:09			476141	1976700			

Site	Trail	Surveyor	Date	Species/Threats	Time	Detection	Distance (m)	GPS Point		Elev (m)	Individuals	Remark
								Eastings	Northings			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Asiatic black bear	8:20	heard	~300	476196	1976649		1	
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Boar/wild pig	9:11	heard	~30	476827	1976172			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Logger/poacher camp	9:24			477230	1976016			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Boar/wild pig nest	10:25			478131	1975332			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Logging/Mai Moon	10:33			478045	1975254			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Boar/wild pig	13:20	heard	~35	476973	1975072			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Boar/wild pig	13:35	heard	~42	476723	1974988			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Boar/wild pig	13:51	heard	~40	476947	1974740			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Boar/wild pig	14:21	heard	~40	476224	1975493			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Logger/poacher camp	14:52			47568	1975425			
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Logger/poacher camp	15:25			475609	1975025			In Nong Ka Pard area /Ban Konglor
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Logger/poacher camp	15:30			475583	1975020			In Nong Ka Pard area /Ban Konglor
Konglor	8	Johnny+Lianphet+Kongla+Kalason+5 rangers	26.11.2020	Logger/poacher camp	16:14			474707	1975436			In Nong Ka Pard area /Ban Konglor
Konglor	9	Johnny+Lianphet+Kongla+5 rangers	27.11.2020	<i>Nomascus siki</i>	5:07	heard	~800	475257	1977441		3	In the Ang Nam Ta Ngon/Ban Konglor
Konglor	9	Johnny+Lianphet+Kongla+5 rangers	27.11.2020	Assamese macaque	7:54	See	~100	475846	1977408	511	7	In the Ang Nam Ta Ngon/Ban Konglor
Konglor	9	Johnny+Lianphet+Kongla+5 rangers	27.11.2020	<i>Trachypithecus laotum</i>	8:16	See	95	475844	1977413	526	6	In the Ang Nam Ta Ngon/Ban Konglor
Konglor	9	Johnny+Lianphet+Kongla+5 rangers	27.11.2020	Boar/wild pig	9:20	heard	~60	475529	1976826			
Konglor	9	Johnny+Lianphet+Kongla+5 rangers	27.11.2020	Logger/poacher camp	10:04			475388	1976380			
Konglor	9	Johnny+Lianphet+Kongla+5 rangers	27.11.2020	<i>Trachypithecus laotum</i> rooting cave	10:41			474880	1976205			

Site	Trail	Surveyor	Date	Species/Threats	Time	Detection	Distance (m)	GPS Point		Elev (m)	Individuals	Remark
								Easting	Northing			
Konglor	9	Johnny+Lianphet+Kongla+5 rangers	27.11.2020	Logging of <i>Diospyros embryopteris</i>	14:30			475609	1977425			
Konglor	9	Johnny+Lianphet+Kongla+5 rangers	27.11.2020	Logging of <i>Diospyros embryopteris</i>	16:17			475624	1977504			
Konglor	9	Johnny+Lianphet+Kongla+5 rangers	27.11.2020	Logging of <i>Dalbergia Cultrata</i>	14:47			475519	1977542			
Konglor	9	Johnny+Lianphet+Kongla+5 rangers	27.11.2020	Logging of <i>Diospyros embryopteris</i>	15:13			475663	1977247			
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	<i>Nomascus siki</i>	5:12	heard	~700	475257	1977441		3	In the Ang Nam Ta Ngon/Ban Konglor
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	Logger/poacher camp	7:37			475379	1977805			
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	Logging of <i>Diospyros embryopteris</i>	7:46			475237	1977890			
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	<i>Trachypitecus laotum</i> food (bamboo)	7:50			475228	1977978			
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	Logger/poacher camp	8:19			475093	1978317			
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	Assamese macaque	8:59	See	150	474783	1978922	~516	8	In the Phou Khar area/Ban Konglor
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	Logger/poacher camp	9:21			474580	1979268			
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	Logging of <i>Diospyros embryopteris</i>	9:37			474336	1979330			
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	Logger/poacher camp	10:58			474214	1978720			
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	Farn/deer	13:43	heard	~200	473696	1978015			
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	Logging/Mai Moon	13:48			473610	1977935			
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	Logger/poacher camp	14:10			473388	1977752			
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	<i>Trachypitecus laotum</i>	14:26	heard	~210	473265	1977527	~625	1	In the Phou Pheng area/Ban Konglor
Konglor	10	Johnny+Lianphet+2 villagers	28.11.2020	Agarwood	15:26			473992	1976845			
Konglor	11	Kongla+3 villagers	28.11.2020	Assamese macaque	8:25	heard	~200	474713	1976098			In the Ang Nam Ta Ngon/Ban Konglor

Site	Trail	Surveyor	Date	Species/Threats	Time	Detection	Distance (m)	GPS Point		Elev (m)	Individuals	Remark
								Easting	Northing			
Konglor	11	Kongla+3 villagers	28.11.2020	Logging of <i>Diospyros embryopteris</i>	14:44			475303	1974665			
Konglor	11	Kongla+3 villagers	28.11.2020	Logging of <i>Diospyros embryopteris</i>	10:20			475849	1974724			
Konglor	11	Kongla+3 villagers	28.11.2020	Logger/poacher camp	10:56			476062	1974284			
Konglor	11	Kongla+3 villagers	28.11.2020	Ladder (moving the timber)	9:45			475442	1974908			Near Nong Ka Pard area
Konglor	11	Kongla+3 villagers	28.11.2020	Ladder (moving the timber)	9:59			475589	1974929			Near Nong Ka Pard area
Konglor	11	Kongla+3 villagers	28.11.2020	Ladder (moving the timber)	10:07			475777	1974842			Near Nong Ka Pard area
Konglor	11	Kongla+3 villagers	28.11.2020	Ladder (moving the timber)	11:16			476477	1974174			Near Nong Ka Pard area
Konglor	12	Johnny+Lianphet+Kongla+5 rangers	29.11.2020	Logger/poacher camp	10:34			477029	1978425			Near Nong Ka Pard area
Konglor	12	Johnny+Lianphet+Kongla+5 rangers	29.11.2020	Hornbill sp.	10:34	heard	~65	477029	1978425		1	Huay lurk area
Konglor	12	Johnny+Lianphet+Kongla+5 rangers	29.11.2020	Logger/poacher camp	11:33			477350	1978231			
Konglor	12	Johnny+Lianphet+Kongla+5 rangers	29.11.2020	Logging of <i>Diospyros embryopteris</i>	11:57			477463	1978364			
Konglor	12	Johnny+Lianphet+Kongla+5 rangers	29.11.2020	Logging of <i>Diospyros embryopteris</i>	16:53			477590	1979048			
Konglor	12	Johnny+Lianphet+Kongla+5 rangers	29.11.2020	Logger/poacher camp	16:12			477668	1978861			
Konglor	12	Johnny+Lianphet+Kongla+5 rangers	29.11.2020	Feces (Serow sp.)	16:17			477663	1978829			
Konglor	13	Johnny+Lianphet+2 villagers	30.11.2020	<i>Trachypithecus laotum</i>	7:46	See	253	477304	1979456	390	3	In the Ang Khee Ther/Ban Konglor
Konglor	13	Johnny+Lianphet+2 villagers	30.11.2020	Poacher camp	8:04			477487	1979465			
Konglor	13	Johnny+Lianphet+2 villagers	30.11.2020	Poacher camp	8:37			477713	1979473			
Konglor	13	Johnny+Lianphet+2 villagers	30.11.2020	Logger/poacher camp	9:12			478043	1979366			
Konglor	13	Johnny+Lianphet+2 villagers	30.11.2020	Logging of <i>Diospyros embryopteris</i>	9:22			478131	1979504			

Site	Trail	Surveyor	Date	Species/Threats	Time	Detection	Distance (m)	GPS Point		Elev (m)	Individuals	Remark
								Easting	Northing			
Konglor	13	Johnny+Lianphet+2 villagers	30.11.2020	Asiatic black bear	9:50	heard	~300	478689	1979479	~351	1	Near Ang Khee Ther area
Konglor	13	Johnny+Lianphet+2 villagers	30.11.2020	Assamese macaque	9:49	heard	~210	478688	1979476	~351	2	Near Ang Khee Ther area
Konglor	13	Johnny+Lianphet+2 villagers	30.11.2020	Logger/poacher camp	9:53			478713	1979458			
Konglor	13	Johnny+Lianphet+2 villagers	30.11.2020	Logging of <i>Diospyros embryopteris</i>	11:21			479515	1979938			
Konglor	13	Johnny+Lianphet+2 villagers	30.11.2020	Logger/poacher camp	11:27			479564	1979948			
Konglor	14	Kongla+3 villagers	30.11.2020	Logging of <i>Diospyros embryopteris</i>	7:42			477852	1978385			
Konglor	14	Kongla+3 villagers	30.11.2020	Logger/poacher camp	7:55			477915	1978302			
Konglor	14	Kongla+3 villagers	30.11.2020	Poaching/ Logging of <i>Diospyros embryopteris</i>	8:13			478302	1978028			
Konglor	14	Kongla+3 villagers	30.11.2020	Logging/Mai Moon	8:51			478508	1977752			
Konglor	14	Kongla+3 villagers	30.11.2020	Logger/poacher camp	9:20			478539	1978315			
Konglor	14	Kongla+3 villagers	30.11.2020	Logger/poacher camp	9:56			478681	1978719			
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	02.12.2020	Logging of <i>Diospyros embryopteris</i>	9:13			475721	1982633			
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	02.12.2020	Logging of <i>Diospyros embryopteris</i>	10:06			476403	1982522			
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	02.12.2020	Logging of <i>Diospyros embryopteris</i>	10:33			476950	1982371			
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	02.12.2020	Logger/poacher camp	10:52			477141	1982392			
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	02.12.2020	Boar/wild pig	11:03	heard	~100	477354	1982494	~499		
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	02.12.2020	Logging of <i>Diospyros embryopteris</i>	11:20			477618	1982457			
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	02.12.2020	Logging of <i>Diospyros embryopteris</i>	11:40			477766	1982450			
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	02.12.2020	Logging of <i>Diospyros embryopteris</i>	11:52			477914	1982363			

Site	Trail	Surveyor	Date	Species/Threats	Time	Detection	Distance (m)	GPS Point		Elev (m)	Individuals	Remark
								Eastings	Northing			
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	03.12.2020	<i>Trachypithecus laotum</i>	6:57	heard	~250	478108	1982105	~420	2	In the Kuan Dig/Ban Konglor
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	03.12.2020	Logger/poacher camp	7:10			478352	1981897			
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	03.12.2020	<i>Trachypithecus laotum</i> food (bamboo)	7:52			478369	1982075			In the Kuan Dig/Ban Konglor
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	03.12.2020	<i>Trachypithecus laotum</i>	7:39	See	215	478413	1981923	451	5	In the Kuan Dig/Ban Konglor
Konglor	15	Johnny+Lianphet+Kongla+5 rangers	03.12.2020	Logging of <i>Diospyros embryopteris</i>	8:23			478504	1981881			
Buamlou	16	Johnny+Lianphet+ Peter +Balame+Khampoun+5 rangers	08.12.2020	<i>Trachypithecus laotum</i>	7:03	heard	~80	471557	1966419	~166	1	Near Kouan Pang/Ban Buamlou
Buamlou	16	Johnny+Lianphet+ Peter +Balame+Khampoun+5 rangers	08.12.2020	<i>Nomascus siki</i>	10:27	heard	~1000	471951	1967493	~678	2	Kouan Pang/Ban Buamlou
Buamlou	16	Johnny+Lianphet+ Peter +Balame+Khampoun+5 rangers	08.12.2020	Feces (Serow sp.)	13:27			472342	1967644			
Buamlou	16	Johnny+Lianphet+ Peter +Balame+Khampoun+5 rangers	08.12.2020	<i>Trachypithecus laotum</i>	14:46	heard	~200	472314	1967234	~504	1	Kouan Pang/Ban Buamlou
Buamlou	16	Johnny+Lianphet+ Peter +Balame+Khampoun+5 rangers	08.12.2020	Asiatic black bear (nail trace)	16:39			472453	1967561			
Buamlou	17	Johnny+Lianphet+Balame+3 villagers	10.12.2020	Motorbike	9:47			473726	1965230		1	
Buamlou	17	Johnny+Lianphet+Balame+3 villagers	10.12.2020	<i>Trachypithecus laotum</i>	9:55	heard	~75	473879	1965276	~182	2	In the Phou Muang Khai
Buamlou	17	Johnny+Lianphet+Balame+3 villagers	10.12.2020	<i>Trachypithecus laotum</i>	10:22	heard	~200	474160	1965135	~227	1	In the Phou Muang Khai
Buamlou	17	Johnny+Lianphet+Balame+3 villagers	10.12.2020	Assamese macaque	10:57	heard		474484	1965128		2	In the Phou Muang Khai
Buamlou	17	Johnny+Lianphet+Balame+3 villagers	10.12.2020	Logging of <i>Diospyros embryopteris</i>	14:07			475073	1964894			
Buamlou	17	Johnny+Lianphet+Balame+3 villagers	10.12.2020	Logger/poacher camp	14:13			475197	1964842			

Site	Trail	Surveyor	Date	Species/Threats	Time	Detection	Distance (m)	GPS Point		Elev (m)	Individuals	Remark
								Easting	Northing			
Buamlou	17	Johnny+Lianphet+Balame+3 villagers	10.12.2020	<i>Trachypithecus laotum</i> rooting cave	14:43			475462	1964749			
Buamlou	17	Johnny+Lianphet+Balame+3 villagers	10.12.2020	<i>Pycnonotus hualon</i>	15:18	See	18	475552	1964716	423	3	In the Phou Muang Khai
Buamlou	17	Johnny+Lianphet+Balame+3 villagers	11.12.2020	<i>Trachypithecus laotum</i>	10:07	heard	~400	472173	1965379	~171	1	Close to Phou Muang Khai area
Kuankacha	18	Johnny+Lianphet+3 villagers	15.12.2020	<i>Trachypithecus laotum</i>	6:28	heard	~370	469638	1974185	~212	1	Kouan Khaen/ Ban Kuankacha
Kuankacha	18	Johnny+Lianphet+3 villagers	15.12.2020	<i>Pycnonotus hualon</i>	7:56	See	15	469667	1973645	471	2	Kouan Phai/Ban Kuankacha
Kuankacha	19	Balame+Khampoun+3 rangers	15.12.2020	<i>Trachypithecus laotum</i> rooting cave	8:38			468506	1977479			
Kuankacha	19	Balame+Khampoun+3 rangers	15.12.2020	Logger/poacher camp	8:54			468537	1977573			
Kuankacha	19	Balame+Khampoun+3 rangers	15.12.2020	Logger/poacher camp	10:29			468612	1978533			
Kuankacha	19	Balame+Khampoun+3 rangers	15.12.2020	Logger/poacher camp	10:50			468942	1978688			
Kuankacha	20	Johnny+Lianphet+3 villagers	16.12.2020	Assamese macaque	11:33	heard	~200	471827	1972519	~400	2	Kouan Or/Ban Kuankacha
Kuankacha	21	Johnny+Lianphet+3 villagers	17.12.2020	<i>Nomascus siki</i>	6:52	heard	~600	467019	1976301	~286	1	Pha Luang/Ban Kuankacha
Kuankacha	21	Johnny+Lianphet+3 villagers	17.12.2020	<i>Trachypithecus laotum</i> (feces)	7:47			467730	1976674			
Kuankacha	20	Johnny+Lianphet+3 villagers	16.12.2020	<i>Trachypithecus laotum</i>	6:15	heard	~370	469638	1974185	~212	1	Kouan Khaen/ Ban Kuankacha

Annex 3: Participant lists

No	Participant Name	Position	Organization
1	Mr. Bounchan Xaipunya	Director	Khammouane Provincial Agriculture and Forestry Office
2	Mr. Khamseng Sengthongnalin	Head	Protected Area and Protection Forest Section/PAFO
3	Mr. Lianphet Phetphilanon	Technical	Protected Area and Protection Forest Section/PAFO
4	Mr. Balamy Soudthilath	Technical	Hinboun District Agriculture and Forestry Office
5	Mr. Konglar	Technical	Khounkham District Agriculture and Forestry Office
6	Mr. Johnny Souwideth	Student	Vietnam National University of Forestry Office
7	Mr. Keooudon Thammavong	Head	Forest Unit/Hinboun DAFO
8	Mr. Phetmany Kongmany	Head	Khounkham District Agriculture and Forestry Office
9	Mr. Linthong Malakeomany	Head	Nakai District Agriculture and Forestry Office
10	Mr. Vilay Xayalath	Technical	Nakai District Agriculture and Forestry Office
11	Mr. Phomma Chanthavong	Head	Yommalath District Agriculture and Forestry Office
12	Mr. Bounhong Sibounheuang	Head	Forest Unit/Yommalath DAFO
13	Mr. Bounyuen Xayalath	Head	Mahaxay District Agriculture and Forestry Office
14	Ms. Vilakoun Xayakoummarn	Head	Forest Unit/Thakhek DAFO
15	Ms. Chomthong Phonthilath	Technical	Thakhek District Agriculture and Forestry Office
16	Mr. Ki	Villager	Ban Buamlou
17	Mr. Boun	Villager	Ban Buamlou
18	Mr. Air	Villager	Ban Buamlou
19	Mr. Khamsay	Villager	Ban Kuankacha
20	Mr. Lampha	Villager	Ban Kuankacha
21	Mr. Pali	Villager	Ban Kuankacha
22	Mr. Khensone	Villager	Ban Natan
23	Mr. Khaima	Villager	Ban Natan
24	Mr. Khenkhong	Villager	Ban Konglor
25	Mr. Hom	Villager	Ban Konglor
26	Mr. Khanmai	Villager	Ban Konglor
27	Mr. Yao	Villager	Ban Konglor
28	Mr. Phet	Villager	Ban Konglor
29	Mr. Kalason Xayalath	Technical	Khounkham District Agriculture and Forestry Office
30	Mr. Khampoun	Technical	Hinboun District Agriculture and Forestry Office
31	Mr. Phomma	Villager	Ban Konglor
32	Mr. Peter Brakels	Expert	IUCN Laos

Annex 4: Picture taken from the field



Two Lao langurs were sitting on the rock (*Trachypithecus laotum*), Adult-female langur (right) and sub-adult male (left). Photo by: Johnny Souwideth



An adult langur (*Trachypithecus laotum*) was on the branch of a tree and was eating young leaf. Photo by: Johnny Souwdieth



Adult-female langur and a juvenile langur (*Trachypithecus laotum*) eat bamboo leafs. Photo by: Johnny Souwideth



A juvenile Assamese macaque (*Macaca assamensis*) was found in Ang Ta Ngon area. Photo by Johnny Souwideth



The soft part of the bamboo was eaten by Lao langurs (*Trachypithecus laotum*). Photo by Johnny Souwideth



A group of Assamese macaques (*Macaca assamensis*) was found close to the Konglor Cave. Photo by: Johnny Souwideth



A poacher/logger camp with guns found near Non Ka Pard area. Photo by Johnny Sowideth



Logging of *Diospyros embryopteris* found near Ang Ta Ngon area. Photo by Johnny Souwideth



Survey team in Ban Konglor, Khounkham district. Photo by Johnny Souwideth



Survey team join the patrolling team in Ban Buamlou, Hin Boun District. Photo by Johnny Souwideth



Survey team in Ban Kuankacha, Hinboun district



Nong Ka Pard is important water source for wild animals at the Total Protection Zone



The Truong Son Pit Viper (*Trimeresurus truongsonensis*) found at Tham Kuay. Photo by Johnny Souwideth



Scratch mark of Asiatic Black Bear on a tree bark (*Ursus thibetanus*) at Kuan Pang, Buamlou sector. Photo by Johnny Souwideth