Participatory Survey, Assessment and Conservation of Green Peafowl (*Pavo muticus*) in Dong Khanthung Provincial Protected Area, the far south-western Lao PDR

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Vientiane 2012

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Funding Agency: The Critical Ecosystem Partnership Fund (CEPF)

Citation: Vongkhamheng, C., Phiapalath P., Vongkhamheng Ch., Ounmany S., et al. (2012). Participatory survey, assessment and conservation of Green peafowl (*Pavo muticus*) in Dongkhanthung Provincial Protected Area of Champasak, the far south-western Lao PDR. Lao Wildlife Conservation Association. Vientiane.

Copies available from: The Lao Wildlife Conservation Association (Lao WCA)

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Executive summary

Once widely occurred across the Lao PDR, the endangered green peafowl (*Pavo mutiacus*) remain today only in a few scattered sites throughout the country, with its current population status is still uncertain. Lack of basic information on the status and distribution of the species make it difficult for the Lao government to design proper conservation strategy. This report represents results of the country' first systematic assessment and conservation of the green peafowl at the Dong Khanthung (DKT) Provincial Protected Area (PPA) in the far south-western Lao PDR, on Lao-Cambodia-Thai tri-border, conducted from January 1st to June 30th 2012. A Grid-based questionnaire was first employed to gain overall understanding on bird occurrence and distribution across the area, and then followed by listening stations (point count) on the ground to confirm and assess the bird occurrence and population status. The findings showed clearly that Dong Khanthung remains an important habitat that supports viable populations of green peafowl, and other key large birds and mammals. Approximately 70% of the area was reportedly occupied by the green peafowl, and about 50% of a total listening stations (n=41) were recorded presence of birds, with a minimum estimate of approximate 76 birds were counted. Additionally, signs of birds (i.e., footprints, feathers), and direct observation of birds in the field were encountered by survey teams. Direct hunting, collection of eggs, and habitat disturbance are major threats to the survival of the green peafowl in DKT, which it requires immediate conservation attention on the ground to enhance conservation awareness, and thus reduce those emerging threats that birds are now facing. Land-use planning at villages inside and nearby the DKT is most urgently needed to avoid further encroachment into the green peafowl' natural habitat. Further ground survey is also needed in the western part of DKT to cover larger area so that it provides reliable baseline data for conservation planning and monitoring of conservation progress.

Introduction

Global population and conservation status

The Green peafowl (*Pavo muticus*) was formerly widespread across the north-east India, Bangladesh, Myanmar, Thanland, Malaysia (west), Indonesia (Java), Cambodia, Laos, Vietnam and Southern China (Delacour 1977). The species now has undergone a massive decline across its range, primarily owing to high hunting level and habitat loss and fragmentation (Fuller and Garson 2000). The green peafowl is now extinct from several former range countries, and subsists today in very fragmented and small populations in few countries. It has recently been classified to "Endangered" by the Birdlife International (2009) and IUCN Red list (2012). The only sizeable remaining populations are today confirmed in Cambodia, Myanmar, and west-central Vietnam (Birdlife International 2009). Cambodia is cited as supporting the most significant populations left in the world (Brikle et al. 2008), most restricted to the remote forests of the north and north-east-west country, but the surviving population s are however increasingly fragmented and declining throughout the country (Goes 2009). In Laos and Vietnam, it is now extirpated from over much of its former range (Evans and Timmins 1996, Brickle et al. 1998). The declines are too rapid in both countries as result of the forest fragmentation and over-hunting in the past few decades (Fuller and Garson 2000). In Thailand, it is now only known from one location near Myanmar border, Huay Kha Khaeng wildlife sanctuary, and another small remnant population is in Yanan, China. The bird is believed to be extinct in north India and Bangladesh , and is extinct in Malaysia and peninsular Thailand (Birdlife International 2012).

Population and conservation status in Lao PDR.

The green peafowl was formerly found common and widespread across Laos (Delacour and Jabouille 1925a cited in Brikle et al. 2008). In the last 30 years, the bird was markedly undergone the massive range contraction (Fuller and Garson 2000). The general field wildlife surveys carried out since 1988 has found evidence of small populations of birds at several sites. Larger numbers may survive only at a few locations and a large decline has clearly occurred (Evans and Timmins 1996). Despite bird' conservation significance and the threats facing them, there has never been a systematic assessment of green peafowl status in any places over the country. Lack of such important data make it is difficult for the government of Laos to design effective conservation

strategies and thus pay conservation attention on this species. This study in Dong Khanthung presents the country' first effort to assess population status and distribution of the green peafowl as well as associated threats facing them. Results of this field work will shed light for future conservation work on the species in the country.

Objectives of the study

The primary objectives of the study were;

- Obtaining reliable data on the abundance and distribution of green peafowl in DKT for future design of the proper conservation strategies to recover this species (and other key wildlife).
- Involving local communities (and government staff at province and district levels) in field surveys to build conservation partnership with local communities to initiate participatory wildlife conservation and monitoring.
- Strengthening capacities of government staff and local communities in conservation and field survey techniques for the green peafowl and other associated wildlife species in DKT.
- Developing a conceptual model to build local understanding on direct and indirect threats, and potential solutions to effectively address those emerging threats to the green peafowl and other endangered mammals and birds.

The Lao Wildlife Conservation Association

The Lao Wildlife Conservation Association (Lao WCA) was founded in earlier 2010 with the primary goal is to take leadership and encourage Lao citizen to save wildlife and wild land all over Lao PDR through science-based participatory conservation. The Lao WCA collaborated with the Department of Forest Resource management (DFRM), Ministry of Natural Resource and Environment (MNRE), Provincial Agriculture and Forestry Office (PAFO), District Agriculture and Forestry Office (DAFO), military and local village authorities to conduct field activities to achieve the above objectives, with generously financial support by the Critical Ecosystem Partnership Fund (CEPF).

Methods

Dong Khanthung description

The Dong Khanthung (DKT) Provincial Protected Area (PPA) covers approximately 1,700 km^2, located in the far south-western Lao PDR, at the Laos-Cambodia-Thailand tri-borders, in Champasak province (Figure 1). From 1996 to 1999, a series of wildlife and socio-economic surveys was undertaken by WCS, IUCN, and PAFO (Bermuller and Vilawong 1996, Timmins and Vongkhamheng 1996, Round and Vongkhamheng 1998). Findings clearly show that the DKT harbors several endangered large mammals (e.g., Asian Elephant, Eld's deer, tigers, Banteng, Gaur, Pileated Gibbon) and large birds (e.g., Giant Ibis, Sarus Crane, Greater/lesser Adjutant, vultures, hornbills, green peafowl). Most important, DKT is probably the last remaining large block of lowland dry dipterocarp forest in Lao PDR (Round 1998).

Given its unique conservation significance, in 1996, the DKT was first proposed to national government to assign as national protected area (NPA) by district governor of Mounlapamok district, and Provincial Agriculture and Forestry Office (PAFO) of Champasak, followed the Prime Minister's decree 164. Unfortunately, the proposal was unsuccessful owing to the fact that more than 18 NPAs were already established in 1993, and many of those faced funding shortage for management at the time. However, the DKT was subsequently assigned as provincial protected area, and later on some part of DKT was partially declared as national forest protection area, particularly forest along border with Thailand and Cambodia. In 2010, the fieldwork undertaken by the IUCN, provided evidence that DKT still remains important habitat that support populations of key wildlife species, including the green peafowl (Phiapalath and Saysavanh 2010) .

Grid-based questionnaires

Occupancy sampling design

Given the limited knowledge on bird presence and distribution, we first used local expert opinion surveys combined with occupancy modeling (Mackenzie 2002) to determine distribution and occupancy of green peafowl over the Dong Khanthung PPA. In this say, we want first to identify where are the highest probability of birds presence in this PPA prior to making a decision where ground survey effort should be targeted. The questionnaire approach has been widely applied to

large scale study of mammals (Fang et al. 2009, Karanth et al. 2009, Vongkhamheng 2011), and birds (Mackenzie et al. 2003). Of particular interesting, occupancy model allows estimating habitat occupancy of birds, and also assessment of impacts of covariates (e.g. forest cover, water bodies) on occupancy and distribution of birds in this landscape. A grid cell size of 4 km^2 (figure 2) was used as a sampling unit by dividing the area into grid cells using Arc GIS 9.2 to collect data on presence-absence of green peafowl, and relevant covariates. This cell size was assumed to be a home range size for green peafowl. In each grid cells, four "local experts" who are knowledgeable about green peafowl, other wildlife and the area were chosen and interviewed independently, and treat as replicates for each 4 km^2 grid cell. Detection and non-detection of the bird in each grid by local experts were then compiled to produce bird detection history matrix. The matrix consisted of rows representing sampling units (or grids), and columns representing detection history of animals in each grid (or replicates). The program "PRESENCE" was used to generate occupancy rate and then applied with the ArcGIS 9.3 to create a spatial distribution map of green peafowl over the landscape, showing different gradient of occupancy rate. The cells with darker colors present the higher probability of species occupancy, whereas the cells with light colors show otherwise.

Village questionnaire survey

Questionnaire forms were pre-prepared and basic training on identification of local experts, questionnaire, and data form and recording techniques was first provided for survey teams including two Lao WCA staff, one Department of Forest Resources Management (DFRM), one PAFO, one DAFO staff, and four villagers. This is to ensure the accuracy and consistency in data collection. We divided into four teams, two people per team, to conduct interviews and used motorbikes to travel between villages. Questionnaire data were then stored into Database-Microsoft and then processed in Microsoft Excel before application in "PRESENCE" Program.

Photo: Staff conducting a village interview using grid-based map to locate the presence of green peafowl, while another recording reports into data form.

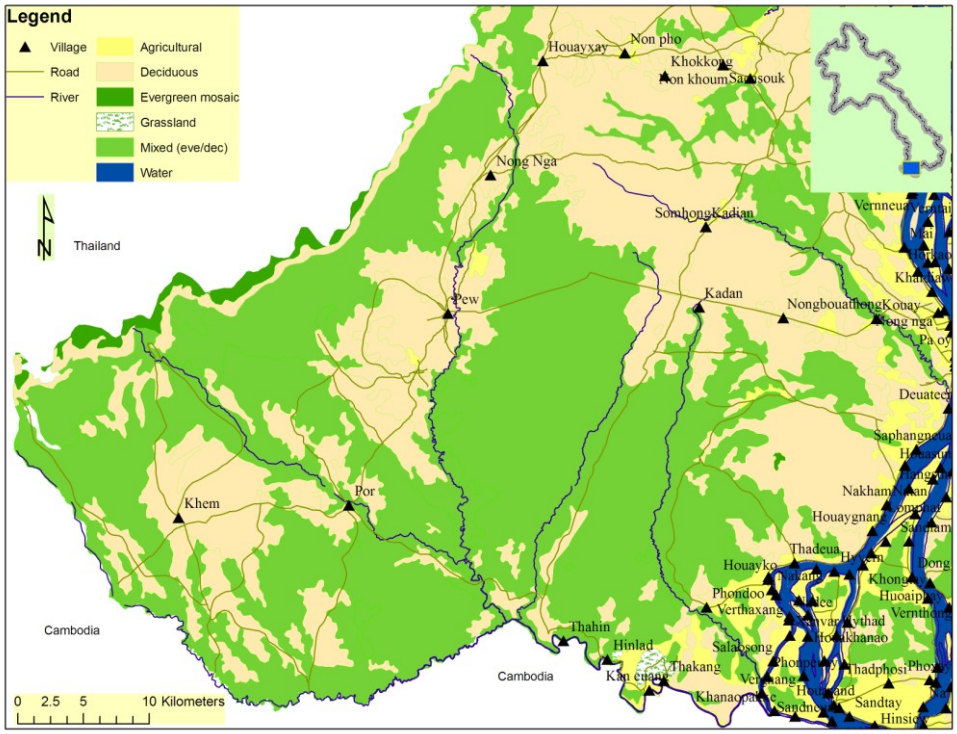

Figure 1. DKT located in the south-western Mekhong rive, at Lao-Thai-Cambodia tri-borders, dominated with low land deciduous dry dipterocarp forest

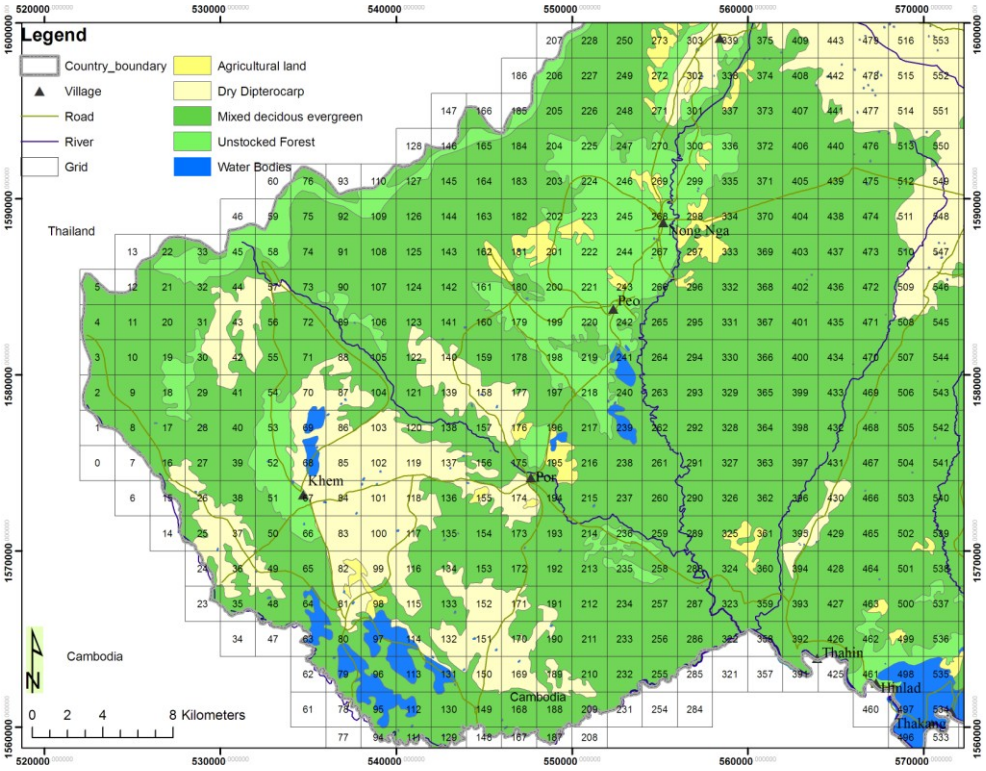

Figure 2: Grid-base map used for questionnaire survey, showing the grid numbers and background habitats

Listening stations (point-count)

After questionnaire survey, the spatial distribution map was produced and we then used it as a reference for designing the field sampling and discussion with villagers prior implementation of fieldwork. We conducted listening stations or point counts in those grids that show the likely high potential occurrence of birds (associated with village informant), from April 15th to May 15th, to confirm their occurrence and assess their abundance and distribution. We set up five survey teams of two people (one team leader and assistant) and provided them training on basic field sampling techniques and ecological behavior of the green peafowl. These five survey teams conducted point counts simultaneously on every possible morning and each evening. The standardized point count methodology was mainly followed previous study of green peafowl by Brickle et al. (1998) in Dak Lak, Vietnam. Point stations were spaced by at least 1.5 km in order to ensure independent counts as a result of the large distance that the green peafowl can be heard calling from. Location of point counts was neither random nor systematic, mainly focused in areas where high reports of green peafowl presence. Counts of two hours duration were made around sunrise (c. 5h30-7h30) and dust (16h30 - 18h30) at each station. Counts were made by two observers in the morning and evening at each point count. We recorded the number of calling birds, time, frequency, and types of calls, compass bearing and type of call for every Green Peafowl call heard. At the end of a two hour recording period an estimation was made of the minimum number of calling birds present. This was based on direction and timing of calls. For example if two calls were heard in succession at widely differing compass bearings or distances, two birds would be assumed to be present. However if two calls in succession could not confidently be attributed to two birds, then the minimum number present was recorded as one. Also, if two distinct calls of male and female in succession at the same location and direction, two birds were assumed to be present.

Dr. Chanthavy worked with team leaders at village to allocate the survey teams.

Other general wildlife survey

During the fieldwork, after point-count survey in the morning, the survey teams also walked toward the calling sites to observe general habitat and record signs (or sightings if possible) of the peafowl and other wildlife species, particular large mammals and large water birds based on animal' sign and sighting. The teams focused their visits to key water bodies like ponds and streams, which thought to be concentrated by birds and mammals. Pre-designed data form was made before implementing field work (see appendix 2)

A group photo of survey teams, with their motorbikes to move between survey sites.

Photo: A team is sitting at point count listening and recording calls of bird in earlier morning and dusk

Results

Occupancy survey using questionnaire

We completed village interviews in nine villages and five army camps inside and nearby the DKT, from 2th December 2011 to 15 January, 2012, resulted in completion of 453 4-km^2 grid cells, covering approximately 1,812 km^2 over the DKT landscape. Reports of presence of the green peafowl within the past one year was 70% (Psi =0.7, SE=0.05) from 453 surveyed grid cells. The occurrence and distribution of green peafowl were patchy and quite far from villages and most are associated with water source (see figure 3).

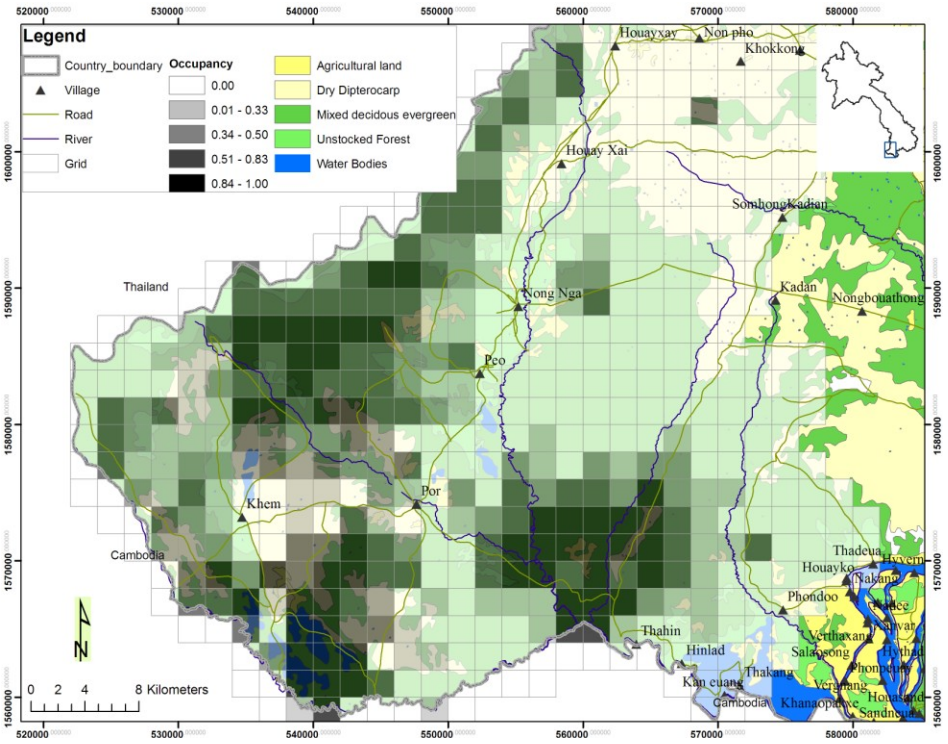

Figure 3. Estimated probability of green peafowl occurrence in Dong Khanthung based on a questionnaire survey, darker cells indicate higher probability whereas lighter indicate otherwise.

Point count survey

A total of 41 independent point counts were made in some parts of Dong Khanthung, mainly concentrated on grids with high probability of bird presence based on earlier village opinion surveys. Of those, the green Peafowl were recorded at 20 point counts spread across DKT. A total of 87 Green Peafowl contacts were made representing a minimum of 76 birds. Mean

number of contacts per point was 2.09 (S.E. = 0.32, range 0-11), representing a mean minimum number of birds per point of 1.8 (S.E. = 2.5, range 0-8)

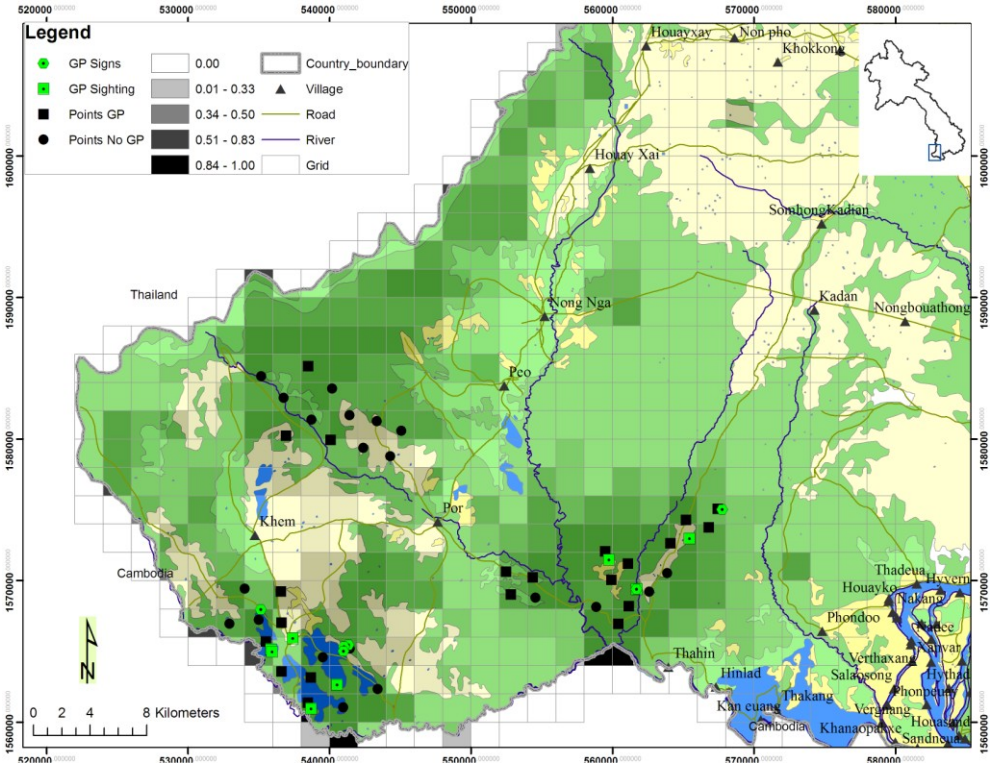

Figure 4 Point-counts on the ground to estimate a minimum number of green peafowl based on calls, the green squares indicate points with presence of bird, whereas circle points show otherwise

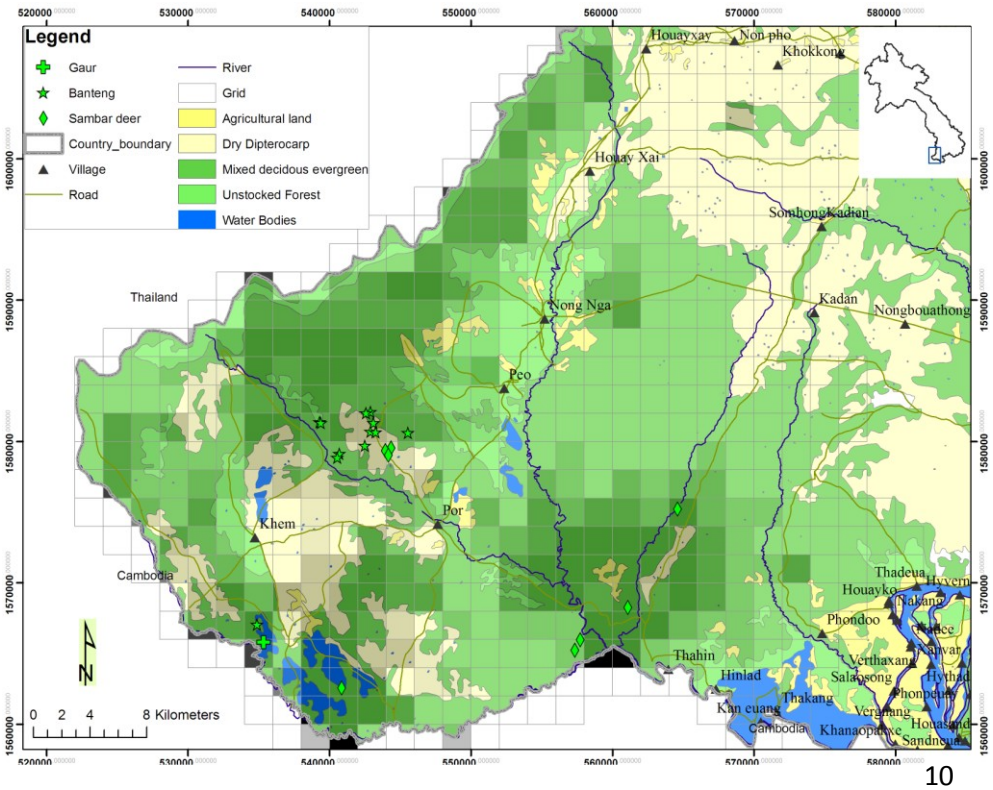

Figure 5. Records of key large mammals in DKT based on signs and sighting

Table 1 Direct and indirect evidence of green peafowl recorded by survey teams

GridNo	E	N	Date	Note	Habitat	Remark
G95	538701	1560960	22/04/2012	S	Green forest	Sighting about 8 m in distance
G95	535158	1567978	22/04/2012	FP	Pond	Footprint
G361	561718	1569408	28/04/2012	S	Mixed evergreen	Sighting about 4 m in distance
G361	561718	1569408	28/04/2012	FP	Mixed evergreen	Footprint
G361	559755	1571492	28/04/2012	S	Mixed evergreen	Sighting about 4 m in distance
G113	540538	1562649	23/04/2012	F,S	Dry dipterocarp	Sighting about 15 m in distance
G97	537404	1565934	23/04/2012	S	Dry dipterocarp	Sighting of two birds
G63	535852	1565165	25/04/2012	S	Dry dipterocarp	Sigting of one female bird
G63	535950	1564981	25/04/2012	S	Dry dipterocarp	Sigting of one bird flying to dense forest
G114	541360	1565474	22/04/2012	FP	Dense evergreen	Footprint (pond in jungle)
G114	541041	1565351	22/04/2012	FP	Dry dipterocarp	Footprint (Nong Saeng)
G114	541006	1565024	22/04/2012	FP,F	Dry dipterocarp	Peafowl feathers
G430	565442	1572996	26/04/2012	S	Dense evergreen	Sighting of one young peafowl
G467	567760	1575029	30/04/2012	FP	Dense evergreen	Footprint in Nongkaen

Note: S, Sighting; FP, Foot print; F, Feathers;

Threats to green peafowl

Results from local expert opinion survey (combined with direct observation) clearly pointed out that direct hunting of the green peafowl is a major threat responsible for the green peafowl population decline (Figure 6). Approximately 32% of respondents (n=90) reported that the green peafowl was occasionally hunted (i.e., 1 to 3 birds were hunted per year) and 8% of respondents reported the birds were moderately hunted (i.e., a bird was hunted a month), while 0.56% reported birds were heavily hunted (i.e., 2 birds were hunted per month). In addition, most villagers (or respondents) acknowledged that major potential threats to the green peafowl' natural habitat in Dong Khanthung were logging, NTFP collection, forest fire, agriculture (particularly rubber plantation), and road (Figure 5).

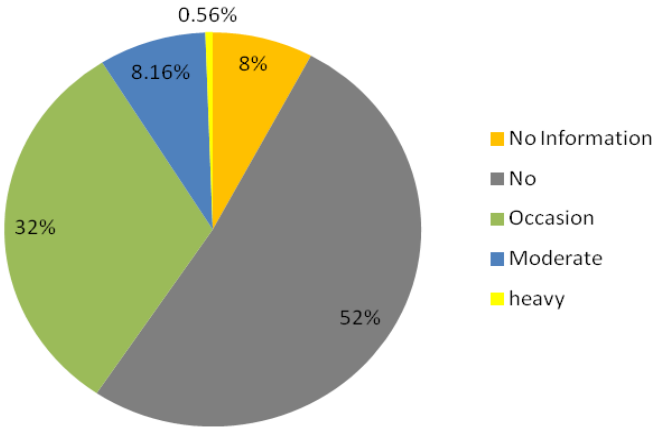

Figure 6 Reports from informants (n=90) of major threats to the green peafowl in Dong Khanthung PPA involves in direct hunting of birds (Heavy – 2 birds hunted per months, Moderate – once a month, and Occasion – 1 to 3 birds per year).

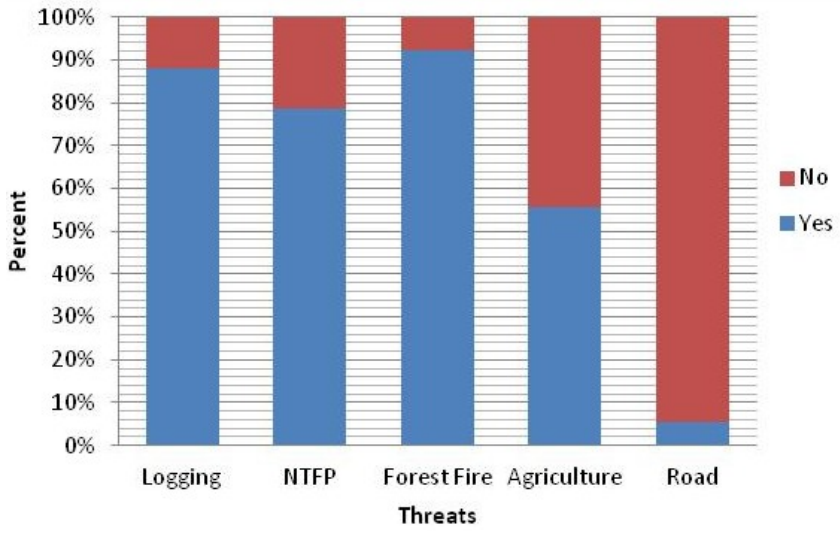

Figure 7 Reports (n=90) of current major threats to the green peafowl habitat in Dong Khanthung PPA. Blue color refers to the people felt it puts negative impact on green peafowl habitat, whereas red is otherwise.

Other records of mammals

Table 2 Some large mammal and bird species recorded during the field survey, and village questionnaires

Common Name	Scientific Name	Note[1]	Status[2]		Remark
			Global	Laos	
Mammals					
Gaur	*Bos gaurus*	T, R	VU	ARL	Ban Thahin area
Banteng	*Bos javanicus*	S,T,R	EN	ARL	South DKT
Sambar deer	*Cervus unicolor*	S,T,R			
Elephant	*Elephas maximus*	T,R	EN	ARL	
Eld's deer	*Cervus eldi*	R	EN	ARL	
Indian muntjac	*Muntiacus muntjak*	S,T,R			
Wild pig	*Sus scrofa*	S,T,R			
Dhole	*Cuon alpinus*	R	EN	ARL	
Bears	*Ursus sp.*	R	VU	ARL	
Fishing cat	*Prionailurus viverrinus*	R	EN	LKL	
Golden cat	*Catopuma temminckii*	R	NT	LKL	
Clouded leopard	*Pardofelis nebolusa*	R	VU	ARL	
Leopard	*Panthera pardus*	R	NT	ARL	
Tiger	*Panthera tigris*	R	EN	ARL	Tiger seen by military camp 24.
Pileated gibbon	*Hylobates pileatus*	C,R	EN	ARL	
Birds					
Sarus Crane	*Grus antigone*	R	VU	ARL	Birds seen annually in raining season by Khem & Nong Hin villages
Greater/lesser Adjutant	*Leptoptilos dubius/juvanicus*	R	EN/VU	ARL	
Giant ibis	*Thaumatibis gigantea*	R	CR	ARL	
White-shoulder Ibis	*Pseudibis davisoni*	R	CR	ARL	
Black-necked stock	*Ephippiorhynchus asiaticus*	R	NT	ARL	
Wooly-necked stock	*Ciconia episcopus*	S, R	LC	ARL	Widely reported occurrence
White-winged duck	*Cairina scutulata*	R	EN	ARL	Reports of presence in Houay Phak
Great Hornbill	*Buceros bicornis*	C,R	NT	ARL	Reports of prence along Houay Phak

[1]S – seen, T – track, C – Call heard, R – reported by local villagers. [2] CR, Critical Endangered; En , Endangered; Vu, vulnerable; NT, near threatened, LC, Least Concern (IUCN Red List of Threatened Species 2012). ARL, At risk in Laos, LKL, Little known in Laos (Duckworth et al., 1999).

Discussion

Occupancy estimate and distribution map of the green peafowl generated from this study (Figure 3), using local knowledge associated with the statistic-based occupancy model, combined with the truth ground listening point count survey provide the first systematic assessment of the green peafowl in Lao PDR. Results provide clear evidence that the DKT remain one of the most important conservation areas that support a viable population of the green peafowl (table 1, figure 3, 4) as well as of other several key birds and mammals (table 2, figure 5). Local knowledge of wildlife presence/absence has been recognized as reliable information as local people have a long history of interaction with wildlife and their localities (Terborgh 1999, Gadgil et al. 1993, Redford and Stearman 1993, Anadon et al. 2009). It has been worldwide accepted that involvement of local people in wildlife assessment is the most important step in conservation initiatives (Sekhar 2000, Steinmetz 2001). Most importantly, they provide baseline information that guide and inform the subsequent ecological field surveys in terms of field survey design and logistic preparation (Anadon et al. 2009, Steinmetz 2001, Karanth and Nichols 2010).

Green peafowl were recorded during 41 point counts made in the field, with an estimated minimum number of 76 birds were present. Those birds were largely confirmed in those grid cells that have a high probability of bird occurrence reported by local villagers (Figure 3). Also, Direct sighting of birds were frequently encountered during the field work (table 1, figure 4), providing such reliable data on abundance and distribution of green peafowl in DKT. Our findings are in line with previous studies in that the birds are likely entirely found in deciduous forest area with permanent water availability, e.g., ponds and rivers (Figure 4), particularly during dry season (Brickle et al. 1998). The number of green peafowl recorded here is however not considered to be representative of the relative density at the whole DKT because the point counts were not entirely located across the whole grid cells, especially in the western part of the DKT, near Lao-Thai border, where local reports of potential bird occurrence was high (Figure 3). The main reasoning behind this was due to the state of access to the site was quite difficult in raining season, plus some security issue (i.e., land mine). Therefore, further ground point count survey is needed in the western area of DKT, and must be paid attention that the field work shall

occur in dry season when villagers are free from their agriculture farms, particularly persons who know the area well.

Additionally, results from questionnaire survey and ground field survey also generated better understanding on status of other mammal and bird species that are of national and international conservation concerns, particularly large mammals and large water birds (table 2). Many of those were probably extirpated from other forest of Lao PDR, such as Banteng (*Bos javanicus*), Pileated gibbon (*Hylobates pileatus*), Sarus crane (*Grus antigone*), and Giant Ibis (*Thaumatibis gigantea*) so that they require immediate conservation attention on the ground . Presence of those species suggested that DKT remain the healthy dry deciduous forest in the Indochina, which further conservation investment should be targeted.

Recommendation of key measure for conservation

Previous studies of Green Peafowl have estimated a population density of birds in favorable habitat to be around one breeding male per km^2, or approximately four birds of all ages per km^2 (Stewart-Cox and Quinnell 1990, Indrawan 1995). Although the number of birds found here is relatively low (an estimated minimum of 76 individuals), given its rich habitat availability and the extent of prime deciduous forest, the DKT is still one of the most important sites for long-term conservation of the endangered green peafowl (as well as other distinctive communities of other bird and mammal species) in Lao PDR. However, it is noted that if just only a large area of forest is protected but the permanent water supplies within it are not free from human disturbance, the value of the entire forested area will be seriously diminished (Brickle 1998).

Therefore, in order to effectively increase the population of the green peafowl in its natural habitat, it requires immediate conservation interventions to suppress the current level of threats, i.e., hunting and habitat disturbance;

- Public awareness campaign – Building local understanding about regulation and laws on wildlife and forest, and conservation significance of birds and impacts its conservation on local environment and economy should be the top priority, and should do continuously. Campaigns should focus on military camps and villages inside the DKT

- Land use planning in nine villages inside and nearby the DKT – currently, it is evident that some parts of land in the northern part of DKT was given a concession to a private company for rubber (and sugar) plantation. However, it was told that some concession was cancelled due to it is against national policy on forest protection and national security. Accordingly, land use planning should be taken as the first priority to secure the habitat for wildlife and human needs. Zoning of conservation area should be immediately taken into account to reduce human disturbance in those key habitat sites where green peafowl and other endangered species were recorded (Figure 3).

- Support law enforcement in place – currently check points along the key road through DKT is set-up by the military, largely for security purpose and illegal logging check. Given this opportunity, working closely with local officials, such as military, police, DAFO, and village cluster offices is most urgently needed in order to adding wildlife into agenda for law enforcement. At the moment, as a result of our meetings, it seems likely that the military take an initiative of law enforcement by not allowing outsiders to enter into the protected area for hunting purpose. It therefore requires further cooperation to continue on the current initiative to strengthen law enforcement.

- Continue on the field ground surveys to understand better the population status of green peafowl in areas where no field work were not implemented. This is largely in the western part of DKT where access is limited. Repeated field surveys using point count (or listening station) should be done annually to provide important data necessary to tracking changes in green peafowl population.

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Photos

Footprints believed to be the green peafowl

Feathers of male green peafowl found at military camp

Photos

Male feathers of green peafowl in field

Fresh footprint of Banteng taken after sighting of a herd of animals by survey team

Photos

Field check after point count and example of habitat types in DKT, water bodies (e.g., ponds) are scattered, semi/evergreen forests are dominated along the steams

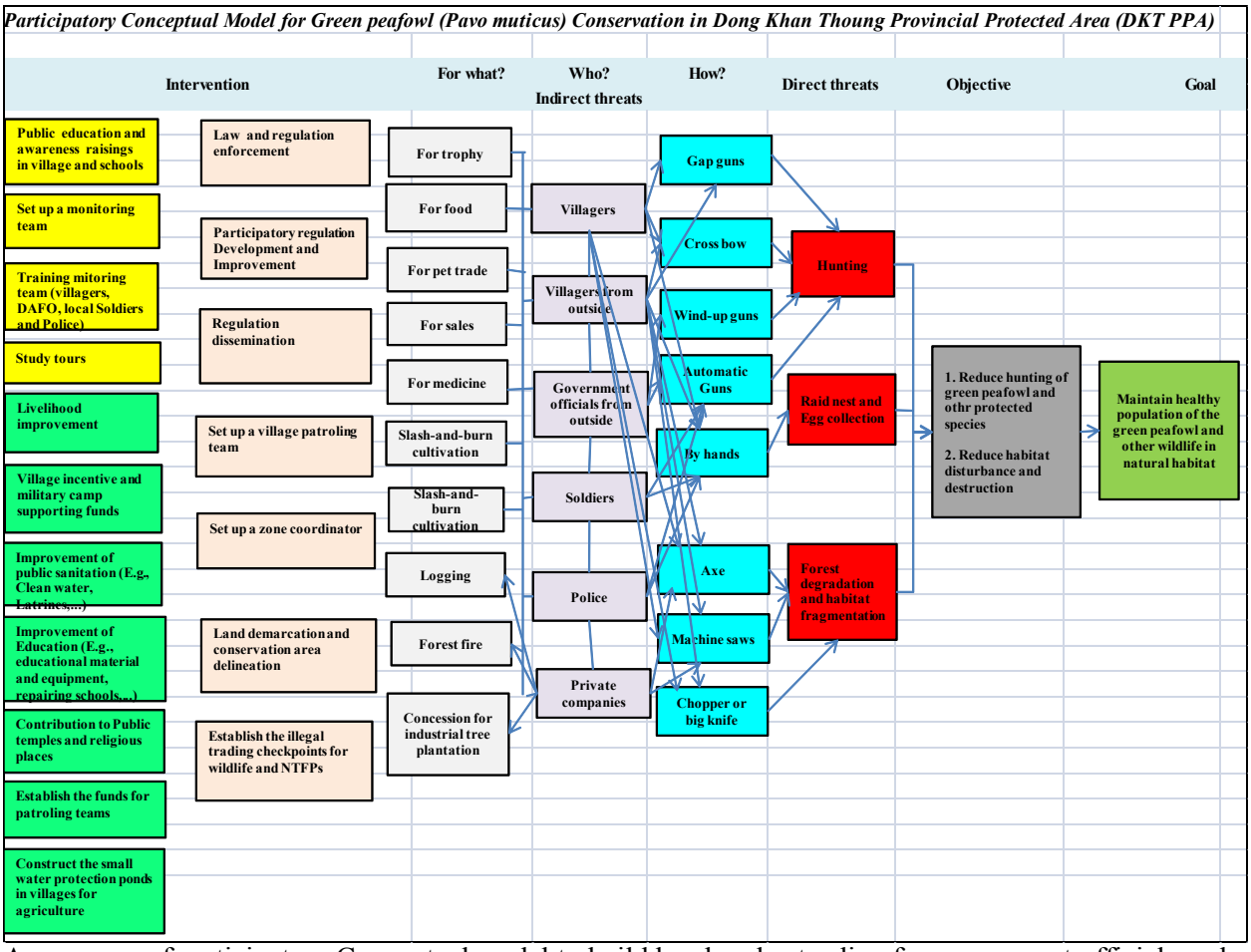
Photos

Hunting birds for food and collection of chicks for pets were found in villages, and become hot issues to be addressed

Photos

Conceptual model meeting to build better understanding for local officials, including military, police, DAFO, PAFO, DFRC, village cluster heads, about green peafowl conservation

Group discussion during the conceptual model workshop



A summary of participatory Conceptual model to build local understanding for government officials and villagers.

Appendices

GREEN PEAFOWL DATA FORM
OCCUPANCY SURVEY*: QUESTIONNAIRE DATA BASED ON ASSESSMENT OF INFORMANTS*

Informant No: ເລກທີ ຜູ້ໃຫ້ສຳພາດ *(Name_grd no).e.g. OD-grd# -1, 2, 3,4 etc..*	
Date of filling the form: ວັ ເດືອ ປີ ສຳພາດ	
Name of the person filling the form ຊື່ຜູ້ສຳພາດ:	
Informant's name and contact address **ຊື່ຜູ້ໃຫ້ສຳພາດ ແລະ ທີ່ຢູ່:**	
GPS Coordinates UTM: *E/N*	

Please circle the relevant cell for each question (ຂີດວົງມົ ອ້ອມເອົາຄຳຕອບ)

1. Evidence for green peafowl presence during past one year (*how do you know green peafowl are present now?*): ຫລັກຖາ ົກຍູງທີ່ພົບເຫັ ໃນ 1 ປີຜ່ານມາ (ສິ່ງທີ່ເຮັດໃຫ້ຄິດວ່າມີ ົກຍູງ)

Bird seen ເຫັ ໂຕ	Bird signs seen ເຫັ ຮ່ອງຮອຍ	Secondary Source ໄດ້ຍິ ຄ ອື່ນເວົ້າ	No evidence ບໍ່ເຫັ ຫຍັງ

Mark the locations where green peafowl are present on the reference map ຫມາຍໃສ່ແຜ ທີ່ (ຕົວຢ່າງ 1/1, 1/2 ຫລັກຖາ ເຫັ ົກຍູງໂດຍຜູ້ຖືກສຳພາດທີ 1 ແລະ 2 ໃ 1 ປີ ຜ່າ ມາ.

2. Evidence for green peafowl presence during the past 1-5 years (*how do you know* green peafowl *are present now?* ຫລັກຖາ ົກຍູງທີ່ພົບເຫັ ພາຍໃ 5 ປີ:

Green peafowl seen	Green peafowl signs seen	Secondary Source	No evidence

Mark the locations where green peafowl are present on the reference map ຫມາຍລົງແຜ ທີ່ (ຕົວຢ່າງ 5/1, 5/2 ຫລັກຖາ ເຫັ ົກຍູງໂດຍຜູ້ຖືກສຳພາດທີ 1 ແລະ 2 ໃ 5 ປີ ຜ່າ ມາ.

Assessment of green peafowl population trend during last 5 years within the survey area ປະເມີ ທ່າອ່ຽງປະຊາກອ ຂອງ ົກຍູງໃ ຊ່ວງ 5 ປີຜ່າ ມາ (*ask informant if any change in the status of green peafowl during the last 5 years, why?):*

Stable ຄົງທີ່	Declining ຫລຸດລົງ	Increasing ເພີ້ມຂຶ້ນ	No information ບໍ່ມີຂໍ້ມູ

Why do you think it increase/decrease/stable **ເປັນຫຍັງຈິງຄິດວ່າ ຄົງທີ່/ຫລຸດລົງ/ເພີ້ມຂຶ້ນ**?

3. Evidence for Green peafowl reproducing during the past one year (*how do you know there are chicks being born?* ຫລັກຖາ ກາ ແພ່ພັ ຂອງ ົກຍູງຊ່ວງ 1 ປີຜ່າ ມາ (ຮູ້ໃດ້ແ ວໃດວ່າ ົກ ຍູງເກີດລູກ):

Chicks Seen ເຫັ ລູກ ົກ	Signs seen ເຫັ ຮັງໄຂ່, ຍ ສງ	Secondary Source ຮູ້ຈາກຄົນອື່ນ	No evidence ບໍ່ມີຫລັກຖາ

If the informant can give details, mark the locations where green peafowl chicks seen on the reference map ຫມາຍລົງແຜນທີ່ຖ້າເຫັນ *(please use a different color marker to mark a "Chick" for each informant on reference map, e.g. Chick1, Chick2…, green peafowl chicks seen by informant 1, 2)*

4. Is there any instances of crop raiding by green peafowl in the surveyed area during past one year ມີ ົກຍູງທ ລາຍຜ ລະປູກບ່ໃ 1 ປີຜ່າ ມາ?

Yes ເຫັ	No ບໍ່ເຫັ	ຫລັກຖາ Evidence :

If yes, provide details of evidence of crop raiding and mark the locations on the reference map **ຫມາຍຊະນິດຜົນລະປູກ ແລະ ຫມາຍລົງແຜນທີ່ຖ້າມີ**. *(Please circle the crop types and the mark location)*

Rice **ເຂົ້າ**	Corn **ສາລີ**	Vegetables **ຜັກ**	Others **ອື່ນໆ**

5. . Presence of other wildlife species, within green peafowl habitat in the survey area ຊະນິດສັດປ່າອື່ນໆທີ່ມີໃນຂົງເຂດສ ຫລວດ ຫລ ໃ ຕາກະໂລເປົ້າຫມາຍ.

Species **ຊະ ິດ**	Yes/no **ເຫັ ,ບ່**	Seen/Signs/ Second **ເຫັ** **ໂຕ, ຮ່ອງຮອຍ, ຜູ້ອື່ນເວົ້າ**	Species **ຊະ ິດ**	Yes/no	Seen/Signs/ Second **ເຫັ** **ໂຕ, ຮ່ອງຮອຍ, ຜູ້ອື່ນເວົ້າ**
Tiger **ເສືອໂຄ່ງ**			Elephant **ຊ້າງ**		

Leopard เสือดาว			Gaur กะทิง		
Clouded Leopard เสือลายเมฆ			Banteng วัวป่า		
Golden Cat เสือไฟ			Eld's deer โอ่ง-มั่ง		
Fishing Cat เสือปา			Sambar deer กวาง		
Dhole หมาใ			Muntjac ฟา		
Bear (2 spp) หมี			Wild pig หมูป่า		

ากปะก

Species ชะิด	Yes/no เัห ,บ่	Seen/Signs/ Second เัห โต, ร่องรอย, ผู้อื่นเว้า	Species ชะิด	Yes/no	Seen/Signs/ Second เัห โต, ร่องรอย, ผู้อื่นเว้า
Crane ากขา			White-shoulder Ibis ากากะสาคัขาว		
Greater/lesser adjutants ากากะฮุม			Great Hornbill ากก๊าก		
Giant/Ibis ากอุ้มลิว, อุ้มลา (ข้อ หอย)			Others large birds ากอื่นๆ		

6. Assessment of threats: Are there any paddy fields and livestock grazing areas in the grid? ปะเมินไพขี่มฮู่ : มีที่ๆ า, เขดล้างสัด ใ ตากะโลสำหลวด ? : Yes มี / No บ่มี
If yes, please use a reference map

7. Occurrence of green peafowl poaching in the surveyed area in the past one year มีากยูงถืกข้าตายบ่ใ ฮ่วง 1 ปี ผ่า มา:

Organized green peafowl poaching or green peafowl trade (ล่าเปี ກຸ່ມ): Yes / No / No information *(if poaching green peafowl organized by a group of people such as traders, local villagers, gear suppliers)*

Incidental green peafowl poaching (ล่าผู้ດ່ຽວ): Yes / No / No information *(if only one or two persons kill green peafowl without involvement of outsiders such as traders, supplier for hunting gears)*

8. Occurrence of hunting or poaching of green peafowl ມີການ ລ່ານົກຍູງບໍ່: Yes / No / No information

Heavy ຫັກ, ຫລາຍ	Moderate ປານ ກາງ	Occasional ບາງຄັ້ງຄາວ	No ບໍ່ມີ	No Information ບໍ່ຮູ້
> 2 ຕໍ່ ເດືອ	1 ເທື່ອຕໍ່ເດືອນ	1-3 ເທືອຕໍ່ປີ		

9. Occurrence of hunting or poaching of other wildlif ມີການ ລ່າສັດປ່າປະເພດອື່ນໆບໍ່: Yes / No / No information *(please focus on any of large mammals and birds mentioned above, if hunting any of those more than 2 times a month please circle "heavy", moderate*

Heavy ຫັກ, ຫລາຍ	Moderate ປານ ກາງ	Occasional ບາງຄັ້ງຄາວ	No ບໍ່ມີ	No Information ບໍ່ຮູ້
> 2 ຕໍ່ ເດືອ	1 ເທື່ອຕໍ່ເດືອນ	1-3 ເທືອຕໍ່ປີ		

10. Logging extraction ຕັດໄມ້ທ່ອ : Severe / Moderate / No / No information *(circle "severe" if logging is operated by company, and moderate if logging is made by villagers for timber sale)*

11. NTFP collection ເກັບເຄື່ອງປ່າຂອງດົງ: Severe / Moderate / No / No information *(severe if NTFP collection is supported by company, and moderate if collection is made by villagers for household use/sale)*

12. Forest fire ໄຟໃຫມ້ປ່າ: Severe / Moderate / No / No information. (*Severe if burning is greater than 1 ha. and moderate if burning is lesser than 1 ha)*

13. Developmental projects either planned or underway over the past 5 years ໂຄງການ ຫລື ກິດຈະກຳດ້ານພັດການທະນາທີ່ພົບເຫັນ: *(Circle any if encounter any actual development projects that are visible and underway with indication of location on the grid cell)*

Types	Responses			Remarks
Local road construction ສ້າງທາງ	Yes	No	No information	
Mines ຂຸດຄົ້ ບໍ່ແຮ່	Yes	No	No information	
Agriculture (paddy/corn/ plantation) ກະສິກຳ (ໄຮ່, ຢາງພາລາ, ໄມ້ສັກ	Yes	No	No information	
Others (Please specify) ອື່ນໆ	Yes	No	No information	

14. Any other relevant anecdotal information ເລື່ອງເລ່າລືກັນຕາມພື້ນບ້ານ: