



## Survey Report

### Rapid Herpetofauna Assessment of the Community Forests at Tumring REDD<sup>+</sup> Project Site in Kampong Thom Province



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## ABBREVIATION

MAFF	Ministry of Agriculture, Forestry and Fisheries
FA	Forestry Administration
DWB	Department of Wildlife and Biodiversity
CF	Community Forestry
PLWS	Preylang Wildlife Sanctuary
CBC	Center for Biodiversity Conservation
IUCN	International Union for Conservation of Nature
RSS	Record from Survey Sighting
RCI	Record from Community Interview
UN	United Nation
REDD <sup>+</sup>	Reducing Emissions from Deforestation and Forest Degradation
a.s.l	Above sea level

## ABSTRACT

Herpetofauna are cold blooded and their body temperature fluctuating according to the surrounding environment in which they live. Herpetofauna study in Cambodia was not distributed to all over the country. For the purpose of conservation and scientific researches were only conducted in protected areas of Cardamom Mountains, northeastern Cambodia, Siem Reap province and in the Prey Lang Wildlife Sanctuary (PLWS). Some areas around the PLWS are still remaining a good natural forest while some areas had been proposed to be Community Forests (CFs), which currently are being managed by the local community. Eight community forests have been included into the pilot of “Tumring REDD<sup>+</sup> Project”, which these areas are likely supporting a high diversity of wildlife but are scarce in term of wildlife research and monitoring, especially herpetofauna study.

Under the wildlife assessment for Tumring REDD<sup>+</sup> Project, a survey was conducted to collect information of herpetofauna species in the targeted community forest areas specifically focused on richness and abundance. These studied community forests still remain relatively good habitat of semi-evergreen forest and many of dipterocarp and resin tree species are still widely distributes across sites. The opportunistic searches for amphibians and reptiles and pitfall traps were applied to collect the data. Captured species were photographed and release back unharmed. Aside from actual field survey, community interviews were conducted to collect a certain key herpetofauna species information in order to identify presence of key conspicuous species especially for globally conservation significant. The interviews also helped to determine the potential threats to the herpetofauna in the targeted areas.

Result from the survey indicates that a total of 49 herpetofauna species were recorded from all survey sites. Among these, 36 species (16 amphibian and 20 reptile species) were recorded from the actual field search while other 13 key conspicuous reptile species were recorded from the local people interviews. The herpetofauna species of the high conservation value were only recorded through interviews and the species recorded from the field survey mostly listed as the least concern by the IUCN Red List. The most detected amphibian species is *M. fissipes* and *E. macularia* for reptiles. In term of diversity scores, Prey O’Kranhak identified to the site of highest diversity for herpetofauna species and this area was observed to contains more flowing streams and puddles than other studied sites. This good condition supports more species to keep active even in dry season. The lowest diversity score is at Prey Ang Taen, which the forest in this area was observed to be more degraded and isolate from others. Illegal logging and wildlife hunting were identified as the main threats at these community forests. We’d recommend to conserve and restore these community forests, preserve swamps and streams, and tackle the illegal logging and wildlife hunting in these community forests.

## I. Introduction

Herpetofauna is a term used to include both amphibians and reptiles. They are cold blooded and their body temperature fluctuating according to the surrounding environment in which they live. Amphibians are classified into three modern orders including: Anura (the amphibians without tail: frogs, toads, tree frogs), Caudata (or Urodela, the amphibians with tail: salamanders and newts), and Gymnophiona (or Apoda, the legless amphibians: caecilians). They are living in various habitat types throughout the world. However, there is no any record species of salamander from Cambodia (Neang & Holden 2008). There are three main groups of Reptiles, including Turtles (~300 species), Lizards & Snakes (~6000 species), Crocodiles & Alligators (~21 species), and Tuataras (only 2 species) (Phylum Chordata – Vertebrates Reptilia, 2015). Only the first three main groups of reptiles have been recorded in Cambodia.

Historically, herpetofauna study in Cambodia was not distributed to all over the country. For the purpose of conservation and scientific researches, they were only conducted in natural forest areas, which mostly concentrated in the Cardamom Mountains of southwest (Daltry & Wüster, 2002; Murdoch et al., 2019; Neang et al., 2014) and northeastern Cambodia (Rowley et al., 2010). Some other herpetofauna surveys were also reported to be carried out in Siem Reap province (Geissler et al., 2019) and Prey Lang Wildlife Sanctuary, Cambodia's central lowland part (Hayes et al., 2015).

Prey Lang Wildlife Sanctuary (PLWS) was established by the Sub-Decree No.74 on 09 May 2016 which covers 431.683 hectares within part of Kampong Thom, Preah Vihear, Stung Treng, and Kratie provinces (Establishment of Prey Lang Wildlife Sanctuary, 2016). From the herpetofauna survey which was led by Mr. Neang Thy in 2015, there were 67 species of herpetofauna recorded in PLWS. Among the 67 recorded species, there were 22 species of amphibians and 45 species of reptiles (Hayes et al., 2015). Recently, two new reptile species were described from PLWS with specifically at Phnom Chi where the location is not so far from the community forest sites of the Tumring REDD+ Project. These two new reptile species were named as the Prey Lang Forest Skink (*Spenomorphus preylangensis*) described in 2019 (Grismer et al., 2019) and the Phnom Chi Bent-toes Gecko (*Cyrtodactylus phnomchiensis*) described in 2020 (Neang et al., 2020).

Some areas around the PLWS are still remaining as a good natural forest while some had been proposed to be Community Forests (CFs) and the areas are being managed by local people as community forest committees. These community forest areas locate mostly in Sandan and Santuk districts, Kampong Thom province and have been included into the pilot REDD<sup>+</sup> under the “Tumring REDD<sup>+</sup> Project”, which has been implemented and managed by the Forestry Administration, Ministry of Agriculture, Forestry and Fisheries. Tumring REDD<sup>+</sup> Project covers an area of 41,166 ha and lies at the southwestern edge of PLWS (central Cambodia), is a multi-partner initiative designed to promote climate change mitigation and adaptation, restore and protect biodiversity, and improve local people livelihoods under the UN scheme of Reducing Emissions from Deforestation and forest Degradation (REDD<sup>+</sup>). Some of community forests at the Tumring REDD<sup>+</sup> Project Site are remaining a good forest condition that are likely supporting a high diversity of wildlife, especially for species of the globally conservation significant. However, the areas are scarce in term of wildlife research and monitoring, especially herpetofauna study.

To achieve a better wildlife protection and conservation at these community forests, collecting information of wildlife species in this area is really important. In December 2021, Department of Wildlife and Biodiversity of the Forestry Administration cooperated with the Center for Biodiversity

Conservation of the Royal University of Phnom Penh conducted a rapid assessment of herpetofauna in the community forest areas of the Tumring REDD+ Project Site. The objective of this assessment was to conduct scientific survey to collect information of herpetofauna species that presence in the targeted community forest areas, specifically focused on species richness and abundance. A mini-community interviews were also carried out to verify the presence or absence of some conspicuous reptile species that the survey team might not able to record during the actual field search due to a very short survey time.

## II. Method and Material

### 2.1. Survey Area

The herpetofauna survey field work was carried out from 06 – 15 December, 2021 at eight community forest sites locate in Sandan and Santuk districts, Kampong Thom province (Figure 1). These community forests are under the “Tumring REDD+ Project Area”, which cover a total area of 41,166 ha. The eight community forest are including of: Prey Kbal O’Kranhak Community Forest, Prey Tatey Community Forest, O’Kranhong Community Forest, O’Das Skor Community Forest, Prey Bos Leav Community Forest, Prey Hong Chamtit Community Forest, Prey Labos Sral Community Forest, and Water Cycle Forest Research Station (Prey Ang Taen) (Table 1). These eight studied community forests are lowland areas (with elevation range from 41 – 107 m a.s.l), separated from a bigger forest of Prey Lang Wildlife Sanctuary and surrounded by cassava and cashew nut plantations.

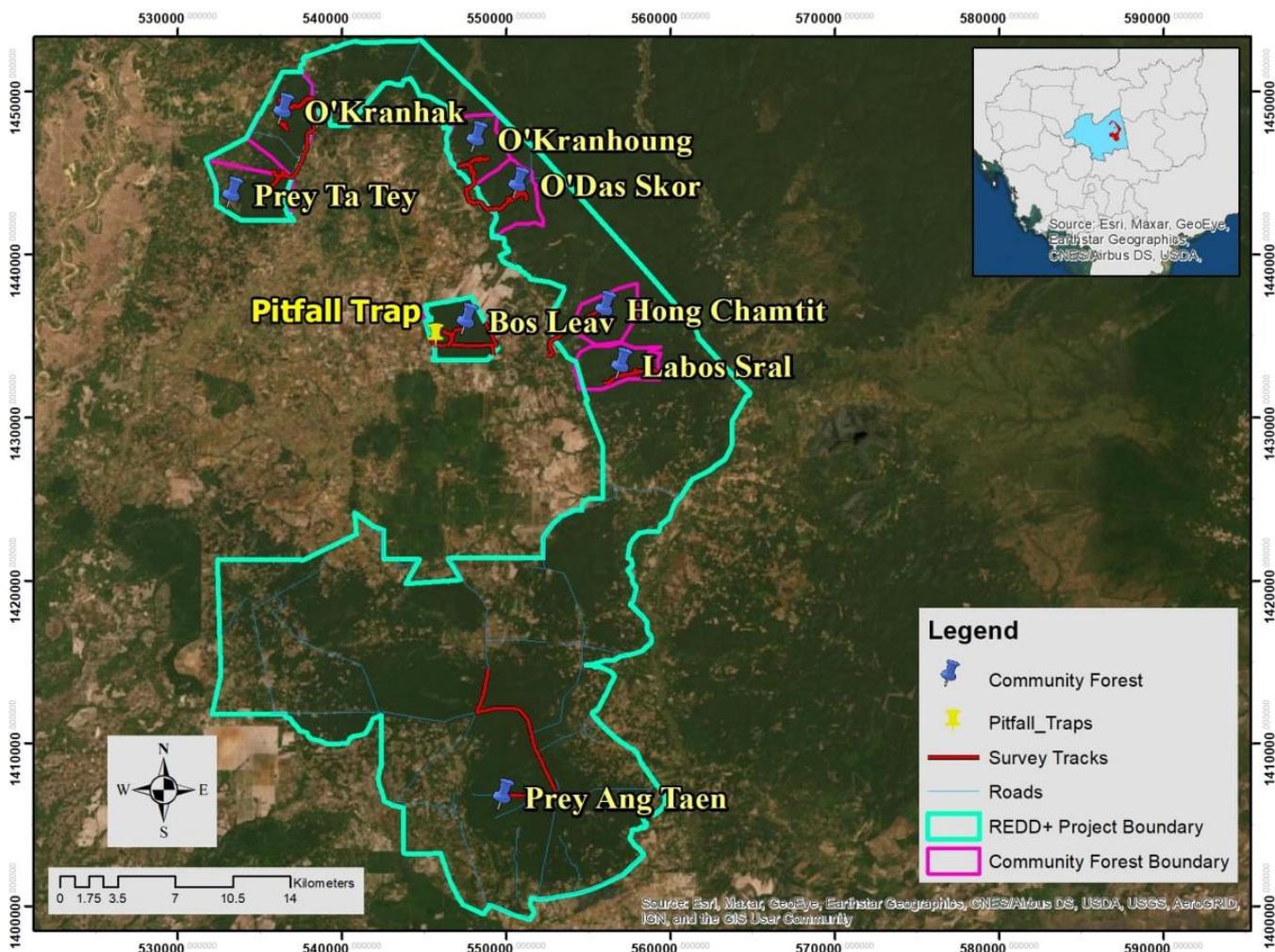


Figure 1: Map showing studied location of 8 communities forest (CFs) in Kampong Thom province.

Table 1: Coordinate of each studied community forest areas.

Survey Site	N	E	Elevation
Prey Kbal O’Kranhak	13.09806	105.33528	41 m
Prey Ta Tey	13.06603	105.33175	77 m
O’Kranhoung	13.07856	105.44946	107 m
O’Das Skor	13.06521	105.46853	104 m
Labos Sral	12.95994	105.53329	78 m
Prey Hong Chamtit	12.99609	105.51694	87 m
Prey Ang Taen	12.72546	105.45917	67 m
Prey Bos Leav	12.98268	105.42588	88 m

**Vegetation description:** the eight survey sites are the community forest areas, which the main habitat can be described as semi-evergreen forest and there are many dipterocarp tree species remain dominantly distribute throughout each area. Some community forest sites maintain a high number of resin tree species and local communities were observed still practicing their traditional resin tapping methods (Figure 2). Swamps and streams are the important water storage found in these community forests, which provide suitable conditions and habitat for amphibians and reptiles as well as other wildlife species in the areas.



Figure 2: The semi-evergreen forest with resin trees at O'Das Skor Community Forest.

## 2.2. Data Collection

Due to some reptile and amphibians are active during the day and some active at the night, a group of 4 - 5 survey people conducted search both during the daytime and at night. The opportunistic searches for amphibians and reptiles were undertaken by slow walking searching on the ground, grasses, vegetation, puddle, tree holes, wood lodge, and on the trees along forest trails and streams (Estes-zumpf et al., 2017; Hayes et al., 2015). During daytime search, we walked along forest trails and looked for herpetofauna species on the ground, under leaf litter, or under wood lodge like some snakes, frogs and skinks. We also looked on the tree for some other species. At night, we basically walked along the streams and some forest trails to see nocturnal species of the areas. We also deployed six pitfall traps of plastic buckets with drift fence to prevent animals pass (Raxworthy & Nussbaum, 1996) (Figure 3) in a community forest called “Prey Bos Leav” for capturing ground dwelling species such as small snakes, skinks and some other small frog species. Most species that we found were photographed at their substrates, recorded their location (using Garmin GPS 64x) and caught for keeping in plastic bags with enough air so that we could photograph them in the next morning and released back unharmed. Amphibians and reptiles species were basically identified by using field guides to the Amphibians of Cambodia (Neang & Holden, 2008), Reptiles of Southeast Asia (Robinson, 2017) and some other online sources.



Figure 3: Drift fence pitfall trap with plastic fence deployed along the stream at “Prey Bos Leav”.



Figure 4: Opportunity search activity by the survey team during day and night along trails, streams, under leaf litter, and under wood lodge at the studied community forests.

### 2.3. Community Interviews

Given a time constraint for the actual field survey in the targeted areas, community interviews were also conducted to collect a certain key herpetofauna species information. The experiential knowledge of the local people who have interactions with the studied community forest areas can provide data on the herpetofauna species known to local communities and also gathering the data sets of species last sightings by local observers. Local people interviews can also provide important information related to anthropogenic pressures and threats on forest areas/resources, combined with the illegal hunting and trade of wildlife that tend to intensify the population decline of animal species and/or their locally extinction. Given the above, the survey team conducted community interviews to collect data on key conspicuous of herpetofauna species that local community used to see or met occasionally and the information related to poaching in the vicinity of the targeted areas. Overall, the interviews aim to identify the presence of key conspicuous or high conservation value species and also gathering the information of potential threats to the herpetofauna hunting and trade in these community forest areas.

The community interviews (Figure 5) were only conducted with local people who joined the field studied with the survey team. A total of 10 local people (1-2 people at each community forest) were interviewed and these people identified to access forest regularly and joining forest patrol activities. The interviews were structured and guided by questionnaire list and data sheets that were filled during the interview process. As the confusion may happen amongst the local people on the species identification that they had seen; therefore, photographs from the field guidebook was also used as an essential element of the interview process. In some cases, they were also asked to describe the features that they use to identify the species to ascertain their level of identification skills and verify the correct name assignment. They were subsequently asked to provide various details about the species (relating to size, color, behavior, habitats) as a means to identify potential or definite misidentifications between similar species. A field guide book entitled the “Reptiles of Southeast Asia” was used to show the interviewees a collection of photographs of individual key species and where it was necessary, to show them illustrations of possible confusion species in order to verify their misidentification.



Figure 5: Local guide interviews to collect information about the presence of conspicuous key reptile species as well as some information of wildlife threats in their area.

### III. Results

#### 3.1 Total Species Richness and Abundance

After exploring the eight community forest sites, a total of 36 herpetofauna species were found from the actual field search (see Table 2 for the full list of all species). They are comprised of 16 amphibian species (arranged by five families and twelve genera). Five family of recorded amphibians with different recorded species such as: Bufonidae (1), Dicroglossidae (4), Microhylidae (7), Ranidae (2), and Rhacophoridae (2). There are 20 recorded species of reptiles, each family has been recorded different number of species such as: Agamidae (3), Gekkonidae (5), Scincidae (4), Colubridae (6), Elapidae (1), and Homalopsidae (1) (see Figure 6).

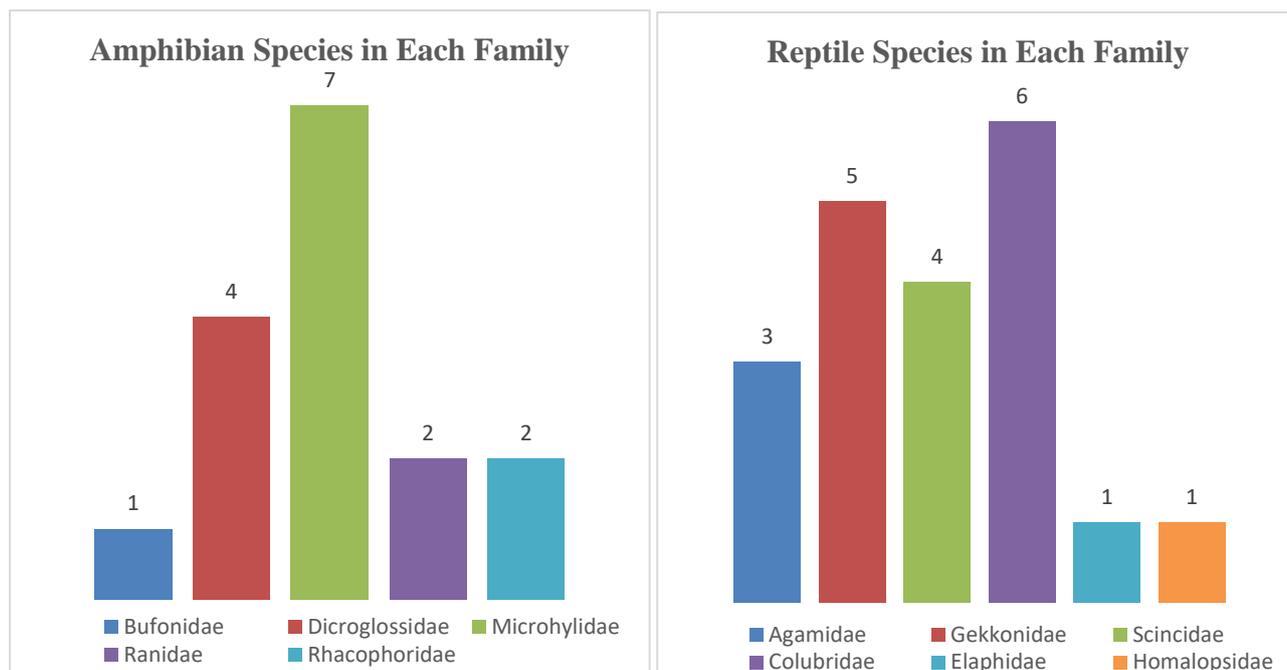


Figure 6: Number of recorded species by family of amphibians and reptiles.

Among the 16 amphibian species that we recorded across the whole survey areas are having high in number and all of them are listed as Least Concern (LC) by the IUCN Red List (IUCN, 2021). For the 20 reptile species, 19 species of them are listed as Least Concern and only a single species is listed as Vulnerable (VU) by the IUCN Red List and it is Indochinese Water Dragon (*Physignathus cocincinus*).

Table 2: List of 36 amphibians and reptile species found across all survey sites.

No.	Khmer Name	Scientific Name	English Name	IUCN Status	Prakas 020.MAFF
<b>Amphibians</b>					
<b>Bufonidae</b>					
1	គីង្កក់ស្រុក	<i>Duttaphrynus melanostictus</i>	Asian common toad	LC	-
<b>Dicroglossidae</b>					
2	កង្កែបអាចម៍តោ	<i>Fejervarya limnocharis</i>	Paddy frog	LC	-
3	កង្កែបកូប	<i>Hoplobatrachus rugulosus</i>	Rugulose bullfrog	LC	-

4	កង្កែបក្បាត់លីម៉ា	<i>Occidozyga lima</i>	Green floating frog	LC	-
5	កង្កែបក្បាត់ម៉ាចេនស៍	<i>Occidozyga martensii</i>	Marten's floating frog	LC	-
<b>Microhylidae</b>					
6	ហ៊ីងចំបក់	<i>Calluella guttulata</i>	Burmese squat frog	LC	-
7	ហ៊ីងជីវ	<i>Kalophrynus interlineatus</i>	Spotted narrow-mouthed frog	LC	-
8	ហ៊ីងម្រាមជើងចង្កូវ	<i>Microhyla butleri</i>	Butler's pigmy frog	LC	-
9	ហ៊ីងហ្វីស៊ីពីស	<i>Microhyla fissipes</i>	Ornate pigmy frog	LC	-
10	ហ៊ីងឆ្មុតខ្មៅចំហៀង	<i>Microhyla heymonsi</i>	Dark-side narrow mouth frog	LC	-
11	ហ៊ីងខ្នងក្រឡា	<i>Microhyla pulchra</i>	Beautiful pygmy frog	LC	-
12	ហ៊ីងអុចខ្នង	<i>Micryletta inornata</i>	Plain narrow mouth frog	LC	-
<b>Ranidae</b>					
13	កង្កែបត្រចៀកក្រហម	<i>Hylarana erythraea</i>	Common green frog	LC	-
14	កង្កែបព្រៃមីរចេនសេន	<i>Sylvirana mortenseni</i>	Mortensen's frog	LC	-
<b>Rhacophoridae</b>					
15	កញ្ចាញ់ចេកក្បាលធំ	<i>Polypedates megacephalus</i>	Hong Kong whipping frog	LC	-
16	កញ្ចាញ់ចេករន្ធលើមានអុច	<i>Theلودerma stellatum</i>	Spotted warty frogs	LC	-
<b>Reptile-lizards</b>					
<b>Agamidae</b>					
17	បង្កួយច្បារ	<i>Calotes versicolor</i>	Common garden lizard	LC	Common
18	បង្កួយស្លាបបំពង់កលឿង	<i>Draco maculatus</i>	Spotted gliding lizard	LC	Common
19	កន្រ្តង	<i>Physignathus cocincinus</i>	Indochinese water dragon	VU	Common
<b>Gekkonidae</b>					
20	តុកកែសៀម	<i>Dixonius siamensis</i>	Siamese leaf-toed gecko	LC	-
21	ជើងចក់ស្រុកម្រាមជើងបួន	<i>Gehyra mutilata</i>	Stump-toed gecko	LC	Common
22	តុកកែ	<i>Gekko gekko</i>	Tokay gecko	LC	Common
23	ជើងចក់ជើងបន្លា	<i>Hemidactylus frenatus</i>	Common house gecko	LC	Common
24	ជើងចក់ស្រុកកន្ទុយសំប៉ែត	<i>Hemidactylus platyurus</i>	Flat-tailed house gecko	LC	Common
<b>Scincidae</b>					
25	ថ្លែនឆ្មុតខ្នងធំ	<i>Eutropis macularia</i>	Speckled forest skink	LC	Common
26	ថ្លែនឆ្មុតខ្នង	<i>Eutropis multifasciata</i>	Common sun skink	LC	Common
27	ថ្លែនឆ្មុតខ្នងខ្មៅលឿង	<i>Lipinia vittigera</i>	Striped tree skink	LC	Common
28	ថ្លែនចម្រិត ឬថ្លែនអូរ	<i>Sphenomorphus maculatus</i>	Streamside skink	LC	Common
<b>Reptile-snakes</b>					
<b>Colubridae</b>					
29	ពស់ហនុមានបៃតង	<i>Boiga cyanea</i>	Green Cat Snake	LC	Common
30	ពស់ភ្នំថ្មកែវ	<i>Boiga multomaculata</i>	Many-spotted Cat Snake	LC	Common

31	ពស់តុកកែក	<i>Chrysopelea ornata</i>	Ornate Flying Snake	LC	Common
32	ពស់អង្កាច់មាសពណ៌ប្រផេះ	<i>Oligodon cf. cinereus</i>	Ashy Kukri Snake	LC	-
33	ពស់ខ្យងអុចស-ខ្មៅ	<i>Pareas margaritophorus</i>	White-spotted Slug Snake	LC	Common
34	ពស់ព្រៃក្បាលព្រលំ	<i>Psammodynastes pulverulentus</i>	Common Mock Viper	LC	Common
<b>Elapidae</b>					
35	ពស់ក្រាយបង្កង់សខ្មៅ	<i>Bungarus candidus</i>	Malayan Krait	LC	Common
<b>Homalopsidae</b>					
36	ពស់ទឹកពោះពណ៌លឿង	<i>Enhydris cf. plumbea</i>	Yellow Belly Water Snake	LC	-

Among the recorded species of amphibians and reptiles, some species have high number of individuals while some has very low detection number. Among the 16 species of amphibians, Ornate Pigmy Frog (*Microhyla fissipes*) is considered as the most abundance species with record of 86 individuals follows by Paddy Frog (*Fejervarya limnocharis*) with recorded abundance of 66 individuals. Some species have very low detections such as Burmese Squat Frog (*Calluella guttulata*) with only one detection and followed by Spotted Narrow-mouthed Frog (*Kalophrynus interlineatus*) and Plain Narrow Mouth Frog (*Micryletta inornata*) with two detections (see figure 7).

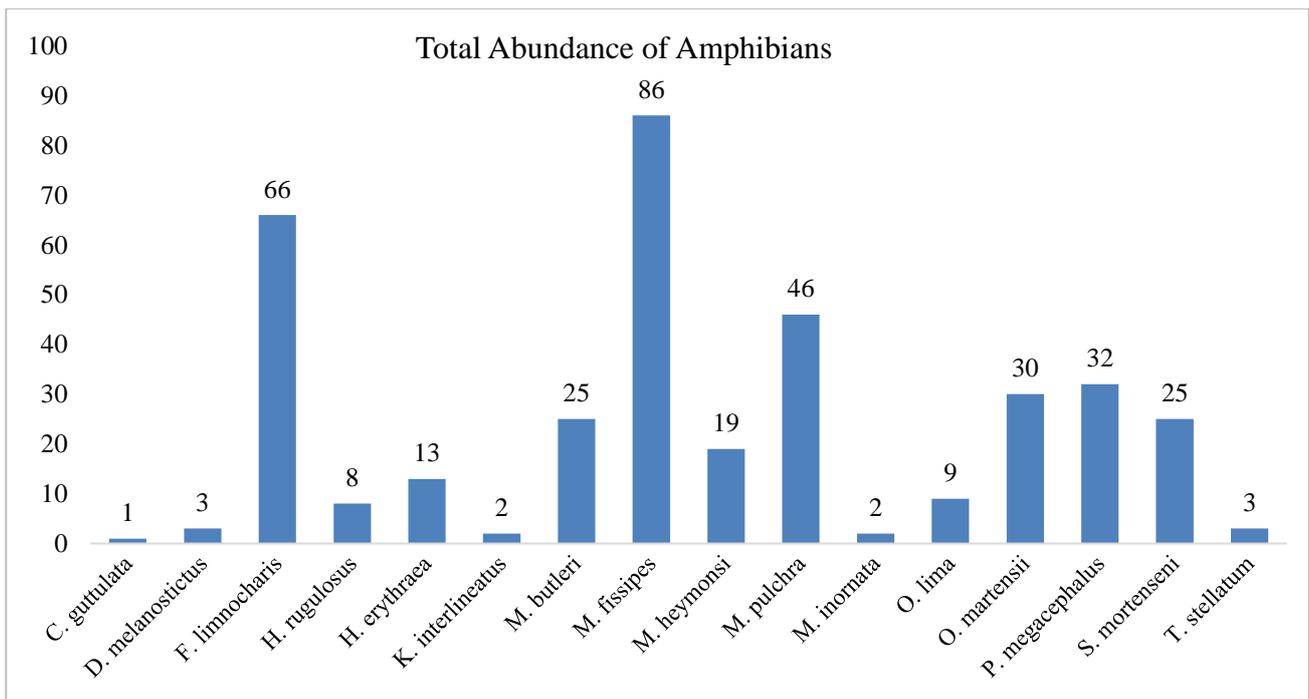


Figure 7: Total abundance of recorded amphibian species across from all survey sites.

Not much different from amphibians, reptiles cover more species with few species has high abundance such as Speckled Forest Skink (*Eutropis macularia*) with abundance of 55 detections and follow by Tokay Gecko (*Gekko gekko*) with abundance of 24 detections while the rests are very low abundance such as: Malayan Krait (*Bungarus candidus*), Green Cat Snake (*Boiga cyanea*), Many-spotted Cat Snake (*Boiga multomaculata*), Ornate Flying Snake (*Chrysopelea ornata*), Yellow Belly Water Snake (*Enhydris cf. plumbea*), Stump-toed Gecko (*Gehyra mutilata*), Striped Tree Skink (*Lipinia vittigera*), Ashy Kukri Snake (*Oligodon cf. cinereus*), Indochinese Water Dragon

(*Physignathus cocincinus*), and Common Mock Viper (*Psammodynastes pulverulentus*), each of them had only one detection (see figure 8).

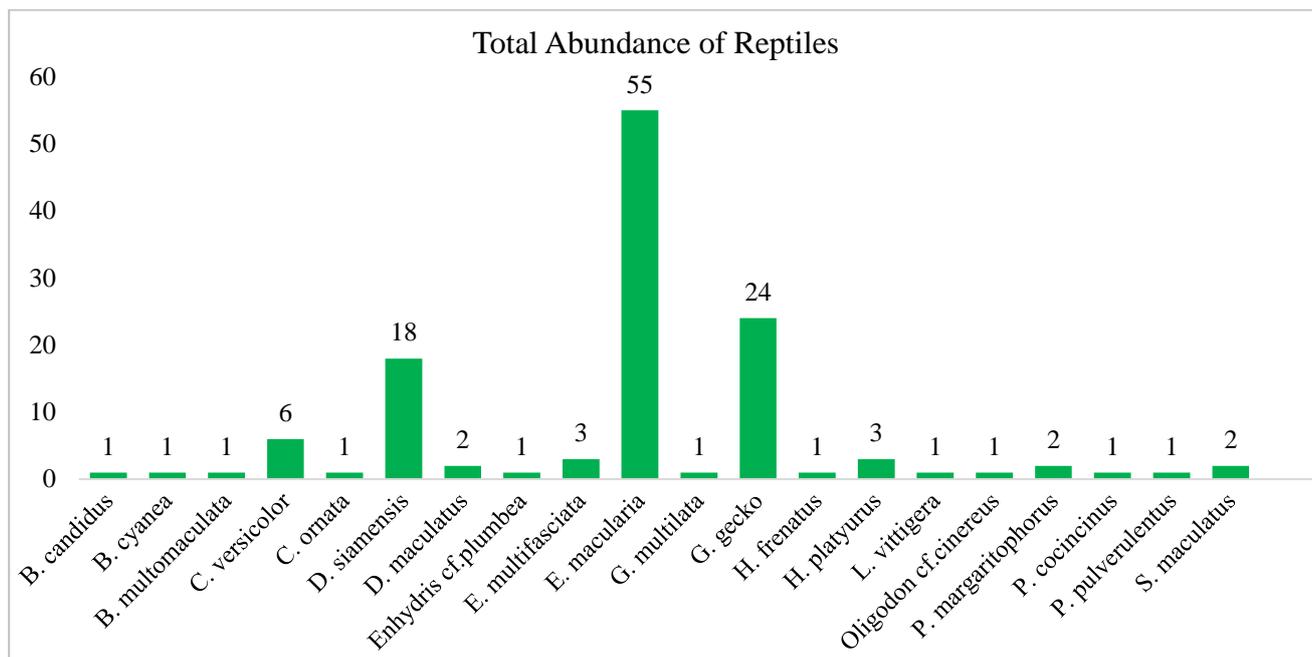


Figure 8: The total abundance of reptile species across from all survey sites.

### 3.2 Species Richness and Abundance of Each Site

This research survey has been conducted in eight different sites as in Table 1. There are different recorded of herpetofauna from each survey site in term of number individuals and number of species. Community forest with highest number of species (species richness) is Prey Bos Leav with 17 recorded species but number of individuals are at the second highest with 95 detections. The highest abundance site is Prey O’Kranhoung Community Forest with 117 detections belongs to 14 species. The site with lowest individuals of 23 detections and number of species of 11 is Prey O’Ta Tey Community Forest (see figure 9).

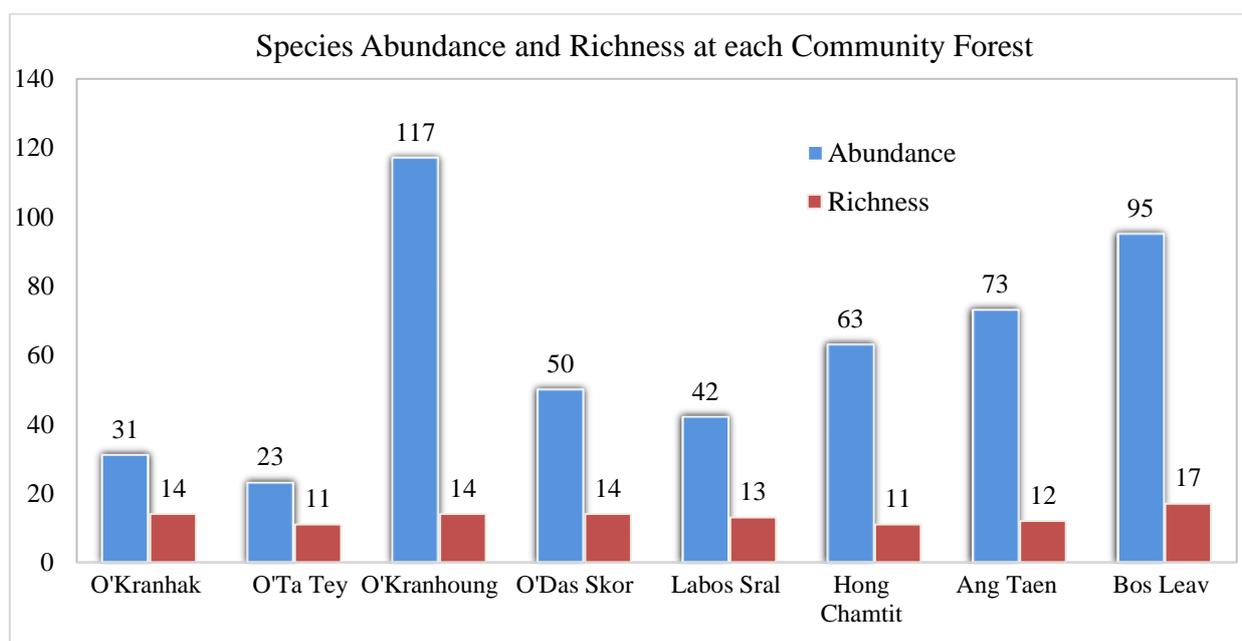


Figure 9: Recorded species abundance and richness of each survey site.

### 3.3 Species Diversity

Based on species richness and relative abundance of recorded amphibian and reptile species from each survey site, the species diversity was calculated. Some diversity indices produce different diversity score depends on different calculation methods. We used some species diversity indices such as: Shannon’s Diversity Index and Simpson's Diversity Index (Roswell et al., 2021; Sarma & Das, 2015; Shannon, 1948), which these two are popularly used in term of diversity calculation. After testing for diversity score of each community forest, we found that the site that has the highest diversity is Prey Kbal O’Kranhak with Shannon diversity index of 2.383 and Simpson diversity index of 0.884. The site with lowest score is Prey Ang Taen with Shannon diversity index of 1.873 and Simpson diversity index of 0.784 (Table 3).

Table 3: Diversity indices, species richness, and evenness of each survey site.

Survey Site	H_Shannon	D_Simpson	Richness	Evenness
O’Kranhak	2.38	0.88	14	0.90
O’Ta Tey	2.22	0.87	11	0.92
O’Kranhoung	1.93	0.80	14	0.73
O’Das Skor	2.30	0.87	14	0.87
Prey Labos Sral	2.33	0.88	13	0.91
Hong Chamtit	2.00	0.82	11	0.83
Prey Ang Taen	1.87	0.78	12	0.75
Prey Bos Leav	2.13	0.82	17	0.75

### 3.4 Species Recorded from Community Interviews

Based on field local guides interviews, 13 key conspicuous reptile species were recorded from across all studied community forest areas (see Table 4). These 13 reptile species were reported to be seen by local people within the last 5 years. Among all these 13 reptile species, 3 species are classified as “Critically Endangered”, 2 as “Endangered”, 4 as “Vulnerable”, 1 as “Near Threatened” and 3 species as “Least Concern” by the IUCN Species Red List (IUCN, 2021). 10 of these key conspicuous reptile species can be considered as a very high value for the conservation purpose as they are globally threatened species.

Table 4: Key conspicuous and high conservation value of reptile species recorded from the community interviews across all survey sites.

No.	Khmer Name	Scientific Name	English Name	IUCN Status	Prakas 020.MAFF
1	ក្រកូត	<i>Varanus bengalensis</i>	Bengal Monitor	NT	Common
2	អន្ស្រង	<i>Varanus salvator</i>	Water Monitor	LC	Common
3	ពស់វែករាម	<i>Ophiophagus hannah</i>	King Cobra	VU	Rare
4	ពស់វែកក្របី	<i>Naja kaouthia</i>	Monocled Cobra	LC	Rare

5	ពស់វែកដំបូក	<i>Naja siamensis</i>	Indochinese Spitting Cobra	VU	Rare
6	ពស់ថ្លាន់តូច	<i>Python bivittatus</i>	Burmese Python	VU	Common
7	ពស់ថ្លាន់ធំ	<i>Python reticulatus</i>	Reticulated Python	LC	Common
8	អណ្តើកព្រិច	<i>Indotestudo elongata</i>	Elongated Tortoise	CR	Common
9	កន្ទាយអាស៊ី	<i>Amyda cartilaginea</i>	Asiatic Softshell Turtle	VU	-
10	អណ្តើកសោម	<i>Heosemys grandis</i>	Asian Giant Terrapin	CR	-
11	អណ្តើកសកល	<i>Heosemys annandalii</i>	Yellow Headed Temple Turtle	CR	-
12	អណ្តើកក្អែក	<i>Siebenrockiella crassicollis</i>	Black Mask Turtle	EN	-
13	អណ្តើកបិទមុខ	<i>Cuora amboinensis</i>	Southeast Asian Box Turtle	EN	Common



**A:** *Dixonius siamensis*



**E:** *Gekko gekko*



**B:** *Gehyra mutilata*



**F:** *Calotes versicolor*



**C:** *Hemidactylus platyurus*



**G:** *Draco maculatus*



**D:** *Hemidactylus frenatus*



**H:** *Physignathus cocincinus*

Figure 10: Picture of recorded reptile species from the survey areas.



**A:** *Oligodon cf. cinereus*



**B:** *Psammodynastes pulverulentus*



**C:** *Pareas margaritophorus*



**D:** *Bungarus candidus*



**E:** *Boiga cyanea*



**F:** *Boiga multomaculata*



**G:** *Eutropis macularia*



**H:** *Sphenomorphus maculatus*

Figure 11: Picture of recorded reptile species from the survey areas.



**A:** *Hylarana erythraea*



**B:** *Sylvirana mortenseni*



**C:** *Polypedates megacephalus*



**D:** *Theloderma stellatum*



**E:** *Duttaphrynus melanostictus*



**F:** *Hoplobatrachus rugulosus*



**G:** *Fejervarya limnocharis*



**H:** *Kalophrynus interlineatus*

Figure 12: Picture of recorded amphibian species from the survey areas.



**A:** *Microhyla butleri*



**E:** *Micryletta inornata*



**B:** *Microhyla heymonsi*



**F:** *Occidozyga lima*



**C:** *Microhyla fissipes*



**G:** *Occidozyga martensii*



**D:** *Microhyla pulchra*



**H:** *Calluella guttulata*

Figure 13: Picture of recorded amphibian species from the survey areas.

### 3.5 Threats

Some threat activities have been observed to threaten the herpetofauna at the studied community forests of the Tumring REDD<sup>+</sup> Project Site in Kampong Thom Province. First, there were signs of illegal logging which these can lead to change in the forest composition and ecosystem and as the result it alters the microclimate and habitat conditions for breeding and shelters of the herpetofauna species. This pose the negative effect on the survival of the amphibians and reptiles species through reduced of reproductive rates, loss of genetic diversity and changes in their growth and activity pattern. Second, the signs of wildlife hunting by the local people and including snares were also observed and reported during the field survey. The snares locally called in Khmer as “Duo” were seen and reported to be set up along the streams inside these studied community forests to catch many amphibian and reptile species including snakes, frogs, turtles and other some specific species such as Indochinese Water Dragon (*P. cocincinus*), which is classified as “Vulnerable” by the IUCN Red List.

The abiotic factors such as water depth and flow velocity help determine the specific micro-habitat that influences the richness, abundance and distribution of the herpetofauna; especially, the amphibian and turtle species. During the actual field search, the survey team observed that many of waterholes and streams in these studied community forests were drying out and some of them have already completely dried out. Climate change can be considered to be an effect on the water availability of those waterholes and streams (Bickford et al., 2010), while changes or increase in sedimentation in hydrological system are also considered as the factor leading to shallow water regimes in these areas. Lacking water availability in these community forest areas suggest risks to the herpetofauna especially for the species that have a restricted movement and may not be able to shift their distribution to accommodate change of their habitat conditions.

Among 75.5% of the interviewed respondents reported to having seen herpetofauna hunting in the studied community forests. Among all 8 surveyed community forest sites, 7 sites were reported that local people collect herpetofauna from the forest for both household food consumptions and generate some extra income. At least 10 of herpetofauna species are reported to be commonly caught within these 7 community forest areas including: Indochinese Water Dragon (*P. cocincinus*), Bengal Monitor (*V. bengalensis*), Water Monitor (*V. salvator*), 3 of cobra species King Cobra (*O. hannah*), Indochinese Spitting Cobra (*N. siamensis*), Monocled Cobra (*N. kaouthia*) and 4 species of turtle/tortoise species Elongated Tortoise (*I. elongate*), Black Mask Turtle (*S. crassicolis*), Asian Giant Terrapin (*H. grandis*), and Asiatic Softshell Turtle (*A. cartilaginea*). Most of these targeted hunting species are high in conservation value which 2 species are classified as “Critically Endangered”, 1 as “Endangered”, 4 as “Vulnerable”, 1 as “Near Threatened” and other 2 species as “Least Concern” by the IUCN Red List.

Among these targeted hunting herpetofauna species, Indochinese Water Dragon and all cobra species are mostly reported to be hunted for selling to generate extra household’s income due to they are high in market price/value. 1.0 kilogram of cobra snake are reported to be sold at the price of around 25 US\$, while the meat of Bengal Monitor may be sold at about 7.5 US\$/kg. Beside these, Indochinese Water Dragon and turtle/tortoise species are more likely collected by local people for diet/food consumption. The main hunting methods used by the hunters in these community forest areas are mainly including traps, dogs and handy-craft gun. The interviewees reported that the middle traders who buy these reptile species are mostly come from outside their area (from Kampong Thmor)

and some also reported that local people hunt and sell these reptile species to the Vietnamese who work or own rubber plantations in those areas.

#### IV. Conclusion and Discussion

A total of 49 herpetofauna species were recorded from all survey sites. Among these, 36 species (16 amphibian and 20 reptile species) were recorded from the actual field search while other 13 key conspicuous reptile species were recorded from the local people interviews. The herpetofauna species of the high conservation value were only recorded through local people interviews and the species found/sighting from the field survey mostly listed as the least concern by the IUCN Red List.

Despite this survey was relatively short time and conducted at only eight community forest sites but the 36 species recorded from the actual survey is approximately equal to 53.7 percent of total recorded species from the nearby Prey Lang Wildlife Sanctuary (PLWS), which the survey at the PLWS found 67 herpetofauna species in total (Hayes et al., 2015). Our finding result from all survey community forests is equal to 72.7 percent of amphibians and 44.4 percent of reptiles of the total species recorded from herpetofauna survey in the PLWS. The most abundance recorded amphibians was narrow-mouth frogs (Microhylidae) specifically *M. fissipes* that we also found them at most of our studied community forest sites. The most abundance recorded reptile is Grass Sun skink (*E. macularia*) that were found at every survey sites. Anyways, there are three species that can be considered as common species as they occur in every survey sites such as: Spot-Legged Tree Frog (*P. megacephalus*), Siamese Leaf-toed Gecko (*D. siamensis*), and Grass Sun Skink (*E. macularia*).

Among the two applied techniques, the Drift fences with pitfall traps was not good in providing result as we have very short time for each site so it was only set up at one site along the stream at the “Bos Leav Community Forest”, which the stream was relatively dry and we only catch a single species of the skink (*E. macularia*). The opportunistic sampling/searching produced much better result due to we have more people that walking during the day along forest trails and at night along the streams and puddles. We have higher chance to record more species and more individuals as we explore more areas in each site, it is a suitable method to collect herpetofauna in the areas while pitfall trap capture less animals same as mention by Ali et al. (2018).

Understanding the species assemblages and their distribution is very useful for fauna conservation in Cambodia. Among the eight survey sites, Prey Bos Leav has the highest species richness and the second highest abundance, this site is surrounded by cashew and cassava plantations and has swamps inside that can attract more species from surrounding areas into the site. The lowest number of species and abundance is Prey O’Ta Tey that is relatively dry, we could not find stream with water in this site and only found few puddles along the trails instead. This condition would lead to scarce herpetofauna diversity in the area. In term of diversity scores, the highest score or we can say the highest diversity is Prey O’Kranhak which has more flowing streams and puddles than other sites. This condition supports more species to keep active even in dry season. The lowest diversity score is at Prey Ang Taen which the forest is more degraded and isolate from others. However, many more species might be not detected during our search at these studied community forest areas due to short exploring time and most part of the areas were getting dried, which are not preferred by some species as their prey relative less than wet season (De Oliveira & Haddad, 2015).

## V. Recommendation

Based on the field observation and result finding from our survey, we would provide some suggestions and recommendations as follow:

- Most of herpetofauna species of the high conservation value recorded from the studied community forest sites only obtained through the local people interviews; therefore, we would suggest to conduct further study/survey with more effort to confirm that these species are really still presence in these areas.
- In case there are confirmed by the further survey that these herpetofauna species of the high conservation value still presence within the studied community forest areas, we suggest to design long-term population trend monitoring and habitat use, as well as conservation action program to preserve these species of the globally conservation significant. The targeted species would be recommended for the future monitoring including of: Indochinese Water Dragon (*P. cocincinus*), Bengal Monitor (*V. bengalensis*), Water Monitor (*V. salvator*), 3 of cobra species King Cobra (*O. hannah*), Indochinese Spitting Cobra (*N. siamensis*), Monocled Cobra (*N. kaouthia*) and 4 species of turtle/tortoise species Elongated Tortoise (*I. elongate*), Black Mask Turtle (*S. crassicolis*), Asian Giant Terrapin (*H. grandis*), and Asiatic Softshell Turtle (*A. cartilaginea*).
- Provide awareness raising and education to local people/villagers about the important and needs in the protecting and conserving herpetofauna as well as other wildlife species such as large mammals and birds.
- Improving and strengthening law enforcement to stop illegal logging and illegal wildlife hunting/collecting activities by the local hunters.
- Restoring natural forest of these areas especially for the sites that are degraded (e.g. Water Cycle Forest Research Station - Ang Taen Forest), which these can providing a better and suitable habitat for the herpetofauna in these targeted areas.
- Preserve major streams, waterholes and other swamp areas within these community forests which these are important habitat and shelters for water dependent species including amphibian, all turtle species and other wildlife species.

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**Appendix 1:** List of herpetofauna species recorded from O'Kranhak Community Forest.

(RSS: Record from Survey Sighting, RCI: Record from Community Interview)

No.	Khmer Name	Scientific Name	English Name	IUCN Status	Prakas 020.MAFF	#Record	Type of Record
<b>Amphibians</b>							
1	កង្កែបអាចម៍តោ	<i>Fejervarya limnocharis</i>	Paddy frog	LC	-	6	RSS
2	កង្កែបកូប	<i>Hoplobatrachus rugulosus</i>	Rugulose bullfrog	LC	-	1	RSS
3	កង្កែបត្រចៀកក្រហម	<i>Hylarana erythraea</i>	Common green frog	LC	-	2	RSS
4	ហ៊ីងហ្វីស៊ីពីស	<i>Microhyla fissipes</i>	Ornate pigmy frog	LC	-	1	RSS
5	ហ៊ីងឆ្មុតខ្មៅចំហៀង	<i>Microhyla heymonsi</i>	Dark-side narrow mouth frog	LC	-	1	RSS
6	ហ៊ីងអុចខ្នង	<i>Micryletta inornata</i>	Plain narrow mouth frog	LC	-	1	RSS
7	កញ្ជាញ់ចេកក្បាលធំ	<i>Polypedates megacephalus</i>	Hong Kong whipping frog	LC	-	6	RSS
<b>Reptiles</b>							
8	ពស់ហនុមានបៃតង	<i>Boiga cyanea</i>	Green Cat Snake	LC	Common	1	RSS
9	បង្កួយច្បារ	<i>Calotes versicolor</i>	Common garden lizard	LC	Common	2	RSS
10	តុកកែសៀម	<i>Dixonius siamensis</i>	Siamese leaf-toed gecko	LC	-	4	RSS
11	ថ្លែនឆ្មុតខ្នង	<i>Eutopis multifasciata</i>	common sun skink	LC	Common	1	RSS
12	ថ្លែនឆ្មុតខ្នងធំ	<i>Eutropis macularia</i>	Speckled forest skink	LC	Common	2	RSS
13	ជើងចក់ស្រុកកន្ទុយសំប៉ែត	<i>Hemidactylus platyurus</i>	Flat-tailed house gecko	LC	Common	2	RSS
14	ថ្លែនចង្រិតឬថ្លែនអូរ	<i>Sphenomorphus maculatus</i>	Stream skink	LC	Common	1	RSS
15	កន្រ្ទង	<i>Physignathus cocincinus</i>	Indochinese water dragon	VU	Common	-	RCI
16	ក្រកូត	<i>Varanus bengalensis</i>	Bengal Monitor	NT	Common	-	RCI
17	ពស់វែករនាម	<i>Ophiophagus hannah</i>	King Cobra	VU	Rare	-	RCI
18	ពស់វែកក្របី	<i>Naja kaouthia</i>	Monocled Cobra	LC	Rare	-	RCI
19	ពស់វែកដំបូក	<i>Naja siamensis</i>	Indochinese Spitting Cobra	VU	Rare	-	RCI
20	ពស់ថ្លាន់តូច	<i>Python bivittatus</i>	Burmese Python	VU	Common	-	RCI
21	ពស់ថ្លាន់ធំ	<i>Python reticulatus</i>	Reticulated Python	LC	Common	-	RCI
22	អណ្តើកព្រិច	<i>Indotestudo elongata</i>	Elongated Tortoise	CR	Common	-	RCI
23	កន្ទាយអាស៊ី	<i>Amyda cartilaginea</i>	Asiatic Softshell Turtle	VU	-	-	RCI
24	អណ្តើកសោម	<i>Heosemys grandis</i>	Asian Giant Terrapin	CR	-	-	RCI

**Appendix 2:** List of herpetofauna species recorded from O'Ta Tey Community Forest.

(RSS: Record from Survey Sighting, RCI: Record from Community Interview)

No.	Khmer Name	Scientific Name	English Name	IUCN Status	Prakas 020.MAFF	#Record	Type of Record
<b>Amphibians</b>							
1	កង្កែបអាចម៍គោ	<i>Fejervarya limnocharis</i>	Paddy frog	LC	-	1	RSS
2	ហ្នឹងហ្នឹងស៊ីពីស	<i>Microhyla fissipes</i>	Ornate pigmy frog	LC	-	1	RSS
3	ហ្នឹងខ្ពងក្រឡា	<i>Microhyla pulchra</i>	Beautiful pygmy frog	LC	-	2	RSS
4	កង្កែបក្តាត់ម៉ាចេនស៍	<i>Occidozyga martensii</i>	Marten's floating frog	LC	-	1	RSS
5	កញ្ចាញ់ចេកក្បាលធំ	<i>Polypedates megacephalus</i>	Hong Kong whipping frog	LC	-	2	RSS
6	កង្កែបព្រៃម៉ាចេនសេន	<i>Sylvirana mortenseni</i>	Mortensen's frog	LC	-	4	RSS
7	គីង្កក់ស្រុក	<i>Duttaphrynus melanostictus</i>	Asian common toad	LC	-	2	RSS
<b>Reptiles</b>							
8	តុកកែសៀម	<i>Dixonius siamensis</i>	Siamese leaf-toed gecko	LC	-	5	RSS
9	ពស់ទឹកពោះពណ៌លឿង	<i>Enhydris cf.plumbea</i>	Yellow Belly Water Snake	LC	-	1	RSS
10	ថ្លែនតូកខ្ពងធំ	<i>Eutropis macularia</i>	Speckled forest skink	LC	Common	1	RSS
11	តុកកែ	<i>Gekko gekko</i>	Tokay gecko	LC	Common	3	RSS
12	កន្រ្តង	<i>Physignathus cocincinus</i>	Indochinese water dragon	VU	Common	-	RCI
13	ត្រកូត	<i>Varanus bengalensis</i>	Bengal Monitor	NT	Common	-	RCI
14	ពស់វែកនាម	<i>Ophiophagus hannah</i>	King Cobra	VU	Rare	-	RCI
15	ពស់វែកក្របី	<i>Naja kaouthia</i>	Monocled Cobra	LC	Rare	-	RCI
16	ពស់វែកដំបូក	<i>Naja siamensis</i>	Indochinese Spitting Cobra	VU	Rare	-	RCI
17	ពស់ថ្លាន់តូច	<i>Python bivittatus</i>	Burmese Python	VU	Common	-	RCI
18	ពស់ថ្លាន់ធំ	<i>Python reticulatus</i>	Reticulated Python	LC	Common	-	RCI
19	អណ្តើកព្រិច	<i>Indotestudo elongata</i>	Elongated Tortoise	CR	Common	-	RCI
20	កន្ទាយអាស៊ី	<i>Amyda cartilaginea</i>	Asiatic Softshell Turtle	VU	-	-	RCI
21	អណ្តើកសោម	<i>Heosemys grandis</i>	Asian Giant Terrapin	CR	-	-	RCI

**Appendix 3:** List of herpetofauna species recorded from O'Kranhounng Community Forest.

(RSS: Record from Survey Sighting, RCI: Record from Community Interview)

No.	Khmer Name	Scientific Name	English Name	IUCN Status	Prakas 020.MAFF	#Record	Type of Record
<b>Amphibians</b>							
1	កង្កែបអាចម៍គោ	<i>Fejervarya limnocharis</i>	Paddy frog	LC	-	32	RSS
2	កង្កែបកូប	<i>Hoplobatrachus rugulosus</i>	Rugulose bullfrog	LC	-	4	RSS
3	កង្កែបត្រចៀកក្រហម	<i>Hylarana erythraea</i>	Common green frog	LC	-	3	RSS
4	ហ៊ីងហ្វីស៊ីពីស	<i>Microhyla fissipes</i>	Ornate pigmy frog	LC	-	31	RSS
5	ហ៊ីងខ្នងត្រឡា	<i>Microhyla pulchra</i>	Beautiful pygmy frog	LC	-	4	RSS
6	កញ្ចាញ់ចេកក្បាលធំ	<i>Polypedates megacephalus</i>	Hong Kong whipping frog	LC	-	5	RSS
7	កង្កែបព្រៃម៉ែរចនសេន	<i>Sylvirana mortenseni</i>	Mortensen's frog	LC	-	4	RSS
8	កញ្ចាញ់ចេកន្ទុយឈើមានអុច	<i>Theloderma stellatum</i>	Spotted warty frogs	LC	-	1	RSS
<b>Reptiles</b>							
9	ពស់ភ្លឺថ្មកែវ	<i>Boiga multomaculata</i>	Many-spotted Cat Snake	LC	Common	1	RSS
10	បង្កួយច្បារ	<i>Calotes versicolor</i>	Common garden lizard	LC	Common	4	RSS
11	តុកកែសៀម	<i>Dixonius siamensis</i>	Siamese leaf-toed gecko	LC	-	1	RSS
12	ថ្លែនឆ្មុតខ្នងធំ	<i>Eutropis macularia</i>	Speckled forest skink	LC	Common	25	RSS
13	តុកកែ	<i>Gekko gekko</i>	Tokay gecko	LC	Common	1	RSS
14	ថ្លែនចម្រើតឬថ្លែនអូរ	<i>Sphenomorphus maculatus</i>	Stream skink	LC	Common	1	RSS
15	កន្រ្តង	<i>Physignathus cocincinus</i>	Indochinese water dragon	VU	Common	-	RCI
16	ត្រកូត	<i>Varanus bengalensis</i>	Bengal Monitor	NT	Common	-	RCI
17	ពស់វែកនាម	<i>Ophiophagus hannah</i>	King Cobra	VU	Rare	-	RCI
18	ពស់វែកក្របី	<i>Naja kaouthia</i>	Monocled Cobra	LC	Rare	-	RCI
19	ពស់វែកដំបូក	<i>Naja siamensis</i>	Indochinese Spitting Cobra	VU	Rare	-	RCI
20	ពស់ថ្លាន់ធំ	<i>Python reticulatus</i>	Reticulated Python	LC	Common	-	RCI
21	អណ្តើកព្រិច	<i>Indotestudo elongata</i>	Elongated Tortoise	CR	Common	-	RCI
22	កន្ទាយអាស៊ី	<i>Amyda cartilaginea</i>	Asiatic Softshell Turtle	VU	-	-	RCI
23	អណ្តើកសោម	<i>Heosemys grandis</i>	Asian Giant Terrapin	CR	-	-	RCI
24	អណ្តើកសកល	<i>Heosemys annandalii</i>	Yellow Headed Temple Turtle	CR	-	-	RCI

25	អណ្តើកក្អែក	<i>Siebenrockiella crassicollis</i>	Black Mask Turtle	EN	-	-	RCI
26	អណ្តើកបិទមុខ	<i>Cuora amboinensis</i>	Southeast Asian Box Turtle	EN	Common	-	RCI

**Appendix 4:** List of herpetofauna species recorded from O'Das Skor Community Forest (RSS: Record from Survey Sighting, RCI: Record from Community Interview).

No.	Khmer Name	Scientific Name	English Name	IUCN Status	Prakas 020.MAFF	#Record	Type of Record
<b>Amphibians</b>							
1	ប៊ីងចំបក់	<i>Calluella guttulata</i>	Burmese squat frog	LC	-	1	RSS
2	កង្កែបអាចម៍គោ	<i>Fejervarya limnocharis</i>	Paddy frog	LC	-	10	RSS
3	កង្កែបត្រចៀកក្រហម	<i>Hylarana erythraea</i>	Common green frog	LC	-	7	RSS
4	ប៊ីងហ្វីស៊ីស	<i>Microhyla fissipes</i>	Ornate pigmy frog	LC	-	4	RSS
5	ប៊ីងឆ្មុតខ្មៅចំហៀង	<i>Microhyla heymonsi</i>	Dark-side narrow mouth frog	LC	-	1	RSS
6	កង្កែបក្តាត់លីម៉ា	<i>Occidozyga lima</i>	Green floating frog	LC	-	1	RSS
7	កញ្ជាញ់ចេកក្បាលធំ	<i>Polypedates megacephalus</i>	Hong Kong whipping frog	LC	-	2	RSS
8	កង្កែបព្រៃមីរចេនសេន	<i>Sylvirana mortenseni</i>	Mortensen's frog	LC	-	7	RSS
<b>Reptiles</b>							
9	ពស់តុកកែ	<i>Chrysopelea ornata</i>	Ornate Flying Snake	LC	Common	1	RSS
10	តុកកែសៀម	<i>Dixonius siamensis</i>	Siamese leaf-toed gecko	LC	-	1	RSS
11	បង្កុយស្លាបបំពង់កលឿង	<i>Draco maculatus</i>	Spotted gliding lizard	LC	Common	2	RSS
12	ថ្លែនឆ្មុតខ្នងធំ	<i>Eutropis macularia</i>	Speckled forest skink	LC	Common	7	RSS
13	តុកកែ	<i>Gekko gekko</i>	Tokay gecko	LC	Common	5	RSS
14	ជីងចក់ស្រុកកន្ទុយសំប៉ែត	<i>Hemidactylus platyurus</i>	Flat-tailed house gecko	LC	Common	1	RSS
15	កន្រ្តង	<i>Physignathus cocincinus</i>	Indochinese water dragon	VU	Common	-	RCI
16	ក្រកូត	<i>Varanus bengalensis</i>	Bengal Monitor	NT	Common	-	RCI
17	ពស់វែករនាម	<i>Ophiophagus hannah</i>	King Cobra	VU	Rare	-	RCI
18	ពស់វែកដំបូក	<i>Naja siamensis</i>	Indochinese Spitting Cobra	VU	Rare	-	RCI

19	ពស់ថ្លាន់ធំ	<i>Python reticulatus</i>	Reticulated Python	LC	Common	-	RCI
20	អណ្តើកព្រិច	<i>Indotestudo elongata</i>	Elongated Tortoise	CR	Common	-	RCI
21	កន្ទាយអាស៊ី	<i>Amyda cartilaginea</i>	Asiatic Softshell Turtle	VU	-	-	RCI
22	អណ្តើកសោម	<i>Heosemys grandis</i>	Asian Giant Terrapin	CR	-	-	RCI
23	អណ្តើកសកល	<i>Heosemys annandalii</i>	Yellow Headed Temple Turtle	CR	-	-	RCI
24	អណ្តើកក្អែក	<i>Siebenrockiella crassicollis</i>	Black Mask Turtle	EN	-	-	RCI
25	អណ្តើកបិទមុខ	<i>Cuora amboinensis</i>	Southeast Asian Box Turtle	EN	Common	-	RCI

**Appendix 5:** List of herpetofauna species recorded from Labos Sral Community Forest.

(RSS: Record from Survey Sighting, RCI: Record from Community Interview)

No.	Khmer Name	Scientific Name	English Name	IUCN Status	Prakas 020.MAFF	#Record	Type of Record
<b>Amphibians</b>							
1	កង្កែបអាចម៍គោ	<i>Fejervarya limnocharis</i>	Paddy frog	LC	-	4	RSS
2	កង្កែបកូប	<i>Hoplobatrachus rugulosus</i>	Rugulose bullfrog	LC	-	1	RSS
3	ហ៊ីងហ្វីស៊ីពីស	<i>Microhyla fissipes</i>	Ornate pigmy frog	LC	-	4	RSS
4	ហ៊ីងខ្នងក្រឡា	<i>Microhyla pulchra</i>	Beautiful pygmy frog	LC	-	9	RSS
5	កង្កែបក្តាត់លីម៉ា	<i>Occidozyga lima</i>	Green floating frog	LC	-	3	RSS
6	កង្កែបក្តាត់ម៉ាទេនស៍	<i>Occidozyga martensii</i>	Marten's floating frog	LC	-	4	RSS
7	កញ្ចាញ់ចេកក្បាលធំ	<i>Polypedates megacephalus</i>	Hong Kong whipping frog	LC	-	6	RSS
8	កង្កែបព្រៃមីរចេនសេន	<i>Sylvirana mortenseni</i>	Mortensen's frog	LC	-	2	RSS
9	គីង្កក់ស្រុក	<i>Duttaphrynus melanostictus</i>	Asian common toad	LC	-	1	RSS
<b>Reptiles</b>							
10	តុកកែសៀម	<i>Dixonius siamensis</i>	Siamese leaf-toed gecko	LC	-	2	RSS
11	ថ្លែនឆ្មុកខ្នងធំ	<i>Eutropis macularia</i>	Speckled forest skink	LC	Common	1	RSS
12	តុកកែ	<i>Gekko gekko</i>	Tokay gecko	LC	Common	4	RSS
13	ពស់អង្កាច់មាសពណ៌ប្រផេះ	<i>Oligodon cf.cinereus</i>	Ashy Kukri Snake	LC	-	1	RSS
14	កន្រ្តង	<i>Physignathus cocincinus</i>	Indochinese water dragon	VU	Common	-	RCI
15	ត្រកូត	<i>Varanus bengalensis</i>	Bengal Monitor	NT	Common	-	RCI
16	អន្ស៊ង	<i>Varanus salvator</i>	Water Monitor	LC	Common	-	RCI
17	អណ្តើកព្រិច	<i>Indotestudo elongata</i>	Elongated Tortoise	CR	Common	-	RCI
18	កន្ទាយអាស៊ី	<i>Amyda cartilaginea</i>	Asiatic Softshell Turtle	VU	-	-	RCI
19	ពស់វែកនាម	<i>Ophiophagus hannah</i>	King Cobra	VU	Rare	-	RCI
20	ពស់វែកដំបូក	<i>Naja siamensis</i>	Indochinese Spitting Cobra	VU	Rare	-	RCI

**Appendix 6:** List of herpetofauna species recorded from Hong Chamtit Community Forest.

(RSS: Record from Survey Sighting, RCI: Record from Community Interview)

No.	Khmer Name	Scientific Name	English Name	IUCN Status	Prakas 020.MAFF	#Record	Type of Record
<b>Amphibians</b>							
1	កង្កែបអាចម៍គោ	<i>Fejervarya limnocharis</i>	Paddy frog	LC	-	6	RSS
2	ហ៊ីងជីវ	<i>Kalophrynus interlineatus</i>	Spotted narrow-mouthed frog	LC	-	1	RSS
3	ហ៊ីងហ្វីស៊ីពីស	<i>Microhyla fissipes</i>	Ornate pigmy frog	LC	-	20	RSS
4	ហ៊ីងឆ្មុកខ្មៅចំហៀង	<i>Microhyla heymonsi</i>	Dark-side narrow mouth frog	LC	-	2	RSS
5	ហ៊ីងខ្ពងក្រឡា	<i>Microhyla pulchra</i>	Beautiful pygmy frog	LC	-	10	RSS
6	កង្កែបក្តាត់លីម៉ា	<i>Occidozyga lima</i>	Green floating frog	LC	-	5	RSS
7	កញ្ចាញ់ចេកក្បាលធំ	<i>Polypedates megacephalus</i>	Hong Kong whipping frog	LC	-	3	RSS
<b>Reptiles</b>							
8	ពស់ក្រាយបង្កង់សខ្មៅ	<i>Bungarus candidus</i>	Malayan Krait	LC	Common	1	RSS
9	តុកកែសៀម	<i>Dixonius siamensis</i>	Siamese leaf-toed gecko	LC	-	1	RSS
10	ថ្លែនឆ្មុកខ្ពងធំ	<i>Eutropis macularia</i>	Speckled forest skink	LC	Common	10	RSS
11	តុកកែ	<i>Gekko gekko</i>	Tokay gecko	LC	Common	4	RSS
12	កន្រ្តង	<i>Physignathus cocincinus</i>	Indochinese water dragon	VU	Common	-	RCI
13	ត្រកូត	<i>Varanus bengalensis</i>	Bengal Monitor	NT	Common	-	RCI
14	ពស់វែកនាម	<i>Ophiophagus hannah</i>	King Cobra	VU	Rare	-	RCI
15	ពស់វែកក្របី	<i>Naja kaouthia</i>	Monocled Cobra	LC	Rare	-	RCI
16	ពស់វែកដំបូក	<i>Naja siamensis</i>	Indochinese Spitting Cobra	VU	Rare	-	RCI
17	ពស់ថ្លាន់ធំ	<i>Python reticulatus</i>	Reticulated Python	LC	Common	-	RCI
18	អណ្តើកព្រិច	<i>Indotestudo elongata</i>	Elongated Tortoise	CR	Common	-	RCI
19	អណ្តើកសោម	<i>Heosemys grandis</i>	Asian Giant Terrapin	CR	-	-	RCI
20	អណ្តើកក្អែក	<i>Siebenrockiella crassicollis</i>	Black Mask Turtle	EN	-	-	RCI

**Appendix 7:** Herpetofauna species recorded from Water Cycle Research Forest Station (Ang Taen).  
(RSS: Record from Survey Sighting, RCI: Record from Community Interview)

No.	Khmer Name	Scientific Name	English Name	IUCN Status	Prakas 020.MAFF	#Record	Type of Record
<b>Amphibians</b>							
1	កង្កែបអាចម៍គោ	<i>Fejervarya limnocharis</i>	Paddy frog	LC	-	7	RSS
2	កង្កែបកូប	<i>Hoplobatrachus rugulosus</i>	Rugulose bullfrog	LC	-	2	RSS
3	ហ៊ីងជីវ	<i>Kalophrynus interlineatus</i>	Spotted narrow-mouthed frog	LC	-	1	RSS
4	ហ៊ីងហ្វីស៊ីពីស	<i>Microhyla fissipes</i>	Ornate pigmy frog	LC	-	25	RSS
5	ហ៊ីងឆ្មុកខ្មៅចំហៀង	<i>Microhyla heymonsi</i>	Dark-side narrow mouth frog	LC	-	2	RSS
6	ហ៊ីងខ្នងក្រឡា	<i>Microhyla pulchra</i>	Beautiful pygmy frog	LC	-	20	RSS
7	កញ្ជាញ់ចេកក្បាលធំ	<i>Polypedates megacephalus</i>	Hong Kong whipping frog	LC	-	3	RSS
8	កង្កែបព្រៃម៉រចេនសេន	<i>Sylvirana mortenseni</i>	Mortensen's frog	LC	-	7	RSS
<b>Reptiles</b>							
9	តុកកែសៀម	<i>Dixonius siamensis</i>	Siamese leaf-toed gecko	LC	-	1	RSS
10	ថ្លែនឆ្មុកខ្នងធំ	<i>Eutropis macularia</i>	Speckled forest skink	LC	Common	2	RSS
11	តុកកែ	<i>Gekko gekko</i>	Tokay gecko	LC	Common	2	RSS
12	កន្រ្តង	<i>Physignathus cocincinus</i>	Indochinese water dragon	VU	Common	1	RSS, RCI
13	អន្សង	<i>Varanus salvator</i>	Water Monitor	LC	Common	-	RCI
14	ត្រកូត	<i>Varanus bengalensis</i>	Bengal Monitor	NT	Rare	-	RCI
15	ពស់វែកនាម	<i>Ophiophagus hannah</i>	King Cobra	VU	Rare	-	RCI
16	ពស់វែកក្របី	<i>Naja kaouthia</i>	Monocled Cobra	LC	Rare	-	RCI
17	ពស់ផ្លាន់តូច	<i>Python bivittatus</i>	Burmese Python	VU	Common	-	RCI
18	ពស់ផ្លាន់ធំ	<i>Python reticulatus</i>	Reticulated Python	LC	Common	-	RCI
19	អណ្តើកព្រិច	<i>Indotestudo elongata</i>	Elongated Tortoise	CR	Common	-	RCI
20	កន្ទាយអាស៊ី	<i>Amyda cartilaginea</i>	Asiatic Softshell Turtle	VU	-	-	RCI

**Appendix 8:** List of herpetofauna species recorded from Bos Leav Community Forest.

(RSS: Record from Survey Sighting, RCI: Record from Community Interview)

No.	Khmer Name	Scientific Name	English Name	IUCN Status	Prakas 020.MAFF	#Record	Type of Record
<b>Amphibians</b>							
1	កង្កែបត្រចៀកក្រហម	<i>Hylarana erythraea</i>	Common green frog	LC	-	1	RSS
2	ហ្នឹងម្រាមជើងចង្កូវ	<i>Microhyla butleri</i>	Butler's pigmy frog	LC	-	25	RSS
3	ហ្នឹងឆ្មុតខ្មៅចំហៀង	<i>Microhyla heymonsi</i>	Dark-side narrow mouth frog	LC	-	13	RSS
4	ហ្នឹងខ្នងក្រឡា	<i>Microhyla pulchra</i>	Beautiful pygmy frog	LC	-	1	RSS
5	កង្កែបក្តាត់ម៉ាថេនស៍	<i>Occidozyga martensii</i>	Marten's floating frog	LC	-	25	RSS
6	ហ្នឹងអុចខ្នង	<i>Micryletta inornata</i>	Plain narrow mouth frog	LC	-	1	RSS
7	កញ្ចាញ់ចេកក្បាលធំ	<i>Polypedates megacephalus</i>	Hong Kong whipping frog	LC	-	5	RSS
8	កង្កែបព្រៃមីរថេនសេន	<i>Sylvirana mortenseni</i>	Mortensen's frog	LC	-	1	RSS
<b>Reptiles</b>							
9	តុកកែសៀម	<i>Dixonius siamensis</i>	Siamese leaf-toed gecko	LC	-	3	RSS
10	ថ្លែនឆ្មុតខ្នង	<i>Eutropis multifasciata</i>	common sun skink	LC	Common	2	RSS
11	ថ្លែនឆ្មុតខ្នងធំ	<i>Eutropis macularia</i>	Speckled forest skink	LC	Common	7	RSS
12	ជើងចក់ស្រុកម្រាមជើងបួន	<i>Gehyra mutilata</i>	Stump-toed gecko	LC	Common	1	RSS
13	តុកកែ	<i>Gekko gekko</i>	Tokay gecko	LC	Common	5	RSS
14	ជើងចក់ជើងបន្លា	<i>Hemidactylus frenatus</i>	Common house gecko	LC	Common	1	RSS
15	ថ្លែនឆ្មុតខ្នងខ្មៅ-លឿង	<i>Lipinia vittigera</i>	Striped tree skink	LC	Common	1	RSS
16	ពស់ខ្យងអុច ស-ខ្មៅ	<i>Pareas margaritophorus</i>	White-spotted Slug Snake	LC	Common	2	RSS
17	ពស់ព្រៃក្បាលព្រលំ	<i>Psammodynastes pulverulentus</i>	Common Mock Viper	LC	Common	1	RSS
18	កន្រ្តង	<i>Physignathus cocincinus</i>	Indochinese water dragon	VU	Common	-	RCI
19	ត្រកូត	<i>Varanus bengalensis</i>	Bengal Monitor	NT	Common	-	RCI
20	ពស់វែកនាម	<i>Ophiophagus hannah</i>	King Cobra	VU	Rare	-	RCI
21	ពស់វែកក្របី	<i>Naja kaouthia</i>	Monocled Cobra	LC	Rare	-	RCI
22	ពស់វែកដំបូក	<i>Naja siamensis</i>	Indochinese Spitting Cobra	VU	Rare	-	RCI
23	ពស់ថ្លាន់តូច	<i>Python bivittatus</i>	Burmese Python	VU	Common	-	RCI

24	ពស់ឆ្មាន់ធំ	<i>Python reticulatus</i>	Reticulated Python	LC	Common	-	RCI
25	អណ្តើកព្រិច	<i>Indotestudo elongata</i>	Elongated Tortoise	CR	Common	-	RCI
26	កន្ទាយអាស៊ី	<i>Amyda cartilaginea</i>	Asiatic Softshell Turtle	VU	-	-	RCI
27	អណ្តើកសោម	<i>Heosemys grandis</i>	Asian Giant Terrapin	CR	-	-	RCI
28	អណ្តើកសកល	<i>Heosemys annandalii</i>	Yellow Headed Temple Turtle	CR	-	-	RCI

**Appendix 9:** Question list used to collect data from the local guide/people interviews.

Date: ..... Interviewer: .....  
Village: ..... Commune: .....

**1. General Information**

- 1.1 Name: ..... Sex: Male Female Age:.....
- 1.2 What is your main occupation?  
Charcoal maker      Fuelwood seller      Selling stuff at home      Farmer  
Hunter      Other: .....
- 1.3 How long have you lived in this village?  
 <5 years       5 – 10 years       >10 years       Home town

**2. Threats**

- 2.1 How often do you go into the forest?  
 None  
 1/day     1/week     2/week     3-4/week     1/month     <1/month
- 2.2 What do you collect from the forest?
- 2.3 Do you see any amphibian/reptile hunting in this area?  
 No  
 Yes --- what species:
- 2.4 What tools do the hunters use?  
 Gun  
 Handy-craft gun  
 Spear  
 Snare  
 Trap  
 Dog  
 Other:.....
- 2.6 Who normally collect/hunt the amphibian and reptile species in this area?
- 2.7 What is the trend of amphibian/reptile species hunt?  
Increase? .....  
Decrease? .....
- 2.8 Do you hunt/collect amphibian and reptile in this area?  
 No  
 Yes ---if yes, what is the purpose of the hunting? For home-consumption or for trade?  
including price/income from sale if there any .....
- 2.9 Are there any amphibian/reptile trade within this area?  
 No  
 Yes ---if yes, what are the most common species found in trade?.....
- 2.10 What is the trend amphibian/reptile species in trade?  
Increase? .....

Decrease? .....

2.11 Who are the main players in trading of the amphibian/reptile species from this area?

2.12 What are the main and other threats to the amphibian and reptile species?

2.13 What can we do to protect these existing amphibian/reptile species in this area?

2.14 Are there outsiders going to the forest in this area?

No

Yes, --- they come for what?

Logging for timbers

Logging for charcoal

Hunting

NTFPs harvesting

Fuelwood collection

Other: .....

2.15 Where do they come from?

### 3. Presence of the Key Herpetofauna Species in the Targeted Area

3.1 Do you see any of these turtle species in the forest?

No.	English name	Khmer name	Never seen	Rarity Perception			
				Common	Rare	Very rare	Last seen (Year?)
1	Elongated Tortoise						
2	Mekong Snail Eating Turtle						
3	Asian Leaf Turtle						
4	Yellow-headed Temple Turtle						
5	Black Marsh Turtle						
6	Asian Box Turtle						
7	Giant Asian Pond Turtle						
8	Asiatic Softshell Turtle						

3.2 Have you seen these snakes and lizards in the forest?

No.	English name	Khmer name	Never seen	Rarity Perception			
				Common	Rare	Very rare	Last seen (Year?)
1	Water Monitor						
2	Bangal Monitor						
3	King Cobra						

4	Monocellate Cobra						
5	Indochinese Spitting Cobra						
6	Burmese Python						
7	Reticulated Python						
8	Siamese Crocodile						