

REPORT

DISTRIBUTION OF OTTERS IN THE TROPEANG ROUNG, KOH KONG PROVINCE, CAMBODIA

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ABSTRACT: Two species of otters are found along Tropeang Rong River, the smooth-coated otter (*Lutrogale perspicillata*) and the hairy-nosed otter (*Lutra sumatrana*). The distribution of these species was studied along a stretch of the Tropeang Rong River in Koh Kong province, Cambodia, between May and June 2009. Their main habitat appears to be both small and big estuary surrounded by Melaleuca, Mangrove and evergreen forest with shoreline vegetation followed by sand (24%), clay (13%), rocky (10%) and bank with vegetation (53%), where is rich of food sources, particularly fish. The sprainting sites were found more under open sky then canopy cover, and situated their spraint in average of 4.33 m from water edge and 2.73 m of water depth. Diet compositions in spraint consisted of fish 64%, frog 5%, crab 2%, shrimp 1% and unidentified debris 28%. The study revealed that the distribution of otters along the river has diminished. Hunting for skin to trade, traditional medicine, meat and habitat disturbance such as sand mining and fishing activities might be putting pressure on the population. Conservation measures such as monitoring of the otter population and interviewing locals should be done regularly and restrictions on sand mining, oil spills from shipping and snaring should be imposed along Tropeang Rong River.

Key-words: *lutrogale perspicillata*, *lutra sumatrana*, habitats, threats, ecology

INTRODUCTION

The occurrences of four species of otter have been mapped by both Lekagul and McNeely (1977) and Corbet and Hill (1992) in Cambodia (Poole, 2003): Hairy-nosed otter (*Lutra sumatrana*), Eurasian otter (*Lutra lutra*), Smooth-coated otter (*Lutrogale perspicillata*) and Asian small-clawed otter (*Aonyx cinerea*). The smooth-coated otter is considered to be Vulnerable due to an inferred future population decline caused by habitat loss and exploitation (Hussain et al., 2008a), the hairy-nosed otter is

considered to be Endangered due to past population declines. Based on estimated rates of decline, this species is suspected to have declined by up to 50% in the past 3 generations (30 years) due to illegal poaching and hunting, pollution, by catches and prey depletion due to over-fishing. The current rates of decline are expected to continue and further threaten this species. In its entire range, the hairy nosed otter is under increasing pressure due to high levels of poaching (Hussain et al., 2008b), the Asian small-clawed otter is considered vulnerable due to a projected future population decline due to habitat loss and exploitation. In the last few decades, the range of Asian small-clawed otter has shrunk particularly in its western portion, as evident from the published literature, (Hussain and de Silva, 2008) and the Eurasian otter is considered to be near threatened due to an ongoing population decline but at a rate no longer exceeding 30% over the past 3 generations. There is concern about what is happening in parts of its range in Asia due to increasing habitat loss and poaching (Ruiz-Olmo et al., 2008).

Based on Poole's (2003) records, there were two species of otters with definite location records from Cambodia, the smooth-coated otter and the hairy-nosed otter. However, recent information show that three species of otters are now confirmed to exist in Cambodia: the smooth-coated otters found in most parts of Cambodia (Hon, 2008), the hairy-nosed otters found at Tonle Sap Great Lake (Olsson et al., 2007) and the small-clawed otters recently found in northeastern Cambodia (Hon et al., 2009). The hairy-nosed otter is a medium-sized otter, around 1.3m in length and weighing around 7-8kg. The paws are fully webbed with well-developed claws. The fur is dark brown above, slightly paler underneath with a contrasting pale chin and upper lip. The whole nasal area (rhinarium) is covered in short, dark fur (Wright et al 2008). The hairy-nosed otter has limited distribution range. In Thailand, they are found in the Toa Daeng peat swamp forests, and also near the mouth of the Bang Nara River, which is low lying and tidal. In Viet Nam, the species have been reported from low lying peat swamp forests dominated by *Melaleuca cajuputi* in lower Mekong. In Cambodia, the species mainly live around the Tonle Sap Lake where the otters live mainly in the flooded forest and scrub surrounding the lake. Like many predators the hairy-nosed otter occurs in low density and the number and frequency of sightings are very few. In recent years, the tropical peat swamp forests have been under severe threat due to fire and other anthropogenic activities such as plantations for oil palm, production of food crops such as rice, corn and soyabean, and fish farming. In Viet Nam, the entire Mekong Delta has been converted into rice fields, reducing the habitat of otters and other wildlife species to a few parks. In Malaysia, fire reduced 70% of the Binsulok Forest Reserve and 10% of the Klias Forest Reserve. This has affected the surrounding environment and its biodiversity. In Indonesia, over the last 20 years, the ecosystem has been reduced from almost 30 million hectares to only about 15 million hectares, and most of what remains has already been logged selectively. Such levels of habitat modification have profound effects on the native biodiversity. All over its range, the hairy-nosed otter is under increasing pressure due to intensive poaching. In Cambodia, around the Tonle Sap Lake, poaching of otters and other wildlife is common practice. In Viet Nam otters are hunted for illegal wildlife trade, as well as for meat and medical use. These problems also occur in other countries of its range (Hussain et al., 2008b).

The smooth-coated otter is a large (7–11 kg) otter characterized by a very smooth, sleek pelage. Color varies from dark to reddish brown, with the undersides slightly lighter. The subspecies *L. p. maxwelli* is the darkest, with a dark brown to almost black coat. The belly is noticeably paler (Kanchansaka, 1988). The upper lip,

cheeks, sides of neck, and throat are whitish or gray. The tail is flattened dorsoventrally, with a distinct lateral keel distally. The eyes and ears are small. The limbs are short, strong, with broad feet. All feet are fully webbed (Yeen and Serge 2005). This species is considered to be vulnerable due to a projected future population decline as a response to habitat loss and exploitation. The smooth-coated otter is essentially an otter of lowlands and floodplains. Major threats to the population are loss of wetland habitats due to construction of large-scale hydroelectric projects, reclamation of wetlands for settlements and agriculture, reductions in prey biomass as well as, poaching and contamination of waterways by pesticides (Hussain *et al.*, 2008a).

The small-clawed otter is the smallest otter in the world (1-3 kg). The male is bigger than the female. The coat color is grayish brown. The color on the belly is lighter than on the sides of the body and on the back. However, the coat color changes from season to season. There is a periosteum between part of the toes, as such, their toes are free for movement, which is different from the other three species of the region. The nails are very short in adults. The juvenile small-clawed otters have long and curved nails, but they fall off when they become 5 weeks old. The small-clawed otters have tactile sensitivity on the front legs, this helps them to hunt efficiently, even in murky water, which is different from the big otters who use eyesight in hunting (Kanchansaka *et al.*, 1998)

The Tropeang Rong River is situated in Peam Krasoap Wildlife Sanctuary, Koh Kong province. The presence of otters has been confirmed there (Hon and Dong, 2008), which makes it a significant area for research and conservation. There is very little data about the otter species along the Tropeang Rong, and the actual otter species present has not yet been clearly established. Because of this, we conducted this study in the area around Rong, focusing on otter distribution, otter species identification, habitats selection by otters and human impact on otters.

Survey Area

The study was carried out between May and June, 2009 on part of the coastal area in Koh Kong province. Six villages were chosen for conducting interview: Koh Sralau, Koh Andeth (Prek Popel and Koh Smach), Koh Kong Khnong, Prek Angkugn, Dei Tomneab and Tropeang Rong (Veal Tapou). Transect surveys were conducted along canals, streams and swamps along Tropeang Rong river (Figure 1), situated in Peam Krasoap Wildlife Sanctuary between latitudes 11°20' and 11°30'N and longitudes 103°03' and 103°20'E. The vegetation at the survey sites are mangrove forests, melaleuca forests and evergreen disturbed forests. The beauty of the natural landscapes and wildlife at Peam Krasoap Wildlife Sanctuary is very important for eco-tourism and conservation. Many estuaries and vegetation along the watercourses are in an optimal state in terms of biodiversity. The vertebrate fauna is rich in fish, reptiles such as turtle species, snake species, and water monitor (*Varanus niloticus*), birds and mammals as Long-tailed Macaque (*Macaca fascicularis*), civet species, Hog badger (*Arctonyx collaris*), Rat species, Northern Slow Loris (*Nycticebus bengalensis*), Wild pig (*Sus scrofa*) etc).

METHODS

Interviews

Interviews were conducted with 50 local people who live around the survey sites. As the first step, local authorities were selected for interviewing in order to identify target

groups, especially the chiefs of the villages. The interviewees were selected based on their experience; they might be fishermen, hunters, wildlife middlemen, or people who spend much time in the forest or in fishing activities. Those people were interviewed by using pre-designed semi-structured questionnaires in order to get information related to the distribution and abundance of otters, their presence both in the present and in the past, their biological characteristics, threats to otters caused by human activities and other factors, wildlife trade in otters or their parts, and general awareness of the value and importance of otters.

Transect Lines

Transect surveys were done for direct observation of otters and their signs. Transects were designed to cover all habitat types and followed waterways such as canals, streams and swamps (Nguyen *et al*, 2001). Sixteen transect lines were done along the waterways. The length of transect surveys was not fixed; it was based on the situation of canals, streams and swamps. Most transect surveys were carried out by boat because of dense forest along waterways. Where travelling by boat was impossible, transect survey had to be conducted on foot. Where otter signs were found, habitat assessments were also done. Signs could be spraint sites, grooming sites and dens (Anoop and Hussain, 2004). Only smooth areas were measured as rolling site and dens were measured up to down and around hole.

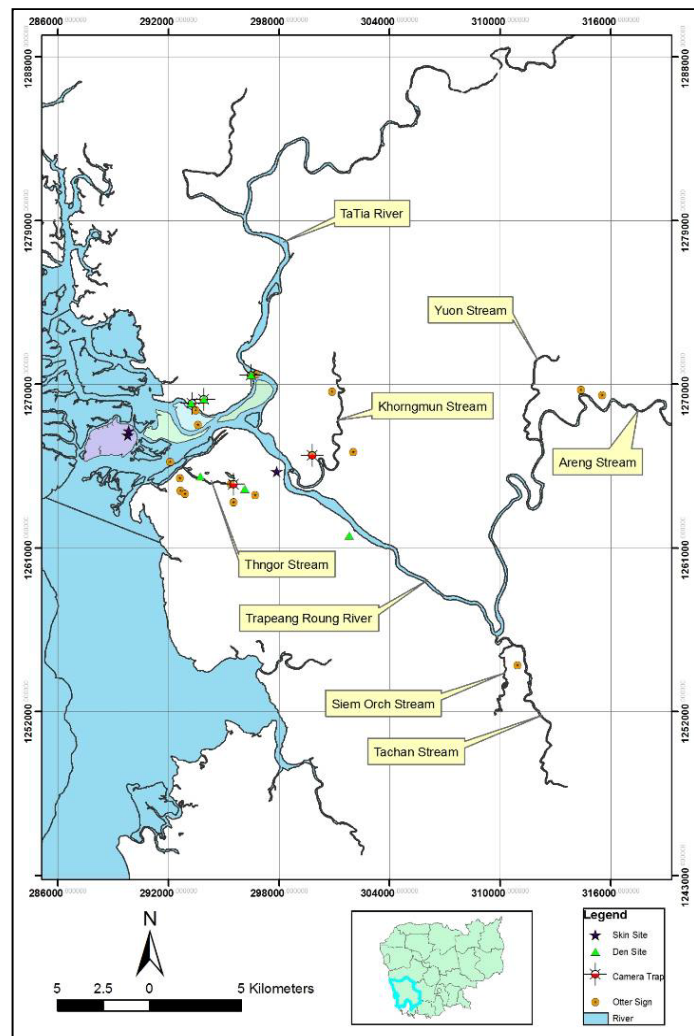


Figure 1. Study sites along Tropeang Rong area

Spraint Collection

Spraints were collected for analysis of otter prey categories. One to four samples of spraint were collected at each spraint site (depending on the number of different spraints at that site). All spraints which were collected were washed under tap water in a steel sieve of mesh size 1 mm (Anoop and Hussain, 2004) and then dried.

Habitat Assessment

Plots were laid around wherever otter signs were found (Anoop and Hussain, 2004). We intended to use plot sizes of 5×10m for habitat assessment; but due to weather conditions (flooding), the situation of the survey sites and the abundant tree species in these study area, the actual plot sizes used were 25m² (5×5m). The habitat variables measured were: distance from water edge to sign, water depth, river width, number of spraint sites, and number of basking and grooming sites (Anoop and Hussain, 2004). Habitat was also classified according to the percentage of canopy cover, ground cover and vegetation. Canopy cover was assessed using a simple method that uses a hole in a piece of paper or large leaf to judge proportions of canopy and open sky. For ground cover, we assessed the proportions of leaf litter, grass cover, soil, rock and sand in the plot area. The vegetation types were measured focusing on vegetation diameter and height. Observed disturbance and threats to otters were also recorded during the survey period.

Camera Trapping

Camera traps were set during the survey in order to identify otter species and threats from humans. Two types of camera traps were used (Cam Trakker, Reconyx 1.3 mpx Mono R). The camera-traps were set at 24 hour activity. The Reconyx 1.3 mpx Mono R powered by six alkaline batteries [batteries (CC)], was set to automatically take batches of three successive pictures when triggered, and the Cam Trakker, powered by eight alkaline batteries [4 batteries (CC) and 4 batteries (AA)], was set to take one picture at a time, with a 10 second delay after triggering. The traps were set for periods of one month at 5 locations in the study area. They were set up in front of otter spraint sites, grooming sites and otter dens. The camera trap setting was flexible base on the location of the signs; they were set in the distance about 1.5 to 2 meters away from otter sign.

RESULTS

Interviews

The 50 interviewees were interviewed in villages along the survey sites. Most of them work closely with natural resources because their livelihoods still depend on them. Three main occupations of interviewees were detected (Figure 2): fishermen, farmers and middlemen. For local people who are fishermen and farmers, they always have a second job to support their family such as going into forests to collect non-timber forest products or to fish etc.

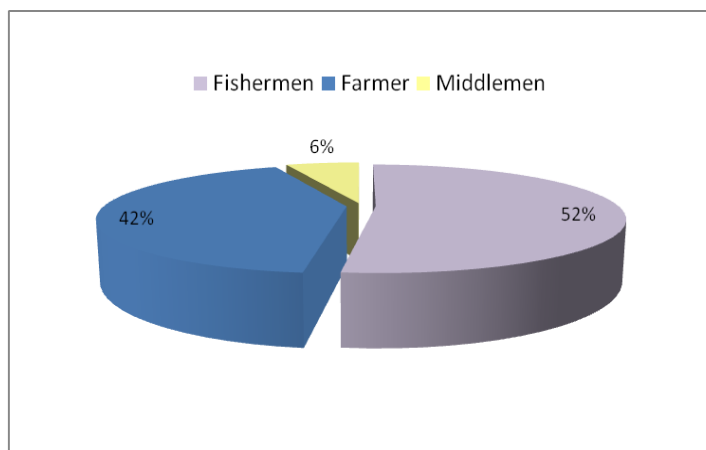


Figure 2: The main occupations of interviewees in the study area

Distribution and species of otter

The interviewees' responses showed that all of them (100 %) used to see otters (Table 1). Nevertheless, the local people could not identify otter species, they just identified them by color as "black" (dark brown) and "grey" (paler brown). The black otters are actually *L. sumatrana* and the grey otters are *L. perspicillata*.

Table 1. Percentage of interviewees who sighted otters in different time periods at the survey sites

Date Period	Percentage of Interviewees reporting Otter Sightings
1980 - 1990	52%
1991 - 2001	27%
2001 - 2009	21%

The local people considered that recently, the otter population has declined rapidly because the present of otters have been less than in the past since sand mining were invested in their areas.

The local people also noticed that otters have always been present along watercourses such as Koh Smach, Koh Krey, Prek Popel, Prek Thngor, Prek Tachan, Prek Khornngmun etc (Koh means Island, Prek: means stream or river). They often saw otters swimming, and walking near the water's edge at low tide. 87.5 % of interviewees saw otters rolling on sand and 12.5 % on grass. Sometimes, they saw otters were catching food along streams. Local people confirmed that otters were present both during day time and at night, and that they caught fish, crabs and shrimp at low tide when they are easy to catch.

Threats

Habitat loss and disturbance: By observation and through the interviews we found that the river banks where otters used to be seen have been destroyed by commercial sand mining. 80 % of local people stated that sand mining only impacted otter habitats, but their own settlements are also facing this issue as well. Food and other economic resources for local livelihoods are being affected because fish, crabs and shrimp yields are now in decline. Sand mining operates both day and night, and has transformed the ecosystem of aquatic animals. In addition, water pollution is caused by fuel leaks from their ships, which has had a great effect on the degree of biodiversity in the area. The sound from the machines also disturbs wildlife, including otters. In addition, forests around the streams are cut down for trade (Melaleuca trees) and making energy (charcoal production).

Hunting and otter trade: Otters are not the main hunting targets for local people, but hunting per say still pose a serious threat to otters. The most common situation when otters are killed is when they come close to settlements and raid fishing equipment. Sometimes, local people go out to hunt other wildlife, but when they meet otters, they will kill them for food, traditional medicine and skins for trade. During interviews, only 32 % of respondents said they had caught otters. Methods include using fishing equipment, guns, dogs, and directly by hand (Figure 3). Local people also said that sometimes otters were killed by accident, especially when raiding fishing gear.

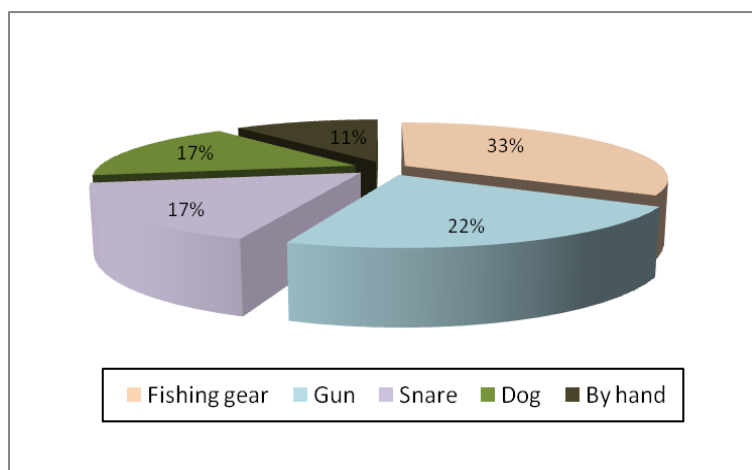


Figure 3. Methods used by local people for catching otters in the study area

Otters and other parts are currently being illegally traded in the survey areas. The middlemen in the local areas buy wildlife and wildlife products from local people and sell them outside the area, such as in Koh Kong town. The prices reflect the type of body part and its quality (Table 2).

Table 2. Price of otters and their parts were destined for trade at the survey sites

Period	Otters and their Parts	Range Price
1990-2000	Skin	10-30 \$
	Whole body	10-15 \$
2001-2007	Skin	50-80 \$
	Penis	10-20 \$
2008-Present	Whole body	25-40 \$
	Skin	90-110 \$
	Penis	15-30 \$

Note: Whole body of otter means otter has not skinned (fresh). It has cheaper price if compare to the dry skin because in order to convert from fresh skin to dry skin, it have to spend long time and need person who have skill for skinning.

The high prices and traditional beliefs of local people have contributed to the decline of the population of otters. Five otter skins were found in Koh Sralau village, Koh Kapi commune and parts of otters were found at a wildlife middleman’s house in Koh Kong Khnong village, Tropeang ROUNG commune during the interviewing and observations. Three of the otter skins are blackish in color, being those of the hairy-nosed otter (Figure 4) and two skins and other body parts (otter feet and penises) are grey in color, from smooth-coated otters (Figure 5).



Figure 4. Skins of hairy-nosed otter (*Lutra sumatrana*) found at Koh Sralau. The local middleman bought them from local people (fishermen) in late 2008. So they were not resold because of their poor quality (hair would detach from the skin).



Figure 5. Body parts and skins of smooth-coated otters (*Lutrogale perspicillata*) found at Koh Kong Khnong and Koh Sralau. From left to right, skins are from animals killed in late 2008, on 23th March 2009, and on 8th May, 2009.

Transect Survey

Fifty signs total of otters were found during the transect survey: 19 spraint sites, 25 grooming sites and six dens.

Sprainting sites

Spraint color depends on how long they have been deposited and in what habitat. Otters defecated on leaf litter, soil, rock and sand. The survey was done in the rainy season, and rain affected the size and the shape of spraints, so we could not measure and identify whether they were fresh or old (Figure 6).



Figure 6. Otter spraint found at a survey site during a transect survey

From spraint analyses, the most abundant prey remains were fish bones and scales, followed by crabs, shrimps and unidentifiable remains (Figure 7)

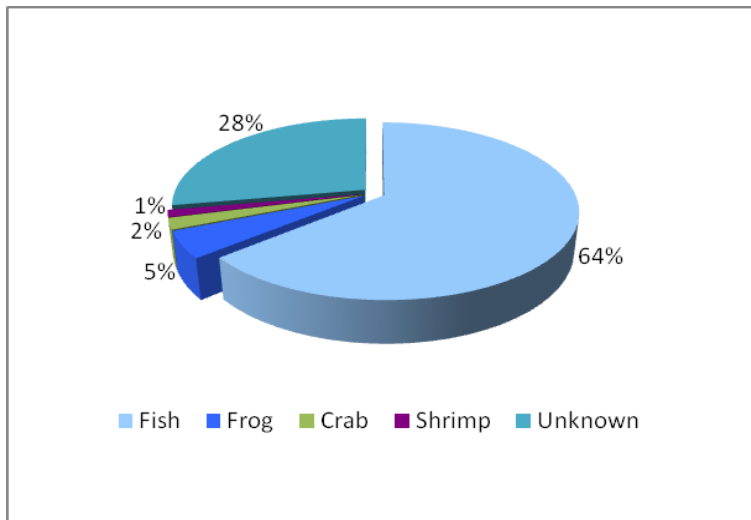


Figure 7. Percentage of otters' prey found in 19 scats in the Tropeang Rong Areas

Rolling sites

Rolling sites were used by otters for rolling and basking. All rolling sites were found associated with spraint sites within an average distance of 2m. 56% of rolling sites were on soil, 40% on sand and 4% on rock. On average, each spraint site was associated with 2 rolling sites.

Dens

Of the six dens found along streams, two were in natural rock crevices, three were dug into the substrate close to the shoreline and one was dug under the roots of a tree. The average distance of dens from the water's edge was 2.83 m (standard error = 0.74, range distance: 1-6 m) and the average distance from spraint and rolling sites was 20.5 m (standard error = 7.17, range distance: 2-50 m). According to the local guides, those dens have been used by otters when they got pregnant and looked after young cubs because the guides used to see otters with their small cubs. Some of the local guides used to catch otter cubs from those dens.

Habitat type

The typical (average) habitats selected by otters had slow water currents, an average water depth of 2.73 m (standard error = 0.32), and a river width of approximately 75 m (standard error = 35.01). Otter signs were found an average of 4.33 m (standard error = 1.36) from the water’s edge. Vegetation tended to be around 4 m in height, with an average trunk diameter of 0.096 m (standard error = 0.34). The watercourse banks were of various compositions (Table 3).

Table 3. Bank characteristic of streams at 50 sites used by otters in the survey area

Habitat type	Bank Characteristic (%)
Sand bank	24
Rocky bank	10
Clay bank	13
Bank with vegetation	53

Thirty-four tree species were recorded at otter sign sites. The dominant vegetation in habitats which were selected was shown in Table 4.

Table 4. Dominance of tree species of otter habitat in the survey sites

Tree species	Percentage of vegetation at otter sign sites
<i>Heritiera littoralis</i>	14.02
<i>Rhizophora mucronata</i>	12.20
<i>Thespesia populnea</i>	8.54
<i>Holarrheno pubescens</i>	6.10
Other 30 species	59.15

Areas chosen by otters (sites found with signs during survey) were characterized by canopy cover and open sky. According to analysis showed that 61% of otter sign sites were under open skies, and 39% under canopy cover. The ground cover was mainly leaf litter and soil (Figure 8).

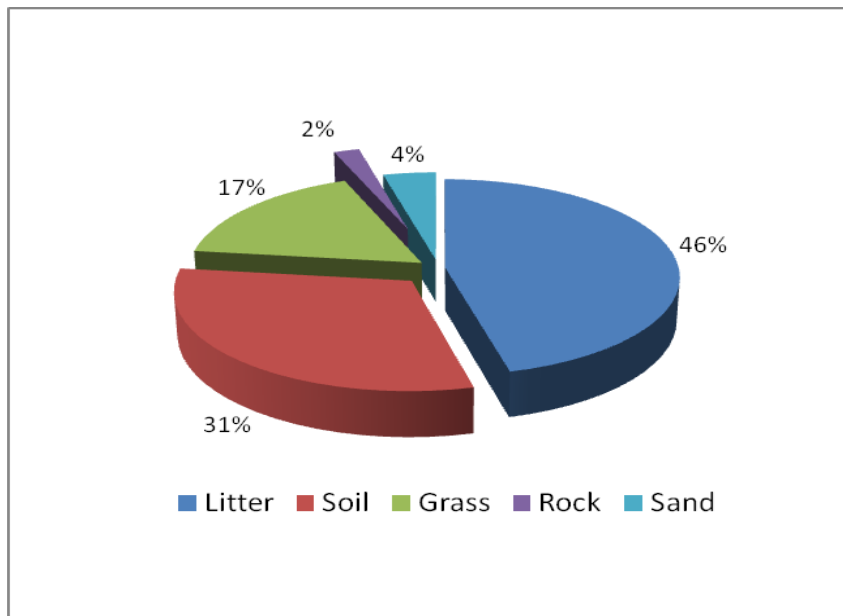


Figure 8. Ground cover components in spraint and rolling sites

Camera Trapping

Eight wildlife species were recorded during camera trapping. Those species were:

- Mammal: Common Palm Civet (*Paradoxurus hermaphroditus*), fishing cat (*Prionailurus viverrinus*), long-tailed macaque (*Macaca fascicularis*), rat species, Berdmore's squirrel (*Menetes berdmorei*), squirrel species, hog badger (*Arctonyx collaris*), East Asian porcupines (*Hystrix brachura*)
- Bird: bird species

There were 6 pictures of civet species, 3 pictures of fishing cat, 36 pictures of long-tailed macaque, 31 pictures of rat species, 39 pictures of quarrel species, 55 pictures of hog badger, 8 pictures of East Asian porcupines, 3 pictures of bird species and 1 picture of an unknown species were recorded by cameras. No otters were recorded during camera trapping.

DISCUSSION

The present of two species of otters were confirmed in the study areas, the smooth-coated and hairy-nosed otters. The presence of smooth-coated otters was confirmed at Tatai Krom (Heng and Hon, 2007) and the hairy-nosed otter was confirmed to be present at Koh Kong Khnong in 2008 (Hon and Dong, 2008). During our study, it was the wet season and waterways were flooded during the survey period, so it was impossible to walk transects along all the waterway's banks. On the other hand, much evidence indicated that the two species of otter are present in our survey area. Three skins of hairy-nosed otters were present in a wildlife middleman's possession, dark in colour, and with the rhinarium covered in hair (Kanchanasaka, 1998 and Wright et al., 2008). Two smooth-coated otter skins were also found in the local people's houses (identified by its paler coat, especially on the belly). There is very little data available from the literature to compare past and present populations of smooth-coated and hairy-nosed otters in the study area, but after interviews with local people in six villages in the study area where the existence of otter was confirmed during the survey, the overall opinion expressed was that the otter population is facing a decline.

The main contributing factors to this pressure on the otter population is the economic poverty of local people, unemployment and lack of awareness about otters and the activities which generally degrade the environment for both humans and wildlife, sand mining, fuel leakage, deforestation and charcoal production. High demand for otter skins in China and Tibet (IOSF, 2008) and its high price (Khan et al, 2008) in the study area, coupled with the low risks for the hunters because of the weakness of wildlife law enforcement, creates a strong encouragement for local people to hunt otters. Along Tropeang Rong River, there is a lot of sand mining, which has eroded some areas close to the river, adversely affecting the ecosystem and hence reducing the abundance of otter prey such as fish, shrimps and crabs, and also staple foods of local people (Sebastian and Vong, 2009). According to the interviewees, the fish and crab yields have decreased rapidly. The combination of competition for food, and the high price of skins have caused a small group of fishermen to make snares and traps to catch otters and sell them to traders. Local people also believe that the skin and penis of an otter are important in traditional Cambodian medicine, which apparently uses the skin in wine to assist women during pregnancy and/or childbirth (Poole, 2003). According the people along Tropeang Rong River, the otter were used for Cambodian traditional medicine too. The dried

penis are rubbed with the rock and mixed with coconut milk as the sexual medicine. It helps the people to increase the sexuality.

Apart from this, evidence of deforestation and charcoal were recorded, resulting in destruction of vegetation in areas used by otters, as well as disturbance by noise, dogs, etc. Otters may be most vulnerable to disturbance when they are raising cubs (Hussain and Choudhury, 1997)

The most likely reason that the camera traps did not capture any otter pictures. Probably, because of disturbance from human activities, otters were not back to their sites. Lopping of trees, setting of fishing nets and settlements occurred near trap sites. Additionally, sand companies were active night and day, and were traveling along the streams. This probably affected the chance of otter going to trap sites. These causes were obstacles for camera trapping. Human occupancy of natural wetlands has created a difficult situation for otters that rely on this habitat for food (Khan et al, 2009). Furthermore, the study period was in the rainy season, which affected trap locations. Two camera traps (Cam Trakkers) were destroyed by rain during the survey, and only three camera traps recorded any wildlife.

CONCLUSIONS

From the considerable decrease in the number of positive sites and sightings of otters and the small number of spraint sites found, we conclude that the population of otters along the Tropeang Rong River is in decline. The Tropeang Rong area is currently controlled by the Wildlife Alliance cooperating with Forestry Administration to try to ensure that most of the wild animals are well protected. Otters have been thus receiving protection along with other aquatic fauna. However, there is no distinct management policy for otter conservation and it is suggested that conservation programs and monitoring activities be extended by the management staff of the authority and other partner organizations to determine future trends in the otter population along the Tropeang Rong River, and determine and implement mitigation measures in order to especially protect the globally rare hairy-nosed otter. Sand mining needs to be controlled, and snaring, charcoal production, cutting and lopping of trees along the banks should be strictly prohibited.

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REFERENCES

- Anoop K.R., Hussain S.A. (2004).** Factor affecting habitat selection by smooth-coated otter (*Lutra perspicillata*) in Kerala, India. *J. Zool.* 263: 417–423.
- Corbet, G. B. and Hill, J. E. (1992).** Mammals of the Indomalayan region: a systematic review. Natural History Museum Publications and Oxford University Press, London and Oxford.
- Heng S., Hon N. (2007).** Survey in Tatai Krom Commune, Koh Kong Province. Unpublished Report for Conservation International-Cambodia.
- Hon N., Dong T. (2008).** Otter Reseach at Peam Krosoup Wildlife Sanctuary, Koh Kong province. Unpublished Report for Conservation International-Cambodia.

- on N., Neak P., Khov V., Cheat V. (2009). Food and habitat of Asian small-clawed otter in Northeastern Cambodia. *IUCN Otter Spec. Group Bull.* **27** (1): 12-23
[<http://www.otterspecialistgroup.org/Bulletin/Volume27/Hon_et_al_2010.html>]
- Hussain, S. A., Choudhury, B.C. (1997). Distribution and status of the smooth-coated otter *Lutra perspicillata* in National Chambal Sanctuary, India. *Biological Conservation*, **80** : 199-206.
- Hussain, S.A., de Silva, P.K. 2008. *Aonyx cinerea*. In: IUCN 2009. IUCN Red List of Threatened Species. Version 2009.1.
[<www.iucnredlist.org>.. Downloaded on 05 October 2009.]
- Hussain, S.A., de Silva, P.K., Mostafa Feeroz, M. (2008a). *Lutrogale perspicillata*. In: IUCN 2009. IUCN Red List of Threatened Species. Version 2009.1.
[<www.iucnredlist.org>. Downloaded on 30 June 2009.]
- Hussain, S.A., Kanchanasakha, B., de Silva, P.K., Olsson, A. (2008b). *Lutra sumatrana*. In: IUCN 2009. IUCN Red List of Threatened Species. Version 2009.1.
[<www.iucnredlist.org>. Downloaded on 08 July 2009.]
- IOSF. (2008). Alarming Trade in Otter Fur. IOSF. 7 Black Park, Bradford, Isle of Skye, IV49 9DE, Scotland. 11 pp
- Kanchanasaka, B., Simcharoen, S., Than, U.T. (1998). Otter: Oriental small-clawed otter. Carnivores of Mainland South East Asia. 73-86
- Khan, W. A., Qasim, M., Ahmad, E., Akbar, G., Habib, A. H., Ali, H., Mueen, F., Chaudhry, A. A., Iqbal, S. Bhaagat, H. B., Akhtar, M., Ahmad, M. S. (2009). A survey of smooth-coated otters (*Lutrogale perspicillata indica*) in the Sindh Province of Pakistan. *IUCN Otter Spec. Group Bull.* **26**(1), 15-32.
[<http://www.iucnosp.org/Bulletin/Volume26/Khan_et_al_2009.html>]
- Khan, W. A., Qasim, M., Ahmad, E., Bhagat, H.B. (2008). Literature review on biology and ecology of Smooth coated otter (*Lutrogale perspicillata*). Internal Report, WWF Pakistan, Ferozpur Road, Lahore. 13 pp.
- Lekagul, B., Mcneely, J.A. (1977). Mammals of Thailand. Association for the Conservation of Wildlife (as updated 1988). Bangkok.
- Nguyen X. D., Pham T. A., Le H.T. (2001). New information about the hairy-nosed otter (*Lutra sumatrana*) in Vietnam. *IUCN Otter Spec. Group. Bull.* **18**(2): 64-75.
[<http://www.iucnosp.org/Bulletin/Volume18/Nguyen_et_al_2001.html>]
- Olsson, A., Heng, S., Hon, N., Peov, S., Nop, N. (2007). Cambodia Otter Research and Conservation Project. Presentation at Xth International Otter Colloquium, October 10-16th, 2007, Hwacheon, South Korea.
- Poole, C.M. (2003). The first records of hairy-nosed otter *Lutra sumatrana* from Cambodia with notes on the national status of three other otter species. *Nat. Hist. Bull. Siam Soc.* **51**(2): 273-280.
- Ruiz-Olmo, J., Loy, A., Cianfrani, C., Yoxon, P., Yoxon, G., de Silva, P.K., Roos, A., Bisther, M., Hajkova, P., Zemanova, B. 2008. *Lutra lutra*. In: IUCN 2009. IUCN Red List of Threatened Species. Version 2009.1.
[<www.iucnredlist.org>. Downloaded on 05 October 2009.]
- Sebastian, S., Vong, S. (2009). Spike in Cambodia sand mining “appears to coincide with the end of sand exports from Indonesia to Singapore”. Sand mining spikes in Koh Kong estuaries. The Phnom Penh Post 10 Mar 09.
[<<http://wildsingaporenews.blogspot.com/2009/03/spike-in-cambodia-sand-mining-appears.html>> Access on 3 Mar 2010.]
- Sivasothi, N., Burhanuddin, Hj. Md. Nor. (1994). A review of otters (Carnivora: Mustelidae: Lutrinae) in Malaysia and Singapore. *Hydrobiologia* **285**: 151-170.
- Wright, L., Olsson, A., Kanchanasaka, B. (2008). A working review of the hairy-nosed otter (*Lutra sumatrana*) *IUCN Otter Spec. Group Bull.* **25**(1), 38-59.
- Yeen, T. H., Serge, L. (2005). *Lutrogale perspicillata*. *Mammalian Species*, **786**: 1 - 4.

RÉSUMÉ

LA DISTRIBUTION DES LOUTRES SUR LA REGION DE TROPEANG ROUNG DANS LA PROVINCE DE KOH KONG AU CAMBODGE.

Deux espèces de loutre, la loutre d'Asie (*Lutrogale perspicillata*) et la loutre de Sumatra (*Lutra sumatrana*), ont été trouvées sur les rives de la Tropeang ROUNG. La distribution de ces deux espèces a été étudiée entre mai et juin 2009 sur une section de rives de la Tropeang ROUNG dans la province de Koh Kong au Cambodge. Leur habitat principal se situe dans le petit et le grand estuaires entouré par la Malaleuca, Mangrove et la forêt sempervirente avec shore line végétation suiviez par les bancs de sable (24%); la terre argileuse (13%); la terre roches (10%) et les rives avec végétation (53%), où sont riches de sources alimentaires, particulière les poissons. Les lieux des laissées sont principalement situés dans des espaces ouverts que sous le couvert de la canopée. Les laissées se trouvent en moyenne à 4.33 m du bord de l'eau et à 2.73 m de profondeur. Leur composition est à 64% de poisson, 5% de grenouille, 2% de crabe, 1% de crevette et 28% de débris non identifiée. L'étude a révélé que la distribution des loutres sur la rivière a diminué. La chasse pour le commerce de la fourrure, de la médecine traditionnelle, de la viande de brousse, ainsi que la perturbation de l'habitat comme la collecte de sable, la pêche mettent une pression sur la population de loutre. Des mesures de conservation devraient être menées le long de la rivière Tropeang ROUNG comme le suivi régulier des populations de loutres et des entretiens avec les populations locales. De même, devraient être imposées des restrictions comme la collecte des sables, le rejet de pétrole par les bateaux et la pose de pièges.

RESUMEN

DISTRIBUCIÓN DE NUTRIAS IN LA REGION DE TROPEANG ROUNG, PROVINCIA DE KOH KONG EN CAMBODIA

Dos especies de nutrias fueron identificadas a lo largo del rio Tropeang ROUNG: la nutria de pelaje fino (*Lutrogale perpecillata*) y la nutria de sumatra o lutra de nariz peluda (*Lutra sumatrana*). La distribución de estas especies fue estudiada a lo largo de un segmento del rio Tropeang round en la privincia de Koh Kong en Cambodia, entre los meses de mayo y junio de 2009. El hábitat principal parece ser pequeños y grandes estuarios rodeados de Malaleuca, Manglar y bosque perennifolio con vegetación riverseña, seguido por arena (24%), arcilla (13%) y piedra (10%) y bancos con vegetación (53%) ricos en fuentes de alimento, especialmente peces. Sitios de defecación fueron hallados principalmente a cielo abierto que bajo el dosel del bosque a 4.33 m del borde del agua en promedio y a 2.73 m de profundidad. La composición de las heces consistió em promedio de 64% peces, 5% ranas, 2% cangrejo, 1% camarón y 28% de residuos no identificados. El estudio reveló que la distribución de nutrias a lo largo del río ha disminuido. Caza para comercializar la piel, medicina tradicional, alimento y alteración de hábitat como minería de arena y pesca podrían ser causantes de presión sobre la población. Se requieren medidas de conservación tales como monitoreo poblacional y entrevistas con la población local. Restricciones a la minería de arena, derrames de aceite y caza con trampas deberán ser impuestas a lo largo del rio Tropeang ROUNG.

សង្ខេប

របាយរបស់សត្វគេនៅតាមបណ្តោយស្ទឹងត្រពាំងរូងខេត្តកោះកុងនៃប្រទេសកម្ពុជា

កេរ្តិ៍ប្រភេទត្រូវបានរកឃើញនៅតាមបណ្តោយស្ទឹងត្រពាំងរូង ដូចជាភេទនរណាង (*Lutrogale perspicillata*) និងភេទមច្រមុះ (*Lutra sumatrana*) ។ របាយរបស់សត្វភេទាំងពីរនេះត្រូវបានសិក្សានៅតាមបណ្តោយដងស្ទឹងត្រពាំងរូង ក្នុងខេត្តកោះកុងនៃប្រទេសកម្ពុជា នៅកំឡុងខែឧសភា និងខែមិថុនា ឆ្នាំ២០០៩ ។ សត្វភេទាំង នេះមានទីជំរកនៅតាមពាម ដែលព័ទ្ធជុំវិញដោយព្រៃស្មៅ កោងកាង និងព្រៃស្រោងដែលនៅតាមមាត់ច្រាំងទាំងនោះមាន ខ្យង ២៤% ដីឥដ្ឋ ១៣% ថ្ម ១០% និងច្រាំងដែលមានរុក្ខជាតិ ៥៣% ។ ទីជំរករបស់ភេទនរណាង និងភេទ មច្រមុះជាកន្លែងដែលសំបូរចំណីជាពិសេសត្រី ។ ទីតាំងលាមករបស់វាភាគច្រើននៅកន្លែងដែលមានពន្លឺថ្ងៃច្រើនជាកន្លែងដែលមានតំបន់ព្រៃ ហើយស្ថិតនៅចំងាយជាមធ្យម ៤.៣៣ ម៉ែត្រពីមាត់ទឹក និងជំរកជាមធ្យម ២.៧៣ ម៉ែត្រ ។ កាកសំណល់ដែលមាននៅក្នុងលាមករបស់គេ គឺមានឆ្អឹងត្រី និងស្រកាត្រី ៦៤% ឆ្អឹងកង្កែប ៥% សំបកក្តាម ២% សំបក បង្ហា ១% និង ២៨% ទៀតជាកំទិចកំទីដែលមិនអាចកំណត់បាន ។ តាមការសិក្សាបង្ហាញថា ចំនួនរបស់សត្វភេទាំងពីរប្រភេទនៅតំបន់នោះមានការធ្លាក់ចុះយ៉ាងខ្លាំង ។ ការបរិច្ចាគយកស្បែក លក់ ធ្វើឱសថបូរាណ យកសាច់បរិភោគ និងការរំខានដល់ទីជំរករបស់វា ដូចជាការបូមខ្យង និងសកម្មភាពនេសាទកំពង់ តែដាក់សំពាធនៅលើចំនួនរបស់គេ ។ ការអភិរក្សតាមរយៈការតាមដាន និងការសំភាសន៍ជាមួយប្រជាជនមូលដ្ឋានគួរតែធ្វើឱ្យ បានទៀងទាត់ ហើយគួរតែរឹតបន្តឹងទៅលើសកម្មភាពបូមខ្យង និងការចាក់ប្រេងម៉ាស៊ីនចូលទៅក្នុងទឹកនៅតាមបណ្តោយស្ទឹង ត្រពាំងរូង ។