

MAMMAL FAUNA IN PHONG NHA KE BANG-HIN NAM NO REGION: THE SPECIES DIVERSITY AND CONSERVATION SIGNIFICANCE

Nguyen Xuan Dang*, Nguyen Xuan Nghia

Institute of Ecology and Biological Resources, VAST, Vietnam

ABSTRACT

Phong Nha Ke Bang-Hin Nam No Region (PNKB-HNN Region) is one of the world largest limestone conservation landscapes which contains the universal outstanding values on biodiversity and high diversity of flora and fauna. This paper reviews results of mammal biodiversity surveys conducted from 1970s to 2017 in PNKB-HNN region to give more comprehensive evaluation of the fauna diversity and conservation significance. The review shows that up to date, 150 mammal species from 32 families and 11 orders have been recorded in PNKB-HNN region. The highest diversity is order Chiroptera (54 species), then follow orders Rodentia (35 species), Carnivora (30 species), Primates (11 species), Artiodactyla (8 species), Soricomorpha (4 species). Other orders (Pholidota, Erinaceomorpha, Lagomorpha, Scandentia and Dermoptera) have only 1–2 species each. PNKB NP alone contains 143 species belonging to 32 families and 11 orders while HNN NCA contains 75 species belonging to 32 families and 11 orders.

PNKB-HNN region is the home of 56 mammal species of conservation priority including 41 species enlisted in 2017 IUCN Red List, 46 species enlisted in 2007 Vietnam Red Data Book. Out of 41 species enlisted in 2017 IUCN Red List, 3 species are at Critically Endangered category (CR), 9 species at Endangered category (EN), 16 species at Vulnerable category (VU), 10 species are at Near Threatened category (NT) and 3 species are of Deficient Data (DD). Out of 46 species enlisted in Vietnam Red Data Book, 3 species are at CR, 19 species at EN, 21 species at VU, 2 species at LR and 1 Species of DD. PNKB NP alone harbors 54 species of conservation priority including 40 globally threatened species, 45 nationally threatened species, 40 species under Governmental Decree No. 32/2006/ND-CP and 24 species under Governmental Decree No. 160/2013/ND-CP. HNN NCA contains 39 species of conservation priority including 32 species enlisted in 2017 IUCN Red List and 34 species enlisted in 2007 Vietnam Red Data Book. The most notable conservation priority species in PNKB-HNN are Ha Tinh Langur *Trachypithecus hatinhensis*, Red-shanked Douc *Pygathrix nemaeus*, Laotian Black Langur *Trachypithecus laotum*, Southern White-cheeked Gibbon *Nomascus siki*, Malaysian Bear *Helarctos malayanus*, Sun Bear *Ursus thibetanus*, Chinese Serow *Capricornis milneedwardsii*, Annamite Striped Rabbit *Nesolagus timminsii* and Laotian Rock Rat *Laonastes aenigmamus*. Moreover, PNKB-HNN region is the only home of Laotian Rock Rat *Laonastes aenigmamus* and Lao Limestone Rat *Saxatilomys paulinae*.

Keywords: Biodiversity, Conservation, Phong Nha-Ke Bang, Hin Nam No, Quang Binh, Khammouane, Laos, Vietnam.

Citation: Nguyen Xuan Dang, Nguyen Xuan Nghia, 2018. Mammal fauna in Phong Nha Ke Bang-Hin Nam No region: The species diversity and conservation significance. *Academia Journal of Biology*, 40(3): 29–36. <https://doi.org/10.15625/2615-9023/v40n3.12656>.

*Corresponding author email: dangiebr@gmail.com

Received 20 May 2018, accepted 30 August 2018

INTRODUCTION

Phong Nha-Ke Bang National Park (PNKB NP) in Quang Binh province, Vietnam and Hin

Nam No National Conservation Area (HNN NCA) in Khammouane province, Lao PDR, together comprise a continuous Phong Nha Ke Bang-Hin Nam No Region one of the world

largest limestone conservation landscapes. The region is recognized by World Wide Fund for Nature (WWF) as the most important global ecoregion within Great Annamite Range which contains the universal outstanding values on biodiversity and high diversity of flora and fauna including many karst-specialist species, endemic species and large quantity of globally endangered species (Batzer et al., 2001). Thus, study of biodiversity components in PNKB-HNN region has been drawn attention of many domestic and international scientific agencies since 1970s.

The studies of mammal biodiversity in PNKB-HNN region were dated back in 1970s, however, the collected data are published scatteredly in various thematic articles or remained un-published. In PNKB NP, before 2000s, mammal surveys were conducted by WWF-Indochina, Fauna & Flora International (FFI-Indochina), Birdlife International in Vietnam (Birdlife Vietnam) and Vietnam-Russian Tropical Centre (VRTC). Results of these studies were presented in a number of technical reports such as Eames et al. (1994), Le Xuan Canh et al. (1997), Nguyen Xuan Dang et al. (1998), Do Tuoc & Truong Van La (1999), Timmins et al. (1999a) and WWF-VRTC (1999). Only in 2002, Meijboom & Ho Thi Ngoc Lanh (2002) summarized results of these studies in their book "*Flora and Fauna of Phong Nha-Ke Bang and Hin Nam No*" published by LINK Project. However, the content of the book is relatively simple, lacks many scientific information and now mainly outdated.

During 2000–2010, a number of mammal surveys were conducted by scientists from Institute of Ecology and Biological Resources, Hanoi National University, Kyoto University (Japan), and Vietnam-Russian Tropical Centre (VRTC). Especially, in 2011 and 2012, with support from the "Nature Conservation and Sustainable Natural Resource Management in PNKB NP Region Project", an intensive mammal surveys were conducted in and outside PNKB NP (Both authors of this paper participated in most of these surveys as mammal expert). Unfortunately, results of these surveys remain un-published, only in technical reports of Nguyen Manh Ha & Do Tuoc (2011), Nguyen Xuan Dang & Nguyen Xuan Nghia (2011), Bleisch et al. (2012) and Vu Dinh Thong et al. (2012).

In HNN NCA, very few mammal surveys were conducted, and results of these surveys were published in a number of publications. Before 2000, some short surveys were conducted by WWF-Laos and WCS-Laos in collaboration with Laos research organizations. The most notable studies in this period are wildlife and habitat surveys conducted by WWF-Laos and WCS-Laos during 1998–1999 (first author of this paper participated in these surveys as mammal experts). Results of these surveys were published in Walston & Vinton (1999), Duckworth et al. (1999) and Meijboom & Ho Thi Ngoc Lanh (2002). After 2000, there are no significant mammal studies in HNN NCA, however, some data on the mammal fauna can be found in some publications, such as Timmins et al. (2003), Jenkins et al. (2005), Musser et al. (2005), Timmins & Duckworth (1999), Timmins & Duckworth (2008), Timmins & Boonratana (2008), Coudrat et al. (2012), Timmins & Duckworth (2013); or in scientific theses, such as Phiapalath (2009), Vongsa (2010), Vongkhamheng (2014).

The fact that mammal data collected in PNKB-HNN Region remained un-published or only scatteredly published makes conservation managers and decision-makers very difficult to access. This paper reviews mammal biodiversity data collected from 1970 to 2017 in PNKB-HNN region to give more comprehensive evaluation of mammal diversity and conservation significance in this region. This review is useful for PNKB NP and HNN NCA to develop relevant strategies for biodiversity conservation in each protected areas as well as for their cooperative transboundary conservation programme.

MATERIALS AND METHODS

Compilation of an updated list of mammal species recorded in PNKB-HNN Region from 1970s to 2017 is based on reviewing published and un-published documents. Totally, 57 documents were reviewed of which 41 documents are published articles or books and 16 documents are un-published survey technical reports. Only valid recorded species are selected for the new species list. The species with vague recording information, such as poor interview information, likely being wrong identified or not being recorded again for many years are not taken for the list. In new species list, systematics and scientific names of species follow Wilson &

Reeder (2005). Conservation status of the species are identified following IUCN Red List of Threatened Species (IUCN, 2017), Red Data Book of Vietnam (MOST & VAST, 2007), Decree No. 32/2006/NĐ-CP, dated 30 March 2006 of Vietnam Government on management of endangered, rare and precious species of plant and animal species, and Decree No. 160/2013/NĐ-CP, dated 12/11/2013 of Vietnam Government on the criteria for selection and management regulations of species under the List of endangered, rare and precious species of conservation priority.

RESULTS AND DISCUSSION

Taxonomic composition of the mammal fauna

Up to date, 150 mammal species from 32 families and 11 orders have been recorded in PNKN-HNN region (PNKB NP: 143 species of 32 families and 11 orders; HNN NCA: 75 species of 32 families and 11 orders). The full list of recorded species is not shown in this article due to page limitation. Table 1 shows the taxonomic structure of the mammal fauna.

Conservation significance of the mammal fauna

The fact that large number of mammal species recorded (150 species) and many of them are nationally or globally endangered species indicates very high importance of PNKB-HNN region for global and national mammal biodiversity conservation. In PNKB NP, 143 mammal species were recorded, accounting for 45.3% of total number of known mammal species in Vietnam. Nine of twenty-four primate species occurred in Vietnam are found in PNKB NP. In addition, PNKB NP harbors a world largest population of globally endangered primates species, such as *Trachypithecus hatinhensis* and Vietnam largest population of *Pygathrix nemaeus* (Bleisch et al., 2012). PNKB NP is a home for 30 of 39 carnivore species known to occur in Vietnam including the most threatened species (Annex1). To date, fifty bat species are known to occur in PNKB NP, representing 41.3% of the total bat species in Vietnam and approximate 4.0% of total bat species in the World (Vu Dinh Thong et al., 2011). PNKB NP contains the great number of cave systems, including the world largest caves which should support very rich bat fauna. So actual bat species of PNKB NP would be much

more diverse than the currently known. In addition, PNKB NP is the only location in Vietnam with confirmed record of *Laonastes aenigmamus* (Nguyen Xuan Dang et al., 2012), Rat *Saxatilomys paulinae* (Nguyen Xuan Nghia et al., 2013; Nghia Xuan Nguyen et al., 2015) and *Macroglobosus sobrinus* (Vu Dinh Thong et al., 2011).

In HNN NCA, 75 mammal species were recorded. Primates represent the most outstanding conservation significance in HNN NCA. The area contains 11 species of Primate, five of which are globally threatened. Three species *Pygathrix nemaeus*, Gibbon *Nomascus siki* and *Trachypithecus laotum* are globally endangered and charismatic 'flagship' species of the NCA. Furthermore, HNN NCA harbors the world largest population of these two endangered langurs (DoFRM, 2015). Bat fauna in HNN NCA is poorly investigated, however, having the great number of cave systems HNN NCA should support very rich bat fauna.

Regarding the conservation significance, PHNK-HNN region is the home of 56 mammal species of conservation priority including 41 globally threatened species (enlisted in 2017 IUCN Red List 2017), 46 nationally threatened species in Vietnam (enlisted in 2007 Vietnam Red Data Book) (Annex 1). Out of 41 globally threatened species, 3 species are at Critically Endangered category (CR), 9 species at Endangered category (EN), 16 species at Vulnerable category (VU), 10 species are at Near Threatened category (NT) and 3 species are of Deficient Data (DD). Our of 46 enlisted in Vietnam Red Data Book, 3 species are at CR, 19 species at EN, 21 species at VU, two species at LR and one species of DD. The most notable conservation priority species in PHNK-HNN region are *Trachypithecus hatinhensis*, *Pygathrix nemaeus*, *Trachypithecus laotum*, southern *Nomascus siki*, *Helarctosmalayanus*, *Ursus thibetanus*, *Capricornis milneedwardsii*, *Nesolagus timminsii* and Laotian Rock Rat *Laonastes aenigmamus*. Especially, *Laonastes aenigmamus* (Fig. 1) is endemic species of PNKB-HNN karst landscape. The species was first discovered in 2006 based on specimens collected in HNN NBA (Jenkin et al., 2006) and the first record of this species in Vietnam was in PNKB NP in 2011 (Nguyen Xuan Dang et al., 2012).

Table 1. Taxonomic composition of mammal fauna in PNKB-HNN region

English name	Scientific name	Number of recorded species		
		PNKB-HNN	PNKB	HNN
I. Ord. SCANDENTS	Scandentia	2	1	2
1. Fam. Treeshrews	Tupaiaidae	2	1	2
II. Ord. FLYING LEMURS	Dermoptera	1	1	0
2. Fam. Colugos	Cynocephalidae	1	1	0
III. Ord. PRIMATES	Primates	11	9	11
3. Fam. Slow Loris	Lorisidae	2	2	2
4. Fam. Monkeys	Cercopithecidae	8	6	8
5. Fam. Gibbons	Hylobatidae	1	1	1
IV. Ord. LAGOMORPH	Lagomorpha	2	2	1
6. Fam. Hares and Rabbits	Leporidae	2	2	1
V. Ord. ERINACEOMORPH	Erinaceomorpha	1	1	0
7. Fam. Gymnures	Erinaceidae	1	1	0
VI. Ord. SORICOMORPH	Soricomorpha	4	4	1
8. Fam. Shrews	Soricidae	3	3	1
9. Fam. Moles	Talpidae	1	1	0
VII. Ord. BATS	Chiroptera	54	50	22
10. Fam. Old World Fruit Bats	Pteropodidae	9	8	3
11. Fam. Horseshoe Bats	Rhinolophidae	11	10	6
12. Fam. Old World Leaf-nosed Bats	Hipposideridae	7	7	3
13. Fam. Old World False Vampires	Megadermatidae	2	2	2
14. Fam. Sheath-tailed Bats	Emballonuridae	1	1	0
15. Fam. Plain-nosed Bats	Vespertilionidae	22	20	7
16. Fam. Bent-winged Bats	Miniopteridae	2	2	1
VIII. Ord. PANGOLINS	Pholidota	2	2	1
17. Fam. Pangolins	Manidae	2	2	1
IX. Ord. CARNIVORES	Carnivora	30	30	16
18. Fam. Cats	Felidae	7	7	5
19. Fam. Civets	Viverridae	9	9	4
20. Fam. Mongooses	Herpestidae	2	2	1
21. Fam. Dogs	Canidae	1	1	1
22. Fam. Bears	Ursidae	2	2	2
23. Fam. Mustelids	Mustelidae	9	9	3
X. Ord. EVEN-TOED UNGULATES	Artiodactyla	8	8	8
24. Fam. Pigs	Suidae	1	1	1
25. Fam. Mousedeers	Tragulidae	1	1	1
26. Fam. Deers	Cervidae	3	3	3
27. Fam. Cattle, Buffalo, Goats	Bovidae	3	3	3
XI. Ord. RODENTS	Rodentia	35	35	12
28. Fam. Squirrels	Sciuridae	10	10	7
29. Fam. Bamboo Rats	Spalacidae	2	2	1
30. Fam. Rats and Mouses	Muridae	20	20	1
31. Fam. Porcupines	Hystricidae	2	2	2
32. Fam. Rock Rats	Diatomyidae	1	1	1
Total (species):		150	143	75

Note: PNKB: Phong Nha-Ke Bang NP, HNN: Hin Nam No NCA.

Order Chiroptera has the highest species diversity with 54 species recorded (PNKB NP: 50 species, HNN NCA: 22 species), accounting for 36.0% of total number of species recorded in the region. The second highest species diversity is order Rodentia with 35 species recorded (PNKB NP: 35 species, HNN NP: 12 species). Then follow orders Carnivora with 30 species, Primates with 11 species, Artiodactyla with 8 species and Soricomorpha with 4 species. Other orders (Pholidota, Erinaceomorpha, Lagomorpha, Scandentia and Dermoptera) have only 1-2 species each



Figure 1. Laotian Rock Rat *Laonastes aenigmamus* found in PNKB NP (Thuong Hoa Commune, Minh Hoa District, Quang Binh province)

Photo: Nguyen Xuan Nghia) PNKB NP alone harbors 54 species of conservation priority including 40 globally threatened species, 45 nationally threatened species, 40 species under Governmental Decree No. 32/2006/ND-CP and 24 species under Governmental Decree No. 160/2013/ND-CP. HNN NCA harbors 39 species of conservation priority including 32 species enlisted in IUCN Red List and 34 species enlisted in 2007 Vietnam Red Data Book

CONCLUSION

Up to date, 150 mammal species of 32 families and 11 orders was recorded in PNKN-HNN region. The highest species diversity belongs to order Chiroptera (54 species), then follow orders Rodentia (35 species), Carnivora (30 species), Primates (11 species), Artiodactyla (8 species), Soricomorpha (4 species). Other orders (Pholidota, Erinaceomorpha, Lagomorpha, Scandentia and Dermoptera) have only 1–2 species each. PNKB NP contains 143 species belonging to 32 families and 11 orders while HNN NCA contains 75 species belonging to 32 families and 11 orders.

PNKB-HNN Region has high global and national conservation value. The region is the home of 56 mammal species of conservation priority including 41 species enlisted in 2017 IUCN Red List, 46 species enlisted in 2007 Vietnam Red Data Book. PNKB-HNN Region

is utmost important for conservation of *Trachypithecus hatinhensis*, *Pygathrix nemaeus*, *Trachypithecus laotum*, *Nomascus siki*, *Helarctos malayanus*, *Ursus thibetanus* *Capricornis milneedwardsii*, *Nesolagus timminsii* and Laotian Rock Rat *Laonastes aenigmamus*. Moreover, PNKB-HNN landscape is the only home of *Laonastes aenigmamus* and *Saxatilomys paulinae*.

Acknowledgements: This study was funded by the Project entitled “Nature Conservation and Sustainable Natural Resource Management in Phong Nha-Ke Bang National Park Region, Quang Binh, Vietnam” (funded by GIZ, KfW bank and managed by Quang Binh Provincial People’s Committee). The authors would like to express their sincerely thanks to the leaders of the Project, Institute of Ecology and Biological Resource, Vietnam Academy of Science and Technology, PNKB NP and HNN NCA for kindly supporting us to implement this study.

REFERENCES

- Baltzer M., Nguyen T. D., Shore R., Hardcastle J., Long B., Clary K., Springer J., 2001. The forests of the Lower Mekong Ecoregion Complex. WWF Indochina, Ha Noi, Vietnam, 42 p.
- Coudrat C. Z., Duckworth J. W., Timmins R. J., 2012. Distribution and conservation status of the Red-shanked douc *Pygathrix nemaeus* in Lao PDR: An Update. *American Journal of Primatology*, 74: 874–889.
- Duckworth J. W., Salter R. E., Khounbolin K., 1999. Wildlife in Lao PDR: 1999 status report. Vientiane, IUCN, WCS, Centre for Protected areas and Watershed management, Samsaen Printing, Bangkok.
- DoFRM, 2015. Hin Nam No NPA: Co-Management Plan (2016–2020), Vientiane, 107 p.
- Eames J. C., Lambert F. R., Nguyen Cu, 1994. A survey of the Annamese Lowland, Vietnam and its implication for the conservation of Vietnamese and Imperial Pheasant *Lophura hatinhensis* and *L. imperialis*. In: Bird Conservation International, 4: 343–382.
- IUCN, 2018. The IUCN Red List of Threatened Species. Version 2017-3. <www.iucnredlist.org>. (accessed 3 June, 2018).
- Jenkins P. D., Kilpatrick C.W., Robinson M. F., Timmins R.J., 2005. Morphological and molecular investigations of a new family, genus and species of rodent (Mammalia: Rodentia: Hystricognatha) from Lao PDR. *Systematics and Biodiversity*, 2(4): 419–454. <https://doi.org/10.1017/S1477200004001549>.
- Meijboom M., Ho N. L., 2002. Flora and Fauna of Phong Nha-Ke Bang and Hin Namno. Published by WWF-LINC Project, 151p.
- Musser G. G., Smith A. L., Robinson M. F., Lunde D. P., 2005. Description of a new genus and species of rodent (Murinae, Muridae, Rodentia) from the Khammouane Limestone National Biodiversity Conservation Area in Lao PDR. *American Museum Novitates*, 3497: 31p.
- MOST & VAST, 2007. Red Data Book of Vietnam. Part 1: Animals, Part 2: Plants. Publisher "Natural Science and Technology", Ha Noi (in Vietnamese).
- Nguyen X. N., Nguyen X. D., Ngo N. X., Nguyen D. D., 2015. New data on recently described rodent species Paulina's Limestone Rat *Saxatilomys paulinae* Musser, Smith, Robinson & Lunde, 2005 (Mammalia: Rodentia). *Biodiversity Data Journal* 3: e4961. <https://doi.org/10.3897/BDJ.3.e4961>
- Nguyen X. D., Nguyen X. N., Nguyen M. H., Le D. M., Nguyen D. L., Dinh H. T., 2012. Discovery of "living fossil" rodent *Laonastes aenigmamus* in Phong Nha-Ke Bang, Vietnam. *Tap chi Sinh hoc (Journal of Biology)*, 34(1): 40–47 (in Vietnamese with English summary).
- Nguyen X. N., Nguyen X. D., Nguyen D. L., 2013. Results of survey on Rodent (Rodentia) in Phong Nha-Ke Bang NP, Quang Binh Province. *Tap chi Sinh hoc (Journal of Biology)*, 35(2): 185–192 (in Vietnamese with English summary).
- Timmins R. J., Do Tuoc, Trinh V. C., Hendrichsen D. K., 1999a. A preliminary assessment of the conservation importance and conservation priorities of the Phong Nha-Ke Bang proposed National Park, Quang Binh Province, Vietnam. Fauna & Flora International-Indochina Program, Ha Noi, Vietnam.
- Timmins R. J., Duckworth J. W., 1999. Status and conservation of Douc Langur (*Pygathrix nemaeus*) in Laos. *International Journal of Primatology*, 20(4): 469–489.
- Timmins R. J., Duckworth J. W., 2008. Diurnal squirrels (Mammalia: Rodentia: Sciuridae) in Lao PDR: distribution, status and conservation. *Tropical Zoology*, 21: 11–56.
- Timmins R. J., Boonratana R., 2008. *Trachypithecus laotum*. The IUCN Red List of Threatened Species 2008: e.T22044A9350930. <http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T22044A9350930.en>. (accessed 17 May, 2017).
- Timmins R. J., Duckworth J. W., Robson C. R., Walston J. L., 2003. Distribution, status and ecology of the mainland slender-tailed tree-shrew *Dendrogale murina*. *Mammal Review*, 33(3): 272–283.

Timmins R. J., Duckworth J. W., 2013. Distribution and habitat of Assamese Macaque *Macaca assamensis* in Lao PDR, Including its use of low-altitude karsts. *Primate Conservation*, 26: 103–114.

Walston J. L., Vinton M. D. (eds), 1999. A wildlife and habitat survey of Hin Namno National Biodiversity Conservation Area and Adjacent Areas, Khammouane

Province, Lao PDR. WWF Lao Project office and WCS Lao Program, Vientiane Lao PDR.

Wilson D. E., Reeder D. M. (eds.), 2005. Mammal species of the world: a taxonomic and geographic reference. 3rd edition, vol. 1& 2, Baltimore: Johns Hopkins University Press, 2141 p.

Annex 1. Mammal species of conservation priority recorded in PNKB-HNN region

No	Scientific name	English name	Areas		Conservation status			
			PN KB	H NN	IU CN	SD VN	ND 32	ND 160
1.	<i>Galeopterus variegatus</i>	Sunda Colugo	+			EN	IB	+
2.	<i>Nycticebus bengalensis</i>	Asian Slow Loris	+	+	VU	VU	IB	+
3.	<i>Nycticebus pygmaeus</i>	Pygmy Loris	+	+	VU	VU	IB	+
4.	<i>Macaca arctoides</i>	Stump-tailed Macaque	+	+	VU	VU	IIB	
5.	<i>Macaca assamensis</i>	Assamese Macque	+	+	NT	VU	IIB	
6.	<i>Macaca leonina</i>	Northern Pig-tailed Macaque	+	+	VU	VU	IIB	
7.	<i>Macaca mulatta</i>	Rhesus Macaque	+	+		LR	IIB	
8.	<i>Pygathrix nemaeus</i>	Red-shanked Douc	+	+	EN	EN	IB	+
9.	<i>Trachypithecus hatinhensis</i>	Hatinh Langur	+	+	EN	EN	IB	+
10.	<i>Trachypithecus laotum</i>	Laotian Langur		+	VU			
11.	<i>Trachypithecus francoisi</i>	Francois's langur		+	EN	EN	IB	+
12.	<i>Nomascus siki</i>	Southern White-cheeked Gibbon	+	+	EN	EN	IB	
13.	<i>Nesolagus timminsi</i>	Annamite Striped Rabbit	+		DD	EN	IB	+
14.	<i>Cynopterus brachyotis</i>	Lesser Short-nosed Fruit Bat	+			VU		
15.	<i>Rhinolophus paradoxolophus</i>	Big-leafed Horseshoe Bat	+	+		VU		
16.	<i>Hipposideros cineraceus</i>	Lesser Leaf-nosed Bat	+		VU			
17.	<i>Myotis siligorensis</i>	Himalayan whiskered Bat	+	+		LR		
18.	<i>Myotis pilosus</i>	Peters's Big-footed Bat	+	+	NT	DD		
19.	<i>Ia io</i>	Great Evening Bat	+	+		VU		
20.	<i>Harpiocephalus harpia</i>	Hairy-winged Tube-nosed Bat	+			VU		
21.	<i>Manis javanica</i>	Sundan Pangolin	+		CR	EN	IB	+
22.	<i>Manis pentadactyla</i>	Chinese Pangolin	+	+	CR	EN	IB	+
23.	<i>Catopuma temminckii</i>	Asian Golden Cat	+	+	NT	EN	IB	+
24.	<i>Pardofelis marmorata</i>	Mabled Cat	+	+	NT	VU	IB	+
25.	<i>Prionailurus bengalensis</i>	Leopard Cat	+	+			IB	
26.	<i>Prionailurus viverrinus</i>	Fishing Cat	+		EN	EN	IB	+
27.	<i>Neofelis nebulosa</i>	Clouded Leopard	+	+	VU	EN	IB	+
28.	<i>Panthera pardus</i>	Leopard	+		NT	CR	IB	+
29.	<i>Panthera tigris</i>	Tiger	+	+	EN	CR	IB	+
30.	<i>Arctictis binturong</i>	Binturong	+	+	VU	EN	IB	+
31.	<i>Chrotogale owstoni</i>	Owston's Civet	+	+	VU	VU	IIB	
32.	<i>Prionodon pardicolor</i>	Spotted Linsang	+			VU	IIB	
33.	<i>Viverra megaspila</i>	Large-spotted civet	+		VU	VU	IIB	
34.	<i>Viverra zibetha</i>	Large Indian Civet	+		NT		IIB	

No	Scientific name	English name	Areas		Conservation status			
			PN KB	H NN	IU CN	SD VN	NĐ 32	ND 160
35.	<i>Viverricula indica</i>	Small Indian Civet	+				IIB	
36.	<i>Cuon alpinus</i>	Dhole	+	+	EN	EN	IB	
37.	<i>Helarctosmalayanus</i>	Sun Bear	+	+	VU	EN	IB	+
38.	<i>Ursus thibetanus</i>	Asiatic Black Bear	+	+	VU	EN	IB	+
39.	<i>Aonyx cinerea</i>	Oriental Small-clawed Otter	+	+	VU	VU	IB	+
40.	<i>Lutra lutra</i>	Eurasian Otter	+		NT	VU	IB	+
41.	<i>Lutrogale perspicillata</i>	Smooth-coated Otter	+	+	VU	EN	IB	+
42.	<i>Arctonyx collaris</i>	Hog Badger	+	+	NT			
43.	<i>Mustela kathiah</i>	Yellow-bellied Weasel	+				IIB	
44.	<i>Mustela strigidorsa</i>	Stripe-Backed Weasel	+				IIB	
45.	<i>Tragulus kanchil</i>	Lesser Mousedeer	+	+		VU	IIB	
46.	<i>Muntiacus vuquangensis</i>	Large-antlered Muntjak	+	+	EN	VU	IB	+
47.	<i>Rusa unicolor</i>	Sambar	+	+	VU	VU		
48.	<i>Bos frontalis</i>	Gaur	+	+	VU	EN	IB	+
49.	<i>Pseudorys nghetinhensis</i>	Saola	+	+	CR	EN	IB	+
50.	<i>Capricornis milneedwardsii</i>	Chinese Serow	+	+	NT	EN	IB	+
51.	<i>Ratufa bicolor</i>	Black Giant Squirrel	+	+	NT	VU		
52.	<i>Belomys pearsonii</i>	Hairy-footed Flying Squirrel	+		DD	CR		
53.	<i>Hylopetes alboniger</i>	Particolored Flying Squirrel	+			VU	IIB	
54.	<i>Petaurista philippensis</i>	Indian Giant Flying Squirrel	+	+		VU		
55.	<i>Saxatilomys paulinae</i>	Lao Limestone Rat	+	+	DD	ne		
56.	<i>Laonastes aenigmamus</i>	Laotian Rock Rat	+	+	EN	ne		

Note: PNKB: Phong Nha-Ke Bang NP; HNN: Hin Nam No NCA; IUCN: 2017 IUCN Red List of Threatened Species; SDVN: Red Data Book of Vietnam in 2007; ND32: Decree 32/2006/ND-CP, dated 30/03/2006 of Vietnam Government on management regulations for endangered, rare and precious species of forest plants and animals; ND 160: Decree 160/2013/NĐ-CP, dated 12/11/2013 of Vietnam Government on the criteria for selection and management regulations of species under the List of endangered, rare and precious species of protection priority. CR: critically endangered, EN: endangered, VU: Vulnerable, NT: Near threatened; DD: Data deficient categories, ne-not evaluated.