

## Camera-trap records of Sunda Stink-badger *Mydaus javanensis* and other small carnivores in South Kalimantan, Indonesia

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### Abstract.

In a modelling exercise in 2016, South Kalimantan was predicted to be mostly unsuitable for Sunda Stink-badger *Mydaus javanensis*. A camera-trap survey from August to November 2014 in Bajuin, Tanah Laut District and Karang Intan, Banjar District, South Kalimantan, Indonesia generated seven Sunda Stink-badger, one Yellow-throated Marten *Martes flavigula*, one Common palm Civet *Paradoxurus hermaphroditus*, two Masked palm civet *Paguma larvata* and six Collared Mongoose *Herpestes semitorquatus* records. These records confirm the occurrence of Sunda Stink-badger in South Kalimantan.

**Keywords:** Borneo, Malay badger, Mephitidae, Camera-trap records, Teledu.

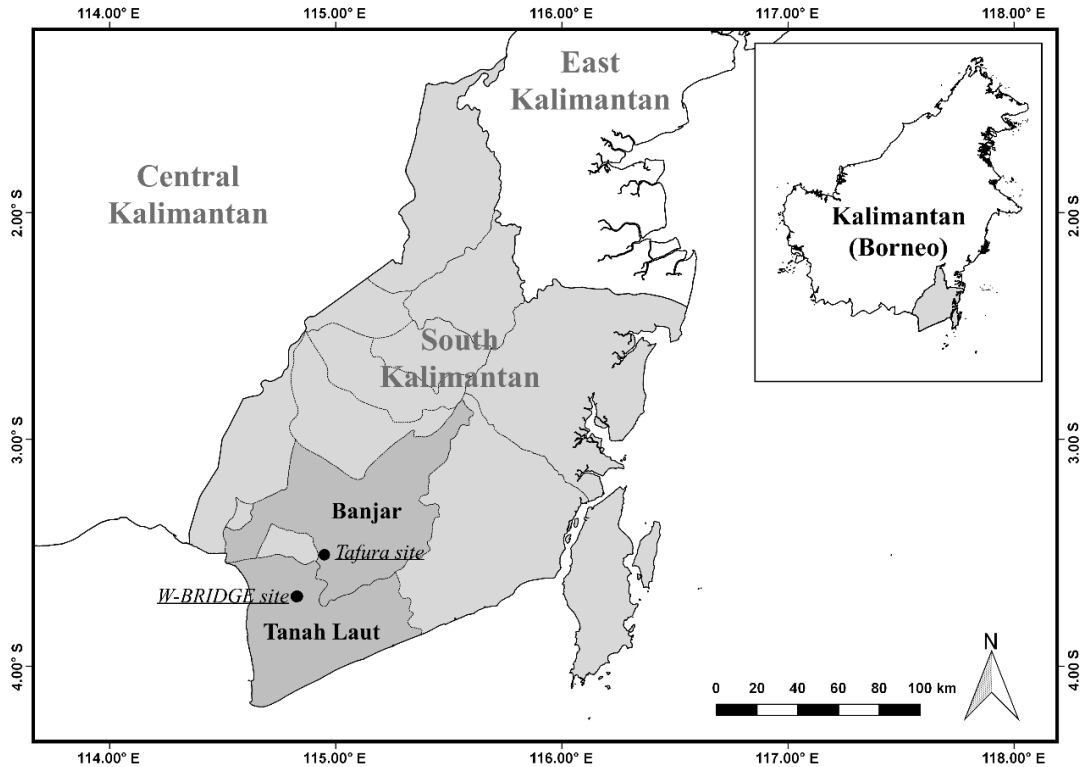
Sunda Stink-badger *Mydaus javanensis* is a small carnivore found on Java, Sumatra, Kalimantan (Borneo) and the North Natuna Islands (Hwang & Larivière 2003, Wilting *et al.* 2015). This species is one of the most commonly encountered carnivores in Malaysian Borneo (especially Sabah; Wilting *et al.* 2010, Samejima & Robert 2012) and Java (Ario 2007); its status on The IUCN Red List of Threatened Species is Least Concern (Wilting *et al.* 2015). Despite its presumed commonness, little is known about the ecology of Sunda Stink-badger and recent confirmed records are scarce in Central, East, West and South Kalimantan (Samejima *et al.* 2016). The scarcity of records in these areas may reflect lower survey effort than that in Malaysian Borneo, however, it is reported that this species was not recorded in 6,025 camera-trap-nights in Sabangau, Central Kalimantan (Cheyne *et al.* 2010) and in 17,974 camera-trap-nights in the Schwaner Mountains, Central Kalimantan (Samejima & Semiadi 2012). According to the information compiled by Samejima *et al.* (2016), Sunda Stink-badger was reportedly a common species in South Kalimantan about a century ago (e.g. Bock 1882, Lyon 1911). There is no recent evidence indicating the presence of this species in South Kalimantan other than the description in Yasuma (1995):

Sunda Stink-badger was described as common around Banjarmasin and Tanjung, and villagers from those areas apparently knew this species very well.

Digital camera-traps (Trophy Cam HD, Bushnell) were set up during August to November 2014 at 12 stations in two sites (Table 1, Figure 1). Nine cameras were installed in secondary forest adjoining W-BRIDGE (Waseda-Bridgestone Initiative for Development of Global Environment), Bajuin, Tanah Laut District, South Kalimantan, with altitudes between 54 m and 172 m above sea level (asl). Three cameras were installed in the reserved natural forest of Tahura site (Forest Park called Taman Hutan Raya Sultan Adam in Indonesian), Karang Intan, Banjar District, with an altitude of approximately 100 m asl. In both sites, *Imperata cylindrica* and other grass species dominate the habitat, with secondary forests remaining along the valleys. The W-BRIDGE project is focused on the rehabilitation of degraded land using Pará Rubber Tree *Hevea brasiliensis*. To date, 51 tree species have been recorded in the forest near the W-BRIDGE site: *Peronema canescens* was dominant and many beans of *Pithecellobium jiringa* were on the forest floor. In addition, some regenerated small trees with 3–5cm DBH (Diameter at Breast Height) were removed by local people, to be used as stakes in agricultural land. There were 24 tree species recorded and *Cryptocarya* was dominant in Tahura site. The cameras were set on trees about 50–100 cm above the ground with a slant of 10–20 degrees facing the ground and the survey was targeting ground-dwelling mammals. The camera-trap stations were visited at approximately one-month intervals; the memory cards and batteries were then changed. The number of notionally independent photographs were counted for each small carnivore species; photographs of the same species at the same camera-trap station were counted as a notionally independent record if separated by at least 30 minutes.

**Table 1.** Camera-trap stations in South Kalimantan, Indonesia.

Trap No.	Study site	Coordinates	Elevation (m)
W01	W-BRIDGE	3°41'31.6" S 114°49'50.6" E	54
W02	W-BRIDGE	3°41'31.5" S 114°49'48.7" E	70
W03	W-BRIDGE	3°41'31.7" S 114°49'49.7" E	70
W04	W-BRIDGE	3°41'27.5" S 114°49'44.5" E	125
W05	W-BRIDGE	3°41'27.9" S 114°49'45.3" E	120
W06	W-BRIDGE	3°41'28.8" S 114°49'46.7" E	83
W07	W-BRIDGE	3°41'35.4" S 114°49'33.5" E	145
W08	W-BRIDGE	3°41'34.1" S 114°49'31.5" E	161
W09	W-BRIDGE	3°41'32.1" S 114°49'31.7" E	173
T01	Tahura	3°30'30.3" S 114°56'59.3" E	111
T02	Tahura	3°30'31.2" S 114°56'59.1" E	109
T03	Tahura	3°30'31.0" S 114°56'58.6" E	104

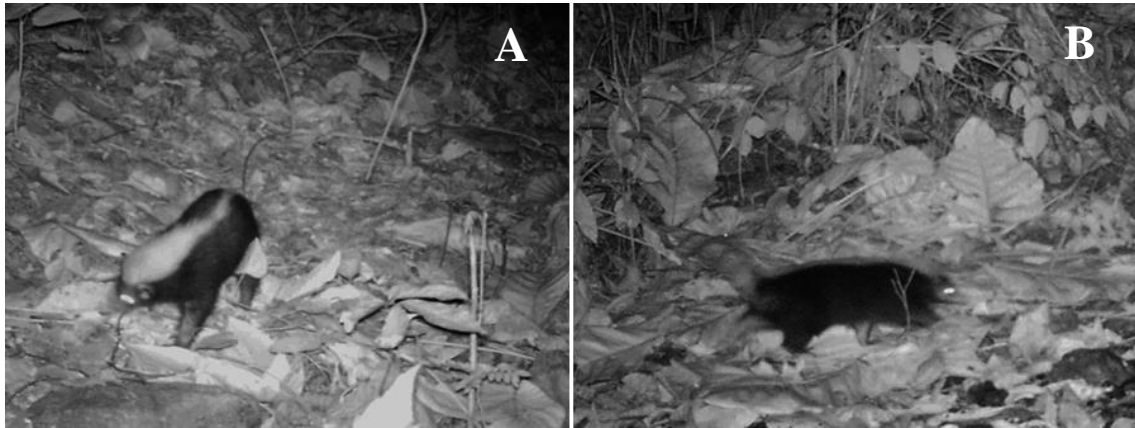


**Figure 1.** Locations of the two survey sites in South Kalimantan, Indonesia.

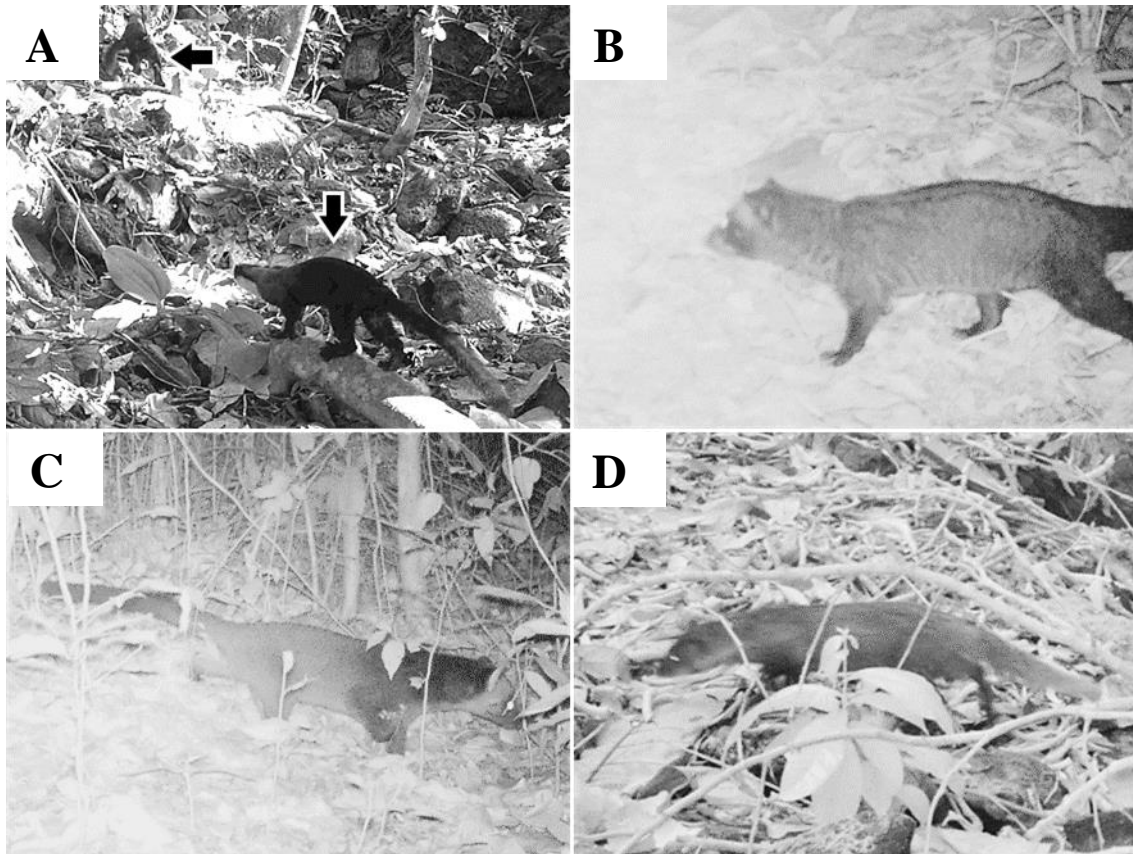
A total of 1,149 camera-trap-nights generated seven Sunda Stink-badger records at four camera-trap stations (Table 2, Figure 2). The camera-trapping also generated one Yellow-throated Marten *Martes flavigula*, one Common Palm Civet *Paradoxurus hermaphroditus*, two Masked Palm Civet *Paguma larvata*, and six Collared Mongoose *Herpestes semitorquatus* records (Table 2, Figure 3).

**Table 1.** Camera-trap records of Sunda Stink-badger *Mydaus javanensis* and other small carnivores from South Kalimantan, Indonesia.

Species	Date	Time	Trap No.
Sunda Stink-badger	2 September 2014	04h15	W06
	2 September 2014	04h24	W04
	7 September 2014	04h44	W05
	8 October 2014	20h21	T03
	9 October 2014	23h37	T03
	12 October 2014	21h31	T03
	25 October 2014	20h59	T03
Yellow-throated Marten	16 September 2014	08h12	W06
Common Palm Civet	31 October 2014	03h44	W08
Masked Palm Civet	23 October 2014	20h33	T02
	24 October 2014	01h50	W08
Collared Mongoose	4 September 2014	08h56	W07
	7 September 2014	11h43-11h59	W01
	22 September 2014	08h27	W07
	29 September 2014	15h22	W07
	3 October 2014	09h02-09h27	W01
	13 October 2014	17h46	W01



**Figure 2.** (A) Camera-trapped Sunda Stink-badger *Mydaus javanensis* from W-BRIDGE site, Bajuin, Tanah Laut, South Kalimantan, Indonesia on 7 September 2014 and (B) Tahura site, Karang Intan, Banjar, South Kalimantan, Indonesia on 9 October 2014 (right).



**Figure 2.** A) Camera-trapped Yellow-throated Martens *Martes flavigula* from W-BRIDGE site, Bajuin, Tanah Laut, South Kalimantan, Indonesia on 16 September 2014, B) Common Palm Civet *Paradoxurus hermaphroditus* from W-BRIDGE site on 31 October 2014, C) Masked Palm Civet *Paguma larvata* from Tahura site, Karang Intan, Banjar, South Kalimantan, Indonesia on 23 October 2014 and D) Collared Mongoose *Herpestes semitorquatus* from W-BRIDGE site on 13 October 2014.

South Kalimantan was predicted to be mostly unsuitable for Sunda Stink-badger (Samejima *et al.* 2016), Yellow-throated Marten (Hon *et al.* 2016a), Common Palm Civet

(Nakabayashi *et al.* 2016), Masked Palm Civet (Semiadi *et al.* 2016) and Collared Mongoose (Hon *et al.* 2016b) by MaxEnt modelling. The records from this survey suggest that the fragmented forests in South Kalimantan are able to support populations of these species.

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## References

- Ario A. 2007. *Javan leopard (Panthera pardus melas) among human activities: Preliminary assessment on the carrying capacity of Mount Salak forest area, Mount Halimun-Salak National Park*. Conservation International Indonesia. Jakarta, Indonesia.
- Bock C. 1882. *The Head-hunters of Borneo: A Narrative of Travel Up the Mahakkam and Down the Barito; also, Journeyings in Sumatra*. Second Edition. Sampson Low, Marston, Searle, & Rivington, London, U.K., 344 pp.
- Cheyne SM, Husson SJ, Chadwick RJ & Macdonald DW. 2010. Diversity and activity of small carnivores of the Sabangau Peat-swamp Forest, Indonesian Borneo. *Small Carnivore Conservation* 43: 1–7.
- Hon J, Hearn AJ, Ross J, Samejima H, Aigeri DM, Mathai J, Mohamed A, Boonratana R, Fredriksson G, Cheyne SM, Heydon M, Rustam Alfred R, Semiadi G, Bernard H, Macdonald DW, Belant JL, Kramer-Schadt S & Wilting A. 2016a. Predicted distribution of the yellow-throated marten *Martes flavigula* (Mammalia: Carnivora: Mustelidae) on Borneo. *Raffles Bulletin of Zoology* 33: 42–49.
- Hon J, Hearn AJ, Ross J, Mohamed A, Alfred R, Samejima H, Cheyne SM, Semiadi G, Rustam Boonratana R, Fredriksson G, Mathai J, Lim NT-L, Marshall AJ, Macdonald DW, Belant JL, Kramer-Schadt S & Wilting A. 2016b. Predicted distribution of the collared mongoose *Herpestes semitorquatus* (Mammalia: Carnivora: Herpestidae) on Borneo. *Raffles Bulletin of Zoology* 33: 142–148.
- Hwang YT & Larivière S. 2003. *Mydaus javanensis*. *Mammalian Species* 723: 1–3.
- Lyon MW Jr. 1911. Mammals collected by Dr. W. L. Abbott on Borneo and some of the small adjacent islands. *Proceedings of the United States National Museum* 40(1809): 53–146.
- Nakabayashi M, Nakashima Y, Hearn AJ, Ross J, Alfred R, Samejima H, Mohamed A, Heydon M, Rustam Bernard H, Semiadi G, Fredriksson G, Boonratana R, Marshall AJ, Lim NT-L, Augeri DM, Hon J, Mathai J, van Berkel T, Brodie J, Giordano A, Hall J, Loken B, Persey S, Macdonald DW, Belant JL, Kramer-Schadt S & Wilting A. 2016. Predicted distribution of the common palm civet *Paradoxurus hermaphroditus* (Mammalia: Carnivora: Viverridae) on Borneo. *Raffles Bulletin of Zoology* 33: 84–88.

- Samejima H & Robert O. 2012. Distribution of Mammals in Deramakot & Tangkulap Forest Reserves, Sabah, Malaysia. *Kyoto Working Papers on Area Studies: G-COE Series 127*: 1–55.
- Samejima H & Semiadi G. 2012. First record of Hose’s Civet *Diplogale hosei* from Indonesia, and records of other carnivores in the Schwaner mountains, Central Kalimantan, Indonesia. *Small Carnivore Conservation* 46: 1–7.
- Samejima H, Meijaard E, Duckworth JW, Yasuma S, Hearn AJ, Ross J, Mohamed A, Alfred R, Bernard H, Boonratana R, Pilgrim JD, Eaton J, Belant JL, Kramer-Schadt S & Wilting A. 2016. Predicted distribution of the Sunda Stink-badger *Mydaus javanensis* (Mammalia: Carnivora: Mephitidae) on Borneo. *Raffles Bulletin of Zoology* 3: 61–70.
- Semiadi G, Ross J, Hearn AJ, Macdonald DW, Mathai J, Augeri DM, Fredriksson G, Rustam Alfred R, Hall J, Heydon M, Brodie JF, Giordano A, Marshall AJ, Eaton AJ, Mohamed A, Samejima H, Belant JL, Kramer-Schadt S & Wilting A. 2016. Predicted distribution of the masked palm civet *Paguma larvata* (Mammalia: Carnivora: Viverridae) on Borneo. *Raffles Bulletin of Zoology* 33: 89–95.
- Wilting A, Samejima H & Mohamed A. 2010. Diversity of Bornean viverrids and other small carnivores in Deramakot Forest Reserve, Sabah, Malaysia. *Small Carnivore Conservation* 42: 10–13.
- Wilting A, Duckworth JW, Meijaard E, Ross J, Hearn A & Ario A. 2015. *Mydaus javanensis*. In The IUCN Red List of Threatened Species 2015. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on 30 June 2017.
- Yasuma S. 1995. *Animals of Kalimantan*. Nikkei-Science, Tokyo, Japan, (In Japanese).