

Records of Sunda Stink-badger *Mydaus javanensis* confirm the species' presence across Indonesian Borneo

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Abstract.

We confirm the continuous presence of Sunda Stink-badger *Mydaus javanensis* in Kalimantan (Indonesian Borneo) through photographic evidence and six other encounters of the species. Together with one additional sighting of the species in Indonesian Borneo reported in the literature, this indicates that the species still occurs in all of the five provinces of Kalimantan. The scarcity of records may indicate that the species is indeed rare in Indonesian Borneo or it may be underreported. We call for further field and interview surveys to better understand what is threatening the species' survival in both Indonesian and Malaysian Borneo.

Keywords: Asia, camera trapping, Carnivora, conservation, mammalogy, oil palm tropical forest.

A recent review of all readily traced distribution records of Sunda Stink-badger *Mydaus javanensis* on Borneo noted that records from West, Central, South and East Kalimantan (Indonesian Borneo), were mostly from the late 19th and early 20th centuries, with recent confirmed records in these areas very scarce or doubtful (Samejima *et al.* 2016). The records from Borneo were used to model habitat suitability across the island, with resulting spatial patterns indicating much higher habitat suitability in the north-eastern half of Borneo compared with the southern-western half. Samejima *et al.* (2016) noted, however, that the analyses may have been influenced by survey bias, with far fewer mammal surveys being conducted in the Indonesian part of Borneo than in the Malaysian part. Consultation for the current paper with various experienced Indonesian field surveyors indicates that, indeed, there appears to be a survey bias, with records from Indonesia existing, but not making it into the published literature. To inform understanding of the ecology and distribution of this species and threats to its survival, we here present seven new recent records of Sunda Stink-badger in Kalimantan.

First record. 15 March, 2018. Location: Protected forest adjacent to oil palm plantation area of PT. ALM, Ketapang District, West Kalimantan Province, Indonesia (1°49.798' S, 110°43.799' E). A Sunda Stink-badger was camera trapped (Figure 1) in a

Protected Forest area (*Hutan Lindung*) adjacent to a community garden. This area is a riparian border of the river. The image was captured as the animal walked past the camera at 01h58.



Figure 1. First photographic evidence of Sunda Stink Badger *Mydaus javanensis* in Kalimantan: protected forest adjacent to oil palm plantation area of PT. ALM, Ketapang District, West Kalimantan Province, Indonesia, 15 March, 2018 (Photo: Y. Santosa, 2018)).

Second record. 2016. Location: Sungai Joloy, Hutan Lindung Bukit Batikap, Murung Raya District, Central Kalimantan (0°49.800' S, 112°32.400' E). This is a remote area, dominated by lowland Dipterocarp forest. One Sunda Stink-badger was clearly observed by one of us (KO) from about 7 m distance, around 11h00 while following a rehabilitated Bornean Orangutan *Pongo pygmaeus* and its baby. The stink-badger was on top of a fallen, dead tree. It fled before a photo could be taken, leaving behind a strong smell.

Third record. 2008. Location: Orangutan Research Station Tuanan, Tumbang Mangkutup, Mantangai Subdistrict, Kapuas District, Central Kalimantan Province, Indonesia. Tuanan (2°5.400' S, 114°15.599' E) is located in the Mawas Reserve and the study area encloses approximately 7.5 km² of peat swamp forest, which has been subject to logging in the past. A Sunda Stink-badger was observed for about 2 minutes initially from a distance of about 2 m, when one of us (KO) was walking on a board walk at 05h00. The animal was seen underneath the board walk, but it was not possible to take a photograph. The

animal left a strong smell when it ultimately fled. At this time, the swamp area where the animal was encountered was dry. It was seen only once in this location over a period of 10 years of surveys. Local people in the area refer to the Sunda Stink-badger as the *Hantu Ribut* or “noisy ghost”.

Fourth record. August 2015. Location: Housing Complex Bukit Permata Indah, Sungai Ulin, Banjar Baru Subdistrict, Banjar Baru city, South Kalimantan Province, Indonesia (3°27.000' S, 114°52.200' E). The housing complex is on the eastern side of Banjar Baru city, in an area with mixed housing, agricultural fields and patches of remnant swamp forest. One of us (KO) saw a Sunda Stink-badger directly during a morning survey at 06h30. The animal was clearly seen on the ground, on an asphalt path in the housing complex from a distance of about 4 m. It could be approached to about 3 m after which it disappeared in a road-side ditch. In local language the animal is referred to as *Gubang* or *Sado*.

Fifth record. 2001. Location: Desa Tumbang Mangkutup, Mantangai Subdistrict, Kapuas District, Central Kalimantan Province, Indonesia (2°5.997' S, 114°18.000' E). Sunda Stink-badgers were reportedly seen quite frequently in early morning and late afternoon by two former logging operators (Mr Didi and Mr Samsi) in the area of the area of the Ulin, Upak and Kaliwang tributaries of the Mangkutup River. This is an area of now-degraded peat and fresh water swamp forest, but in 2001 the condition of these forests was according to the informants much better at the time. The Stink-badgers were seen on dry land adjacent to the swamp forests.

Sixth record. 9 August, 2017. Location: PT, ASMR-BGA oil palm plantation, Kumai Subdistrict, Kotawaringin Barat District, Central Kalimantan Province, Indonesia (2°46.798' S, 111°45.000' E). Two Sunda Stink-badgers were seen by an observation team (Giga, Windi, and Joni) in an oil palm plantation (five years old oil palm) from a distance of about 5 meters. The area is directly adjacent to the Kumai Seberang village in the west, a large oil palm plantation in the north, the Sekonyer River in the south, and a smallholder oil palm plantation in the east. The two animals were seen walking from one block to another at about 20h00. The encounter was very short and the animals were finally lost in the bushes, making it impossible to take a photograph. This animal has several local names: *Sigung*, *Teledung*, and *Goang*.

Seventh record. 2006. Location Hutan Wehea, Desa Nehes Liah Bing, Muara Wahau sub District, East Kutai District, East Kalimantan Province (1°34.799' N, 116°36.000' E). One Sunda Stink-badger was clearly observed by NA and a second observer (Purnomo) from about 10 m distance, around 09h15 while conducting an Bornean Orangutan population survey in Wehea forest. The stink-badger was on the ground. It fled before a photo could be taken, leaving behind a strong smell.

The seven new records and reports of Sunda Stink-badger from the Indonesian part of Borneo add to our understanding of the distribution of the species. Not all these reports can be accepted as incontrovertible records, as not all were accompanied by photographic or other evidence. Decades of field experience of the authors in Borneo's forests and experience in identifying mammal species, however, add significantly to the credibility of the records of this visually highly distinctive species. They thus confirm that Sunda Stink-badger still occurs in multiple well-spaced parts of Kalimantan, including in areas dominated by freshwater and peat swamp forests, and even in suburban areas – similar to where it is frequently seen in Sabah (Malaysian Borneo; Samejima *et al.* 2016). Our seven records are distributed across four of Kalimantan's five provinces, West, Central, South and East Kalimantan, while another recent sighting from North Kalimantan (Rustam & Giordano 2014) indicates that Sunda Stink-badger remains present in all of Kalimantan's provinces.

Five of our seven records were in areas that the habitat mapping by Samejima *et al.* (2016) considered low suitability (blue areas in Figure 2). Our new records from Kalimantan therefore suggest that further work is needed on mapping the distribution of the species and modelling habitat suitability. This was noted by Kramer-Schadt *et al.* (2016) who emphasised that despite the extensive efforts to compile existing information for Bornean carnivores, “so few or spatially biased occurrence records exist for some species that the model outcomes ... must be interpreted cautiously”. Spatial biases are often encountered in species distribution modelling and despite various attempts to overcome these biases (Kramer-Schadt *et al.* 2013), the current example indicates that any distribution models based on spatially unequal sampling need to be cautiously interpreted. Furthermore, in general the southern half of Borneo was under-represented for almost all Bornean carnivores modelled for such effort; such potential bias should be considered for cautiously using the resulting maps of such exercise.

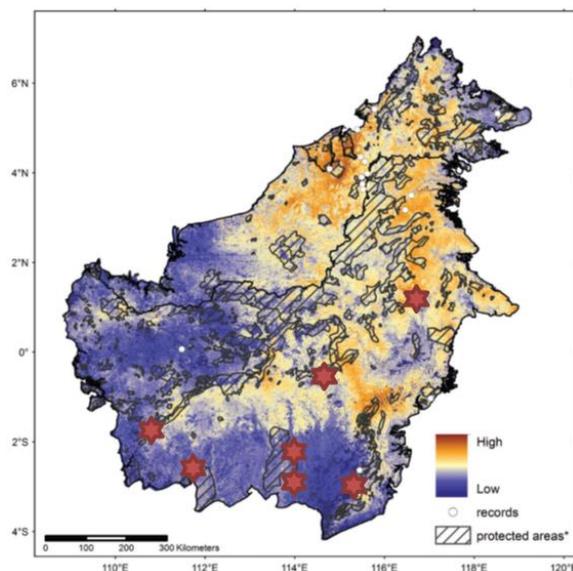


Figure 2. Habitat suitability map for Sunda Stink Badger *Mydaus javanensis* by Samejima *et al.* (2016), with the seven new records in red.

Despite recognition of sampling bias and potential underreporting of records from Kalimantan, the scarcity of records of Stink-badgers in Kalimantan appears to be real. It begs the question what causes this scarcity. Variation in habitat suitability may not well explain the scarce records, with the majority of new records coming from areas of apparent low ecological suitability. Anthropogenic factors (e.g., hunting for food) might play a role as suggested by Samejima *et al.* (2016), but without additional records and ethnobiological information it is hard to test this hypothesis. We therefore call for further surveys that could detect the species, specific requests to Indonesian biologists who spend much time in the field in Kalimantan about any records of the species, and ethnobiological surveys that establish what local people know about Sunda Stink-badger in Kalimantan.

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