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SMALL CAT SURVEYS: 10 YEARS OF DATA FROM CENTRAL KALIMANTAN, INDONESIAN BORNEO

Karen Anne Jeffers, Adul & Susan Mary Cheyne

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SMALL CAT SURVEYS: 10 YEARS OF DATA FROM CENTRAL KALIMANTAN, INDONESIAN BORNEO

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Abstract: We present an update on the photographic detections from camera traps and the activity patterns of Borneo's four small cats, namely, Sunda Leopard Cat *Prionailurus javanensis*, Flat-headed Cat *P. planiceps*, Marbled Cat *Pardofelis marmorata*, and Bay Cat *Catopuma badia*, at two sites in Central Kalimantan, Indonesia. Camera trap survey data of 10 years (2008–2018) from the first site in Sebangau provide details about the temporal partitioning of these small cats from each other but overlap with Sunda Clouded Leopard *Neofelis diardi*. The activity of Flat-headed Cat was higher after midnight and that of Leopard Cat at night with no clear preference before or after midnight. The Marbled Cat is predominantly diurnal, but the remaining three cats have flexible activity periods. While limited data are available from Rungan, the second site, we confirmed the presence of all four small cat species found on Borneo, though we have insufficient data to comment on the Bay Cat. The cat sightings, however, are intermittent and may reflect the unprotected status of this forest. Leopard Cats appear relatively unaffected by habitat disturbance based on encounter rates on camera traps. Conservationists, both NGOs and the government, must pay particular attention to specialists like Flat-headed Cats and Bay Cats when assessing habitat suitability for long-term cat conservation.

Keywords: Activity patterns, camera traps, *Catopuma badia*, diversity, felids, fire, peat-swamp forest, *Pardofelis marmorata*, *Prionailurus javanensis*, *Prionailurus planiceps*.

Bahasa Indonesia Abstract: Kami menyajikan pembaruan pada pendeteksian fotografi dari perangkat kamera dan pola aktivitas empat kucing kecil Borneo yaitu Kucing Kuwuk *Prionailurus bengalensis*, Kucing Batu *Pardofelis marmorata*, Kucing Tandang *Prionailurus planiceps* dan Kucing Merah Cat *Catopuma badia* di dua lokasi di Kalimantan Tengah, Indonesia. Data survei perangkat kamera 10 tahun (2008–2018) dari situs pertama di Sebangau memberikan rincian tentang partisi sementara kucing kecil ini dari satu sama lain tetapi tumpang tindih dengan Macan Dahan *Neofelis diardi*. Aktivitas kucing kepala datar lebih tinggi setelah tengah malam, dan Kucing Kuwuk di malam hari tanpa preferensi yang jelas sebelum atau setelah tengah malam. Kucing Batu didominasi diurnal, tetapi ketiga kucing memiliki periode aktivitas yang fleksibel. Sementara data terbatas tersedia dari situs kedua (Rungan), kami telah mengkonfirmasi keberadaan keempat spesies kucing kecil yang ditemukan di Borneo, meskipun kami tidak memiliki cukup data untuk mengomentari Kucing Merah. Namun, penampakan kucing berselang-seling dan mungkin mencerminkan status hutan yang tidak terlindung. Kucing Kuwuk kembali muncul relatif tidak terpengaruh oleh gangguan habitat berdasarkan pada tingkat pertemuan pada perangkat kamera. Konservasionis (LSM dan pemerintah) harus memberi perhatian khusus kepada spesialis misalnya Kucing Tandang dan Kucing Merah ketika menilai kecocokan habitat untuk konservasi kucing jangka panjang.

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INTRODUCTION

In the absence of Tiger *Panthera tigris*, Borneo's cats represent a fascinating guild, and all are in need of conservation attention. Five species occur on Borneo: the Sunda Clouded Leopard *Neofelis diardi* (Endangered (EN) on the IUCN Red List; Hearn et al. 2016c), the Bay Cat *Catopuma badia* (EN and endemic to Borneo; Hearn et al. 2016a), the Flat-headed Cat *Prionailurus planiceps* (EN; Wilting et al. 2016a), the Marbled Cat *Pardofelis marmorata* (Near Threatened; Ross et al. 2016a), and the Sunda Leopard Cat *Prionailurus javanensis* (Least Concern; Ross et al. 2016). They are all protected under Indonesian law (P.20/MENLHK/SETJEN/KUM.1/6/2018). As they are rare and elusive, it is difficult to study them in the wild. Thus, there is limited knowledge about their ecology despite increased scientific interest.

Since 2008, Borneo Nature Foundation (BNF) and University of Palangka Raya, Centre for the International Management of Tropical Peatlands (UPR-CIMTROP), have been conducting long-term monitoring of the Sunda Clouded Leopard *Neofelis diardi* in Indonesia and, specifically, *N. d. borneensis* in Central Kalimantan. During this time, we also opportunistically obtained images of three of the four small cats in the Sebangau catchment area. Given the disturbed mosaic nature of Sebangau, we also hope to determine which areas are unsuitable for small cats, either due to habitat changes and/or due to human disturbance. Live Leopard Cats are more common in Kalimantan markets for sale as pets than Sunda Clouded Leopards, and their skins are more often found in homes (Rabinowitz et al. 1987). Far less is known about small cat movements, habitat preferences, seasonal movements, breeding patterns, and effects of anthropogenic disturbance across their range. These data are particularly lacking from tropical peat-swamp forests. We present here updated information on temporal activity pattern of four small cats from the Central Kalimantan region of Indonesia.

STUDY AREAS

The Sebangau catchment, Central Kalimantan, Indonesia (Fig. 1), is a peat-swamp forest (mixed-swamp forest sub-type) covering an area of ~5,600km². This study took place in the 50km² research forest located in the northeast. The area was logged under a concession system between 1991 and 1997 followed by illegal logging between 1997 and 2004. The site is at an altitude of about 10m. The area was significantly affected by the forest fires that impacted Indonesia in 2015.

The second research site was established in 2016

in the Rungan Forest, which covers about 1,440km² between the Kahayan and Rungan rivers. The forest is a lowland forest mosaic comprising peat-swamp, 'kerangas' (heathland) and the dominant canopy trees are *Palaquium* sp. (nyatoh), *Syzygium* sp. (jambu) and *Shorea* (meranti), (Dipterocarpaceae family). BNF and the Wildlife Conservation Research Unit (WildCRU) of the University of Oxford initiated the Sebangau Felid Project in May 2008, and BNF initiated the Rungan work in 2016.

MATERIAL AND METHODS

Since 2008, a total of 210 camera locations were surveyed across both forest areas with an average of 30 units in each forest area at any one time. Between 2008 and 2012, cameras were set up in pairs in Sebangau and subsequently as single units. In the Rungan site, cameras were all set up as single units. Cameras were set in a stratified random survey design. Cameras were placed 500m to 1,000m apart and were in each location for a minimum of six months; some cameras were in the same location since May 2008. Locations were selected to cover a range of habitats and disturbances within the forests, avoiding streams and slopes wherever present. Camera traps were placed along established human-made trails (more than four years old) and, where possible, watering areas, to maximise the success rate of photographic captures. A combination of camera models were used, including Cuddeback Expert®, Cuddeback Capture IR® (Cuddeback Digital, Non-Typical Inc, WI, USA) Maginon, Crenova, and Bushnell. Cameras were checked every 40 days when batteries were changed and SD cards exchanged. Data were managed in a custom Microsoft Access database. Active behaviour times were calculated using the kernel density method ('href' bandwidth for kernel smoothing; Ridout & Linkie 2009; Meredith & Ridout 2016) to account for average dawn and dusk times in the sites, which are situated almost on the equator (for more information on the Sebangau study site, see Cheyne & Macdonald 2011; Cheyne et al. 2016b). Detection rate was estimated as number of detections/100 trap nights. Weather data were collected daily at each research site and fire data was obtained from the Indonesian Agency of Meteorology, Climatology, and Geophysics. A 30-min interval between photos of the same species was used to determine if photos were an independent event at the same location and date.



Figure 1. Study sites: circle - Sebangau; star - Rungan.

RESULTS

The number of camera trap (CT) stations at each site varied annually due to broken units (Table 1).

Detailed descriptions of CT locations are in Appendices 1 & 2, including descriptions of the microhabitats, number of trap nights, number of detections, and careful descriptions of the setup around the CT stations. CTs were placed in different habitats across the two sites (Table 2).

The small cats were recorded by 56 of 83 camera traps in Sebangau (67%) and by 16 of 37 camera traps in Rungan (43%) (Table 3).

All small cats in Sebangau were photographed in all main habitat types in the interior forest, <20m from the forest edge and in disturbed areas. All four small cats in Rungan were recorded in the interior forest; only the Flat-headed Cat was recorded near the lake.

Sebangau

Since the cameras were first placed in May 2008, we captured 157 independent images of Sunda Clouded Leopards (Image 1), but only 109 of Sunda Leopard Cats, 54 of Marbled Cats (Image 2), and 33 of Flat-headed Cats (Image 3). Compared to the average detection rates of small cats since the inception of the camera trap study

in 2008, there was a decline in the detections of Marbled Cats and Flat-headed Cats (Fig. 2). From 2014 to July 2018, there was an average of 3.9 independent Marbled Cat images/month (min=0, max=16). No Flat-headed Cats were recorded by camera traps between January 2014 and February 2018 (Fig. 2), which coincided with a significant fire event from September to November 2015.

Of the three small cat species, the Sunda Leopard Cat is predominantly nocturnal with no clear preference for time of night. Flat-headed Cats also showed nocturnal activity but with a slight preference for post-midnight hours. Marbled Cats are strongly diurnal. Interestingly, 65% of 115 nocturnal records (18.00–05.59 h) of Sunda Clouded Leopards were between 01.00h and 05.59h (Fig. 3), thus overlapping with the preferred active time for Flat-headed Cats.

Rungan

Three of the small cats were confirmed in Rungan in the first few months of the study but it took 12 months to confirm the presence of the Flat-headed Cat (Table 4).

Bay Cat

With over eight years of long-term camera trap surveying in the peat-swamp forest of the Sebangau

Table 1. Number of camera trap stations per year in the study site.

| Year | Sebangau | Rungan |
|------|----------|--------|
| 2008 | 40 | 0 |
| 2009 | 40 | 0 |
| 2010 | 40 | 0 |
| 2011 | 36 | 0 |
| 2012 | 34 | 0 |
| 2013 | 30 | 0 |
| 2014 | 25 | 0 |
| 2015 | 30 | 0 |
| 2016 | 30 | 36 |
| 2017 | 25 | 50 |
| 2018 | 28 | 30 |

Table 2. Number of camera trap (CT) locations at each site (NA - habitat type not present in the study site).

| Habitat type | Sebangau | Rungan |
|---------------------------|---------------|---------------|
| Burned area | 3 | NA |
| Kerangas/ heath | NA | 30 |
| Low interior forest | 1 | 4 |
| Mixed swamp forest | 74 | 3 |
| Tall interior forest | 5 | NA |
| Total CT locations | 83 | 37 |
| Total trap nights | 65,261 | 14,642 |

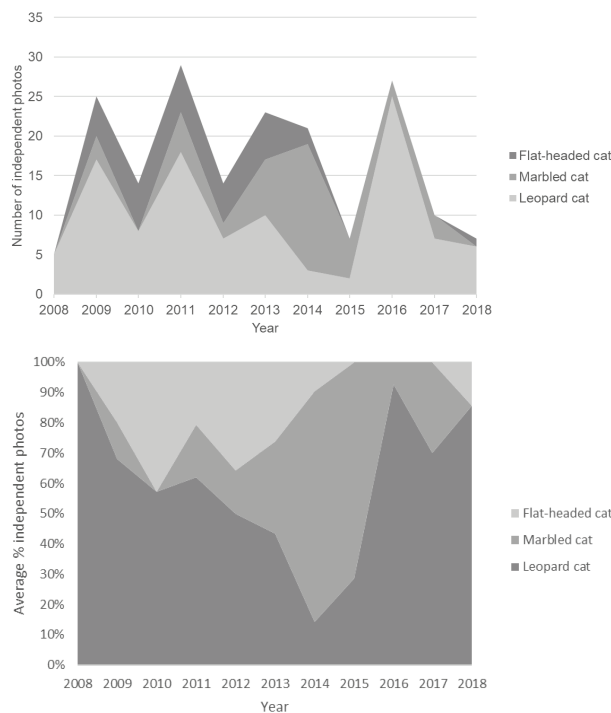


Figure 2. Mean detection of small wild cat species from the inception of the camera trap surveys in Sebangau since 2008.

catchment, the Bay Cat was not detected, and ongoing work suggests that it is not found in peat-swamp forests. The Bay Cat was confirmed in mosaic heath/ peat-swamp forest habitat for the first time (Sastramidjaja et al. 2015; Cheyne et al. 2016a, 2017). Through the use of camera traps, we present new location information on the distribution of Bay Cat in Kalimantan. This new location is approximately 64km southeast outside the range depicted by Hearn et al. (2016a). Our record of Borneo Bay Cat from the new habitat (heath/ peat-swamp forest) warrants further surveys in different habitat types to fully understand Bay Cat distribution and ecologic needs.

DISCUSSION

The small cats are appearing evenly across the habitat types in both Sebangau and Rungan, with the exception of the Bay Cat that likely does not exist in deep ombrogenous peat-swamp forest (Sebangau). Additionally, we have evidence of breeding in Flat-headed Cat and Marbled Cat in Sebangau (images of kittens) (Images 4 & 5).

Flat-headed Cats have a more irregular capture rate and though they are active throughout the day, more captures are obtained at night and therefore they are predominantly nocturnal. Leopard Cats have a more regular capture rate

Table 3. Camera trap (CT) locations with detections and non-detections of small cats with mean occupancy estimates (ψ) in the study sites. NA indicates occupancy cannot be calculated due to no small cats being photographed at these locations.

| | Sebangau | | Rungan | |
|-----------------|------------------------|--------|------------------------|--------|
| | Number of CT locations | ψ | Number of CT locations | ψ |
| Leopard Cat | 20 | 21.05 | 10 | 26.32 |
| Marbled Cat | 20 | 13.68 | 2 | 10.26 |
| Flat-headed Cat | 16 | 11.58 | 3 | 6.50 |
| Bay Cat | 0 | 0 | 1 | 1.28 |
| No small cats | 36 | NA | 23 | NA |



Image 1. Sunda Leopard Cat *Prionailurus javanensis* in Sebangau Forest, Central Kalimantan, Indonesian Borneo. © Borneo Nature Foundation, 28 July 2008.



Image 2. Marbled Cat *Pardofelis marmorata* in Sebangau Forest, Central Kalimantan, Indonesian Borneo. © Borneo Nature Foundation, 20 September 2013.



Image 3. Flat-headed Cat *Prionailurus planiceps* in Sebangau Forest, Central Kalimantan, Indonesian Borneo. © Borneo Nature Foundation, 22 February 2013.

Table 4. Capture rate of small cat species from the inception of the camera trap surveys in Rungan between June 2016 and May 2018.

| | Jun–Aug 2016 | Sep–Nov 2016 | Dec 2016–Feb 2017 | Mar–May 2017 | Jun–Aug 2017 | Sep–Nov 2017 | Dec 2017–Feb 2018 | Mar–May 2018 |
|-------------------|--------------|--------------|-------------------|--------------|--------------|--------------|-------------------|--------------|
| Flat-headed Cat | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Sunda Leopard Cat | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 |
| Marbled Cat | 1 | 4 | 0 | 0 | 1 | 0 | 0 | 0 |
| Bay Cat | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

and appear to be active both during the day and night, though they appear to avoid the hottest time of the day (11.00–13.00 h). Marbled Cats have a regular capture rate with the majority of images taken during the day (05.00–16.00 h), suggesting they are diurnal. There is only one image of a Bay Cat taken at 11.17h. These data are similar to those of Hearn et al. (2018), though these authors did not obtain sufficient images of Flat-headed Cats to make a detailed analysis.

Peat-swamp and associated lowland wetlands are postulated to be an important habitat for Flat-headed Cats (Cheyne et al. 2009; Wilting et al. 2010, 2016b; Cheyne & Macdonald 2011; Adul et al. 2015). Marbled Cats are not believed to frequent roads or plantations (Hearn et al. 2016c) and prefer intact forests, though data are lacking on this cat (Rustam et al. 2016).

Peat-swamp and associated lowland wetlands were

suggested to be poor or marginal habitat for Sunda Leopard Cat (Mohamed et al. 2016), but our work suggests that Sunda Leopard Cat are far more common (Cheyne & Macdonald 2011; Adul et al. 2015; Cheyne et al. 2016b).

The infrequent capture of the small cats in both sites is likely an artefact of the placing of the cameras (± 1 km apart) to focus on the wide-ranging Sunda Clouded Leopard. By moving the cameras closer (± 500 m) we hope to determine the population density for the small cats, determine if the Bay Cat is indeed absent from this forest, and to continue our monitoring of the Sunda Clouded Leopard population. The long period of time required to obtain images of small cats, possibly due to the placement of the cameras targeting Sunda Clouded Leopard, highlights the importance of long-term data and monitoring to avoid false-negative presence data. Sunda Leopard Cat is the most commonly recorded species in the

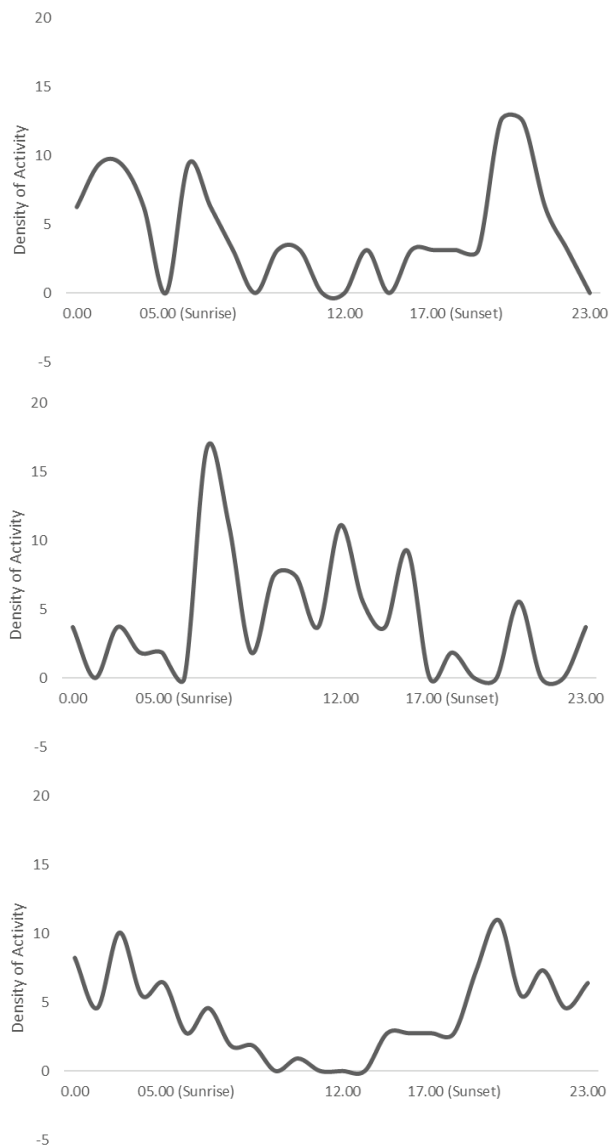


Figure 3. Kernel density estimates of activity patterns of species using alpha of 0.1 smoothing parameter: a - Flat-headed Cat; b - Marbled Cat; c - Sunda Leopard Cat.

study site. Marbled Cat is hard to study and, as many are arboreal, having cameras mainly on the forest floor means we could be missing out on key aspects of their behaviour. Flat-headed Cat is a wetland specialist and prefers forests with water (Wilting et al. 2010). Its diet likely consists of fish, frogs, and small mammals, and it may fill a niche on Borneo filled by the Fishing Cat *Prionailurus viverrinus* elsewhere in Asia (Iwaniuk et al. 2001). Due to this dependence on wetlands, we think that the devastating fires of 2015 may have severely impacted the Flat-headed Cat population, pushing it away from fire-affected areas. Our preliminary results suggest that Flat-headed Cats are returning to these areas, which BNF is actively working to

restore. These data could be an artefact of survey effort (a high number of broken cameras) or a genuine reflection of this species behaviour.

Large parts of the peat-swamp are naturally seasonally flooded for up to nine months per year. The flooded nature of Sebangau does not always prevent the animals using the ground; indeed we have evidence of male Orangutans *Pongo pygmaeus* wading through water (Ancrenaz et al. 2014). Keeping a selection of camera trap locations the same over several months or years allows for variations in detection to be accounted for; given the regular flooding of the forest, it is likely that the wildlife is accustomed to this. We do notice animals using our boardwalks more regularly in the wet season. Peatlands and associated forest fires are a crucial conservation concern in Kalimantan (Gaveau et al. 2016; Miettinen et al. 2017). This is especially true during dry years such as in 2015 when a strong El Niño event led to particularly dry conditions. From August to November of that year, MODIS satellites detected over 50,000 fire hotspots in Kalimantan, 53% of which were on peatland (Gaveau et al. 2016; Miettinen et al. 2017). Since 2006, 17.35% of forest in the core Sebangau research area burned down (9.63% in 2015 alone—5.3km² of 55km²). Of particular threat to the Flat-headed Cat are peat drainage and drying out due to logging canals, the loss of permanent water, and increased hydrologic instability (Page et al. 2009; Vanthomme et al. 2013).

Conservation impact

This work represents the first-ever comprehensive and long-term survey of small cats in Central Kalimantan. There is a severe lack of data on these species in non-protected or small forest areas that may also contain viable populations. It is crucial to remember that, while these surveys indicate the continued presence of these cats, habitat loss, wildlife trade, and likely presence of populations in non-protected areas means that more work is needed to understand the impacts of anthropogenic activities on these cats. As detailed in Appendix 1, this project provides extensive and detailed data about many wildlife species in Sebangau and Rungan forests in addition to the cats—an additional 7,959 images (2,765 videos) of 74 species. Of these, two are IUCN Red Listed as Critically Endangered, five as Endangered, 14 as Vulnerable, 12 as Near Threatened, and 41 as Least Concern.



Image 4. Flat-headed Cat *Prionailurus planiceps* kitten



Image 5. Marbled Cat *Pardofelis marmorata* and kitten

REFERENCES

- Adul, B. Ripoll, S.H. Limin & S.M. Cheyne (2015). Felids of Sebangau: camera trapping to estimate activity patterns and population abundance in Central Kalimantan, Indonesia. *Biodiversitas* 16(2): 151–155; <https://doi.org/10.13057/biodiv/d160208>
- Ancrenaz, M., R. Sollmann, E. Meijaard, A.J. Hearn, J. Ross, H. Samejima, B. Loken, S.M. Cheyne, D.J. Stark, P.C. Gardner, B. Goossens, A. Mohamed, T. Bohm, I. Matsuda, M. Nakabayasi, S.K. Lee, H. Bernard, J. Brodie, S. Wich, G. Fredriksson, G. Hanya, M.E. Harrison, T. Kanamori, P. Kretzschmar, D.W. Macdonald, P. Riger, S. Spehar, L.N. Ambu & A. Wilting (2014). Coming down from the trees: is terrestrial activity in Bornean orangutans natural or disturbance driven? *Scientific Reports* 4: 1–5.
- Cheyne, S.M., Adul, F. Veen, J.F. Van, B.R. Capilla, N. Boyd & S. Maimunah (2017). First record of the Bay Cat in mosaic heath/peat-swamp forest, Kalimantan, Indonesia. *Cat News* 65: 48.
- Cheyne, S.M. & D.W. Macdonald (2011). Wild felid diversity and activity patterns in Sabangau peat-swamp forest, Indonesian Borneo. *Oryx* 45(1): 119–124.
- Cheyne, S.M., S. Maimunah & F. van Veen (2016a). Camera traps reveal wonders in Ironwood Forests. *Peatlands International* 3: 14–15.
- Cheyne, S.M., H. Morrogh-Bernard & D.W. Macdonald (2009). First Flat-headed Cat from Sabangau peat-swamp forest, Indonesian Borneo. *Cat News* 51: 18.
- Cheyne, S.M., W.J. Sastramidjaja, Muhahir, Y. Rayadin & D.W. Macdonald (2016b). Mammalian communities as indicators of disturbance across Indonesian Borneo. *Global Ecology and Conservation* 7: 157–173; <https://doi.org/10.1016/j.gecco.2016.06.002>
- Gaveau, D.L.A., D. Sheil, Husnayaen, M.A. Salim, S. Arjasakusuma, M. Ancrenaz, P. Pacheco & E. Meijaard (2016). Rapid conversions and avoided deforestation: examining four decades of industrial plantation expansion in Borneo. *Scientific Reports* 6: 32017.
- Hearn, A., J. Brodie, S. Cheyne, B. Loken, J. Ross & A. Wilting (2016a). *Catopuma badia*. In: The IUCN Red List of Threatened Species: e.T4037A112910221. Accessed on 14 October 2018. <https://doi.org/10.2305/IUCN.UK.2016-1.RLTS.T4037A50650716.en>
- Hearn, A.J., S.A. Cushman, J. Ross, B. Goossens, L.T.B. Hunter & D.W. Macdonald (2018). Spatio-temporal ecology of sympatric felids on Borneo. Evidence for resource partitioning? *PLoS One* 13(7): e0200828.
- Hearn, A.J., J. Ross, H. Bernard, S.A. Bakar, L.T.B. Hunter & D.W. Macdonald (2016b). The first estimates of Marbled Cat *Pardofelis marmorata* population density from Bornean primary and selectively logged forest. *PLoS One* 11(3): e0151046.
- Hearn, A., J. Ross, J. Brodie, S. Cheyne, I.A. Haidir, B. Loken, J. Mathai, A. Wilting & J. McCarthy (2016c). *Neofelis diardi*. In: The IUCN Red List of Threatened Species: e.T136603A97212874. Accessed on 14 October 2018. <https://doi.org/10.2305/IUCN.UK.2015-4.RLTS.T136603A50664601.en>
- Iwaniuk, A.N., W.G. Blankstein & I.Q. Whishaw (2001). Observations of the feeding behaviour of Fishing Cats (*Prionailurus viverrinus*). *Mammalia* 65(1): 89–91.
- Meredith, M. & M. Ridout (2016). Overview of the overlap package. In: R Development Core Team, R Package. 3.3.1. Edition. R Foundation for Statistical Computing, Vienna, Austria; <https://cran.r-project.org/web/packages/overlap/vignettes/overlap.pdf>
- Miettinen, J., C. Shi & S. Liew (2017). Fire distribution in peninsular Malaysia, Sumatra and Borneo in 2015 with special emphasis on peatland fires. *Environmental Management* 60(4): 747–757.
- Mohamed, A., J. Ross, A.J. Hearn, S.M. Cheyne, R. Alfred, H. Bernard, R. Boonratana, H. Samejima, M. Heydon, D.M. Augeri, J.F. Brodie, A. Giordano, G. Fredriksson, J. Hall, B. Loken, Y. Nakashima, J.D. Pilgrim, Rustam, G. Semiadi, T. van Berkel, J. Hon, N.T.L. Lim, A.J. Marshall, J. Mathai, D.W. Macdonald, C. Breitenmoser-Würsten, S. Kramer-Schadt & A. Wilting (2016). Predicted distribution of the Leopard Cat *Prionailurus bengalensis* (Mammalia: Carnivora: Felidae) on Borneo. *Raffles Bulletin of Zoology, Supplement* 33: 180–185.
- Page, S., A. Hoscilo, H. Wosten, J. Jauhainen, M. Silvius, J. Rieley, H. Ritzema, K. Tansey, L. Graham, H. Vasander & S. Limin (2009). Restoration ecology of lowland tropical peatlands in southeast Asia: current knowledge and future research directions. *Ecosystems* 12(6): 888–905.
- Rabinowitz, A., P. Andau & P.P.K. Chai (1987). The Clouded Leopard in Malaysian Borneo. *Oryx* 21: 107–111.
- Ridout, M. & M. Linkie (2009). Estimating overlap of daily activity patterns from camera trap data. *Journal of Agricultural, Biological, and Environmental Statistics* 14(3): 322–337.
- Ross, J., J. Brodie, S. Cheyne, A. Datta, A. Hearn, B. Loken, A. Lynam, J. McCarthy, C. Phan, A. Rasphone, P. Singh & A. Wilting (2016a). *Pardofelis marmorata*. In: The IUCN Red List of Threatened Species: e.T16218A97164299. Accessed on 14 October 2018. <https://doi.org/10.2305/IUCN.UK.2016-1.RLTS.T16218A97164299.en>
- Ross, J., J. Brodie, S. Cheyne, A. Hearn, M. Izawa, B. Loken, A. Lynam, J. McCarthy, S. Mukherjee, C. Phan, A. Rasphone & A. Wilting (2016b). *Prionailurus bengalensis*. In: The IUCN Red List of Threatened Species: e.T18146A50661611. Accessed on 14 October 2018. <https://doi.org/10.2305/IUCN.UK.2015-4.RLTS.T18146A50661611.en>
- Rustam, R., A.J. Hearn, J. Ross, R. Alfred, H. Samejima, M. Heydon, S.M. Cheyne, J.F. Brodie, A.J. Giordano, H. Bernard, R. Boonratana, B. Loken, A. Mohamed, M.-A. Jayasilan, D.M. Augeri, J. Eaton, J. Hon, A.J. Marshall, J. Mathai, G. Semiadi, D.W. Macdonald, C. Breitenmoser-Würsten, S. Kramer-Schadt & A. Wilting (2016). Predicted distribution of the Marbled Cat *Pardofelis marmorata* (Mammalia: Carnivora: Felidae) on Borneo. *Raffles Bulletin of Zoology, Supplement* 33: 157–164.
- Sastramidjaja, W.J., S.M. Cheyne, B. Loken & D.W. Macdonald (2015). The Bay Cat in Kalimantan, new information from recent sightings. *Cat News* 62: 10–12.
- Vanthomme, H., J. Kolowski, L. Korte & A. Alonso (2013). Distribution of a community of mammals in relation to roads and other human disturbances in Gabon, central Africa. *Conservation Biology* 27(2): 281–291.
- Wilting, A., J. Brodie, S. Cheyne, A. Hearn, A. Lynam, J. Mathai, J. McCarthy, E. Meijaard, A. Mohamed, J. Ross, S. Sunarto & C. Traeholt (2016a). *Prionailurus planiceps*. In: The IUCN Red List of Threatened Species: e.T18148A50662095. Accessed on 14 October 2018. <https://doi.org/10.2305/IUCN.UK.2015-2.RLTS.T18148A50662095.en>
- Wilting, A., S.M. Cheyne, A. Mohamed, A.J. Hearn, J. Ross, H. Samejima, B. Boonratana, A.J. Marshall, J.F. Brodie, A. Giordano, J.A. Eaton, J. Hall, J.D. Pilgrim, M. Heydon, G. Semiadi, E. Meijaard, D.W. Macdonald, C. Breitenmoser-Würsten & S. Kramer-Schadt (2016b). Predicted distribution of the Flat-headed Cat *Prionailurus planiceps* (Mammalia: Carnivora: Felidae) on Borneo. *Raffles Bulletin of Zoology, Supplement* 33: 173–179.
- Wilting, A., A. Cord, A.J. Hearn, D. Hesse, A. Mohamed, C. Traeholdt, S.M. Cheyne, S. Sunarto, M.-A. Jayasilan, J. Ross, A.C. Shapiro, S. Dech, C. Breitenmoser, J.W. Duckworth, J. Sanderson & J. Hofer (2010). Modelling the species distribution of Flat-Headed Cats (*Prionailurus planiceps*), an Endangered south-east Asian small felid. *PLoS One* 5(3): e9612.

Appendix 1. Summary of camera trap (CT) locations in Sebangau, Central Kalimantan Indonesian Borneo. LC - Leopard Cat, MC - Marbled Cat, FHC - Flat-headed Cat.

| No. of CT days | Location of camera | Habitat class | Additional habitat information | Altitude (m) | LC | MC | FhC |
|----------------|------------------------|--------------------|--------------------------------|--------------|----|----|-----|
| 372 | T 1.3E x TY 2015 | Burned area | Interior forest | 16–20 | X | | |
| 375 | T 1B East 975m 2015 | Burned area | Forest edge (<20m) | 16–20 | | X | |
| 180 | T SC East x TY 2015 | Burned area | Forest edge (<20m) | 16–20 | X | | |
| 1475 | JE1 | Mixed swamp forest | Forest edge (<20m) | 16–20 | | | X |
| 2399 | Km2 x Railway | Mixed swamp forest | Interior forest | 16–20 | | | |
| 2399 | Km3 x Railway | Mixed swamp forest | Interior forest | 16–20 | X | | |
| 2399 | Km4 x Railway | Mixed swamp forest | Interior forest | 16–20 | X | | |
| 2447 | Old Railway 400m | Mixed swamp forest | Disturbed logging railway | 16–20 | | X | X |
| 241 | Old Railway x T2E | Mixed swamp forest | Disturbed logging railway | 16–20 | | | |
| 724 | Old Railway x TX | Mixed swamp forest | Disturbed logging railway | 16–20 | | X | |
| 849 | OR x T0.8E 2013 | Mixed swamp forest | Disturbed logging railway | 16–20 | | | |
| 346 | OR1150m | Mixed swamp forest | Disturbed logging railway | 16–20 | | | |
| 382 | Ottercam T1B Canal | Mixed swamp forest | Interior forest | 16–20 | | | |
| 375 | P.Jelutung x TD 2015 | Mixed swamp forest | Interior forest | 16–20 | | X | X |
| 52 | Railway 1450m | Mixed swamp forest | Disturbed logging railway | 16–20 | | | |
| 835 | Secret Transect | Mixed swamp forest | Forest edge (<20m) | 16–20 | | X | |
| 262 | T 0.4 East End 2015 | Mixed swamp forest | Interior forest | 16–20 | | X | |
| 740 | T 0.4 X TD 2015 | Mixed swamp forest | Interior forest | 16–20 | X | | |
| 374 | T 0.8 x TB 2015 | Mixed swamp forest | Interior forest | 16–20 | X | X | |
| 465 | T 0.8 x TE 2015 | Mixed swamp forest | Interior forest | 16–20 | X | | X |
| 372 | T 0.8E x ORW 2015 | Mixed swamp forest | Interior forest | 16–20 | | | |
| 2395 | T 1.6 x P.owa-owa 2015 | Mixed swamp forest | Interior forest | 16–20 | | X | X |
| 436 | T 1.6 x T E | Mixed swamp forest | Interior forest | 16–20 | | X | |
| 372 | T 1.6E x TW 2015 | Mixed swamp forest | Interior forest | 16–20 | | X | |
| 375 | T 16 x TB 2015 | Mixed swamp forest | Interior forest | 16–20 | | | |
| 375 | T 1A x Railway 2015 | Mixed swamp forest | Disturbed logging railway | 16–20 | | | |
| 375 | T 2 700m 2015 | Mixed swamp forest | Interior forest | 16–20 | | X | |
| 375 | T 2 x TE 2015 | Mixed swamp forest | Interior forest | 16–20 | | | |
| 372 | T 2E x ORW 2015 | Mixed swamp forest | Disturbed logging railway | 16–20 | | | X |
| 372 | T 2E x TX 2015 | Mixed swamp forest | Interior forest | 16–20 | | | |
| 649 | T 2km 700m | Mixed swamp forest | Interior forest | 16–20 | | | |
| 2450 | T CC 25m di atas pohon | Mixed swamp forest | Canopy 10m | 10 | X | | |
| 802 | T DD 400m | Mixed swamp forest | Forest edge (<20m) | 16–20 | X | | |
| 248 | T FF 125m 2015 | Mixed swamp forest | Forest edge (<20m) | 16–20 | X | | X |
| 261 | T SC 1412m 2015 | Mixed swamp forest | Forest edge (<20m) | 16–20 | | | |
| 64 | T SC 530m 2016 | Mixed swamp forest | Forest edge (<20m) | 16–20 | | | |
| 965 | T SC 610m 2015 | Mixed swamp forest | Forest edge (<20m) | 16–20 | | | X |
| 841 | T SC East 275m | Mixed swamp forest | Forest edge (<20m) | 16–20 | | X | |
| 935 | T SC East 275m 2015 | Mixed swamp forest | Forest edge (<20m) | 16–20 | | | X |
| 843 | T.Secret 1412m | Mixed swamp forest | Forest edge (<20m) | 16–20 | | X | |
| 880 | T.Secret 610m | Mixed swamp forest | Forest edge (<20m) | 16–20 | | X | |
| 566 | T0 950m di atas pohon | Mixed swamp forest | Canopy 10m | 10 | | X | |
| 436 | T0 x T F | Mixed swamp forest | Interior forest | 16–20 | | X | |

| No. of CT days | Location of camera | Habitat class | Additional habitat information | Altitude (m) | LC | MC | FhC |
|----------------|-------------------------|----------------------|--------------------------------|--------------|----|----|-----|
| 2154 | T0 x TC | Mixed swamp forest | Interior forest | 16–20 | | | X |
| 907 | T0 x TC 2013 | Mixed swamp forest | Interior forest | 16–20 | X | | |
| 907 | T0 x TG 2013 | Mixed swamp forest | Interior forest | 16–20 | | | X |
| 437 | T0 x TH | Mixed swamp forest | Interior forest | 16–20 | | | X |
| 379 | T0.4E END | Mixed swamp forest | Interior forest | 16–20 | | | |
| 904 | T0.8 x TG 2013 | Mixed swamp forest | Interior forest | 16–20 | | | X |
| 427 | T0.8 x THH | Mixed swamp forest | Interior forest | 16–20 | X | | |
| 2154 | T0.8E x TX | Mixed swamp forest | Interior forest | 16–20 | | | |
| 616 | T0.8E x TY | Mixed swamp forest | Interior forest | 16–20 | | | |
| 841 | T1.3E x TY 2013 | Mixed swamp forest | Interior forest | 16–20 | | X | |
| 55 | T1.6 375m | Mixed swamp forest | Interior forest | 16–20 | X | | |
| 2395 | T1.6 x Pondok Owa-Owa | Mixed swamp forest | Interior forest | 16–20 | | X | X |
| 2395 | T1.6 x Railway | Mixed swamp forest | Interior forest | 16–20 | | | |
| 881 | T1.6 x TC 2013 | Mixed swamp forest | Interior forest | 16–20 | | | |
| 435 | T1.6E x TZ | Mixed swamp forest | Interior forest | 16–20 | | X | |
| 2395 | T1A x Railway | Mixed swamp forest | Interior forest | 16–20 | X | | |
| 436 | T1A x TD | Mixed swamp forest | Interior forest | 16–20 | | | |
| 83 | T1B x Railway | Mixed swamp forest | Interior forest | 16–20 | | | |
| 649 | T2 700m 2013 | Mixed swamp forest | Interior forest | 16–20 | | | |
| 5 | T2 x TA | Mixed swamp forest | Interior forest | 16–20 | | | |
| 2446 | T2 x TB | Mixed swamp forest | Interior forest | 16–20 | | | |
| 699 | T2 x TD | Mixed swamp forest | Interior forest | 16–20 | X | | |
| 62 | T2 x THH | Mixed swamp forest | Interior forest | 16–20 | | | |
| 905 | T2E x OR 2013 | Mixed swamp forest | Interior forest | 16–20 | | | |
| 435 | T2E x TY | Mixed swamp forest | Interior forest | 16–20 | | | |
| 2450 | TD x Jelutong Pondok | Mixed swamp forest | Interior forest | 16–20 | | X | X |
| 1007 | Tower Path | Mixed swamp forest | Interior forest | 16–20 | X | | |
| 260 | TREE Railway 1350m 2015 | Mixed swamp forest | Canopy 10m | 10 | | | |
| 258 | TREE T 0.8 412m 2015 | Mixed swamp forest | Canopy 10m | 10 | | | |
| 116 | TREE T 0.8E x TX 2015 | Mixed swamp forest | Canopy 10m | 10 | | | |
| 247 | TREE T 1B 350m 2016 | Mixed swamp forest | Canopy 10m | 10 | X | | |
| 257 | TREE T SC 685m 2015 | Mixed swamp forest | Canopy 10m | 10 | | | |
| 81 | TS x TBB 525m | Mixed swamp forest | Forest edge (<20m) | 16–20 | X | | |
| 81 | TS x TCC | Mixed swamp forest | Forest edge (<20m) | 16–20 | | | |
| 131 | TP 0 650m | Tall interior forest | Interior forest | 16–20 | X | | X |
| 131 | TP 1 1200m | Tall interior forest | Interior forest | 16–20 | | | |
| 130 | TP A 800m | Tall interior forest | Interior forest | 16–20 | | | |
| 130 | TP A x TP 1 | Tall interior forest | Interior forest | 16–20 | | | |
| 131 | TP B 1700m | Tall interior forest | Interior forest | 16–20 | | | |
| 2399 | Km5 x Railway | Low interior forest | Interior forest | 16–20 | X | | |

Appendix 2. Summary of camera trap (CT) locations in Rungan, Central Kalimantan Indonesian Borneo. LC - Leopard Cat, MC - Marbled Cat, FHC - Flat-headed Cat.

| No. of CT days | Location of camera | Habitat class | Additional habitat information | Altitude (m) | LC | MC | FhC | BC |
|----------------|--------------------------------|---------------------|--------------------------------|--------------|----|----|-----|----|
| 107 | Mungku Baru Cam 13 Frank | Kerangas/ heath | Interior forest | 50 | X | | | |
| 107 | Mungku Baru Cam 15 Frank | Kerangas/ heath | Interior forest | 50 | | | | |
| 107 | Mungku Baru Cam 16 Frank | Kerangas/ heath | Interior forest | 50 | X | | | |
| 106 | Mungku Baru Cam 18 Frank | Kerangas/ heath | Interior forest | 50 | | | | |
| 106 | Mungku Baru Cam 19 Frank | Kerangas/ heath | Interior forest | 50 | | | | |
| 682 | Mungku Baru Cam 2 Frank | Kerangas/ heath | Interior forest | 50 | | | | |
| 316 | Mungku Baru Cam 3 Frank | Kerangas/ heath | Interior forest | 50 | X | | | |
| 274 | Mungku Baru Cam 4 Frank | Kerangas/ heath | Interior forest | 50 | | | | |
| 682 | Mungku Baru Cam 5 Frank | Kerangas/ heath | Interior forest | 50 | X | X | | |
| 682 | Mungku Baru Cam 6 Frank | Kerangas/ heath | Interior forest | 50 | | | | |
| 64 | Mungku Baru Cam 7 Frank | Kerangas/ heath | Interior forest | 50 | X | | | |
| 63 | Mungku Baru Cam 8 Frank | Kerangas/ heath | Interior forest | 50 | | | | |
| 63 | Mungku Baru Cam 9 Frank | Kerangas/ heath | Interior forest | 50 | | | X | |
| 661 | Mungku Baru CAM BNF 1+2 | Kerangas/ heath | Interior forest | 50 | X | | | |
| 661 | Mungku Baru CAM BNF 11+12 | Kerangas/ heath | Interior forest | 50 | X | | | |
| 661 | Mungku Baru CAM BNF 13+14 | Kerangas/ heath | Interior forest | 50 | X | | | X |
| 660 | Mungku Baru CAM BNF 17+18 | Kerangas/ heath | Interior forest | 50 | X | | | |
| 660 | Mungku Baru CAM BNF 19+20 | Kerangas/ heath | Interior forest | 50 | | | | |
| 659 | Mungku Baru CAM BNF 21+22 | Kerangas/ heath | Interior forest | 50 | | | | |
| 659 | Mungku Baru CAM BNF 23+24 | Kerangas/ heath | Interior forest | 50 | | | | |
| 660 | Mungku Baru CAM BNF 25+26 | Kerangas/ heath | Interior forest | 50 | | | | |
| 497 | Mungku Baru CAM BNF 27+28 | Kerangas/ heath | Interior forest | 50 | | | | |
| 660 | Mungku Baru CAM BNF 29+30 | Kerangas/ heath | Interior forest | 50 | | | X | |
| 498 | Mungku Baru CAM BNF 3+4 | Kerangas/ heath | Interior forest | 50 | | | | |
| 660 | Mungku Baru CAM BNF 31+32 | Kerangas/ heath | Interior forest | 50 | | | | |
| 660 | Mungku Baru CAM BNF 33 TREE | Kerangas/ heath | 12m in canopy | 70 | | | | |
| 355 | Mungku Baru CAM BNF 34 TREE | Kerangas/ heath | 10m in canopy | 70 | | | | |
| 296 | Mungku Baru CAM BNF 5+6 | Kerangas/ heath | Interior forest | 70 | | X | | |
| 498 | Mungku Baru CAM BNF 7+8 | Kerangas/ heath | Interior forest | 70 | X | | | |
| 62 | Mungku Baru Cam 1 Frank | Kerangas/ heath | Interior forest | 70 | | | | |
| 63 | Mungku Baru Cam 10 Frank | Low interior forest | Interior forest | 70 | | | | |
| 109 | Mungku Baru Cam 11 Frank | Low interior forest | Interior forest | 70 | | | | |
| 109 | Mungku Baru Cam 12 Frank | Low interior forest | Interior forest | 70 | | | | |
| 107 | Mungku Baru Cam 17 Frank | Low interior forest | Interior forest | 70 | | | | |
| 107 | Mungku Baru Cam 14 Frank | Mixed swamp forest | Interior forest | 70 | | | | |
| 660 | Mungku Baru CAM BNF 15+16 | Mixed swamp forest | Interior forest | 70 | | | | |
| 661 | Mungku Baru CAM BNF 9+10 Danau | Mixed swamp forest | Edge of a lake | 40 | | | X | |

Appendix 3. Scientific, common, and Indonesian names and IUCN Red List status of species from Central Kalimantan, Indonesian Borneo.

| Scientific name | Common name | Local name | Recent IUCN status |
|-----------------------------------|------------------------------|-----------------------------|-----------------------|
| <i>Pongo pygmaeus</i> | Bornean Orangutan | Kahiu | Critically Endangered |
| <i>Manis javanica</i> | Sunda Pangolin | Trenggiling, Peusing | Critically Endangered |
| <i>Prionailurus planiceps</i> | Flat-headed Cat | Kucing dampak | Endangered |
| <i>Cynogale bennettii</i> | Otter Civet | Musang air | Endangered |
| <i>Catopuma badia</i> | Bay Cat | Kucing merah | Endangered |
| <i>Hylobates albibarbis</i> | Bornean White-bearded Gibbon | Kalaweit/ Owa-owa | Endangered |
| <i>Ciconia stormi</i> | Storm's Stork | Unknown | Endangered |
| <i>Neofelis diardi</i> | Sunda Clouded Leopard | Macan dahan/ Harimau dahan | Vulnerable |
| <i>Lophura erythrophthalma</i> | Malay Crestless Fireback | Manok himba | Vulnerable |
| <i>Helarctos malayanus</i> | Sun Bear | Beruang | Vulnerable |
| <i>Arctictis binturong</i> | Binturong | Binturong | Vulnerable |
| <i>Aonyx cinerea</i> | Asian Small-clawed Otter | Unknown | Vulnerable |
| <i>Sus barbatus</i> | Bearded Pig | Babi hutan | Vulnerable |
| <i>Cervus unicolor</i> | Sambar | Rusa | Vulnerable |
| <i>Presbytis rubicunda</i> | Red langur | Kelasi/ Lutung merah | Vulnerable |
| <i>Macaca nemestrina</i> | Pig-tailed Macaque | Beruk | Vulnerable |
| <i>Tarsius bancanus borneanus</i> | Horsfield's Tarsier | Inkir/ Binatang hantu | Vulnerable |
| <i>Petinomys setosus</i> | Temminck's Flying Squirrel | Unknown | Vulnerable |
| <i>Mulleripicus pulverulentus</i> | Great Slaty Woodpecker | Balatak | Vulnerable |
| <i>Setornis criniger</i> | Hook-billed Bulbul | Unknown | Vulnerable |
| <i>Melanoperdix niger</i> | Black Partridge | Unknown | Vulnerable |
| <i>Pardofelis marmorata</i> | Marbled Cat | Kuwuk | Near Threatened |
| <i>Hemigalus derbyanus</i> | Banded Civet | Musang | Near Threatened |
| <i>Herpestes semitorquatus</i> | Collared Mongoose | Unknown | Near Threatened |
| <i>H. brachyurus</i> | Short-tailed Mongoose | Unknown | Near Threatened |
| <i>Muntiacus atherodes</i> | Bornean Yellow Muntjac | Kijang/ Kidang, Muncak | Near Threatened |
| <i>Anthracoceros malayanus</i> | Black Hornbill | Tingang/ Enggang | Near Threatened |
| <i>Carpococcyx radiatus</i> | Bornean Ground-cuckoo | Unknown | Near Threatened |
| <i>Strix leptogrammica</i> | Brown Wood-owl | Unknown | Near Threatened |
| <i>Lophura ignita</i> | Bornean Crested Fireback | Unknown | Near Threatened |
| <i>Harpactes diardi</i> | Diard's Trogon | Unknown | Near Threatened |
| <i>Trichixos pyrropygus</i> | Rufous-tailed Shama | Unknown | Near Threatened |
| <i>Trichastoma rostratum</i> | White-chested Babbler | Unknown | Near Threatened |
| <i>Prionailurus javanensis</i> | Leopard Cat | Kucing hutan, Meong congkok | Least Concern |
| <i>Trichys fasciculata</i> | Long-tailed Porcupine | Landak | Least Concern |
| <i>Hystrix brachyura</i> | Malayan Porcupine | Landak | Least Concern |
| <i>Prionodon linsang</i> | Banded Linsang | Musang congkok | Least Concern |
| <i>Paradoxurus hermaphroditus</i> | Common Palm Civet | Unknown | Least Concern |
| <i>Viverra zangalunga</i> | Malay Civet | Unknown | Least Concern |
| <i>Arctogalidia trivirgata</i> | Small-toothed Palm Civet | Civet | Least Concern |
| <i>Martes flavigula</i> | Yellow-throated Marten | Unknown | Least Concern |
| <i>Mustela nudipes</i> | Malay Weasel | Unknown | Least Concern |
| <i>Muntiacus muntjak</i> | Southern Red Muntjac | Unknown | Least Concern |
| <i>Macaca fascicularis</i> | Long-tailed Macaque | Monyet ekor panjang (Kra) | Least Concern |

| Scientific name | Common name | Local name | Recent IUCN status |
|------------------------------------|----------------------------|------------|--------------------|
| <i>Nannosciurus melanotis</i> | Black-eared Squirrel | Hantitik | Least Concern |
| <i>Sundasciurus lowii</i> | Low's Squirrel | Unknown | Least Concern |
| <i>Echinosorex gymnura</i> | Moonrat | Unknown | Least Concern |
| <i>Ptilocercus Lowii</i> | Pen-tailed Treeshrew | Unknown | Least Concern |
| <i>Callosciurus notatus</i> | Plantain Squirrel | Unknown | Least Concern |
| <i>C. prevostii</i> | Prevost's Squirrel | Unknown | Least Concern |
| <i>Maxomys surifer</i> | Indomalayan Maxomys | Unknown | Least Concern |
| <i>Tupaia glis</i> | Common Treeshrew | Tupai | Least Concern |
| <i>T. splendidula</i> | Ruddy Treeshrew | Tupai | Least Concern |
| <i>T. picta</i> | Painted Treeshrew | Tupai | Least Concern |
| <i>T. tana</i> | Large Treeshrew | Tupai | Least Concern |
| <i>T. gracilis</i> | Slender Treeshrew | Tupai | Least Concern |
| <i>T. minor</i> | Lesser Treeshrew | Tupai | Least Concern |
| <i>Exilisciurus whiteheadi</i> | Tufted Pygmy Squirrel | Hantitik | Least Concern |
| <i>Pellorneum capistratum</i> | Black-capped Babbler | Unknown | Least Concern |
| <i>Pitta moluccensis</i> | Blue-winged Pitta | Unknown | Least Concern |
| <i>Ketupa ketupu</i> | Buffy Fish-owl | Unknown | Least Concern |
| <i>Stachyris erythroptera</i> | Chestnut-winged Babbler | Unknown | Least Concern |
| <i>Phaenicophaeus curvirostris</i> | Chestnut-breasted Malkoha | Unknown | Least Concern |
| <i>Centropus bengalensis</i> | Lesser Coucal | Unknown | Least Concern |
| <i>Accipiter trivirgatus</i> | Crested Goshawk | Unknown | Least Concern |
| <i>Spilornis cheela</i> | Crested Serpent-eagle | Unknown | Least Concern |
| <i>Rhipidura javanica</i> | Pied Fantail | Unknown | Least Concern |
| <i>Caprimulgus affinis</i> | Savanna Nightjar | Unknown | Least Concern |
| <i>Pelargopsis capensis</i> | Stork-billed Kingfisher | Bakaka | Least Concern |
| <i>Sitta frontalis</i> | Velvet-fronted Nuthatch | Unknown | Least Concern |
| <i>Amaurornis phoenicurus</i> | White-breasted Waterhen | Baburak | Least Concern |
| <i>Copsychus malabaricus</i> | White-rumped Shama | Murai | Least Concern |
| <i>Spizaetus melanoleucus</i> | Black-and-white Hawk-eagle | Antang | Least Concern |
| <i>Varanus salvator</i> | Common Water Monitor | Biawak | Least Concern |

Author details: Karen Jeffers is the Sebangau Research Project Manager of the Borneo Nature Foundation. She has over 10 years' experience in Indonesia studying biodiversity, policy and has been researching small felids in Sebangau for some years, providing unique insights into their behaviour. Mr. Adul is the Senior Camera Trap Coordinator for BNF. Adul has worked with the camera trap project since its inception and has travelled to several other conservation projects to share his knowledge and skills in running camera trap projects. Adul presented BNF's work at the Indonesian Carnivore Conference in 2017. Susan Cheyne has worked in Southeast Asia since 1997 and in Indonesia since 2002. She is a co-director of BNF and has carried out long-term gibbon and mammal population monitoring in eight sites across Indonesian Borneo. She is a vice-chair of the IUCN Primate Specialist Group Section on Small Apes and a member of the IUCN Cat Specialist Group.

Author contribution: Karen Jeffers carried out the field research under RISTEK permit number 8/TKPIPA/E5/Dit.KI/VIII/2018. She contributed to data collection with Adul and analysis and writing with SMC. Adul designed the camera study grid with KAJ and SMC and assisted the fieldwork. He contributed to data analysis with KAJ and SMC. Susan Cheyne conceived of the study and assisted in the field design. Along with KAJ and Adul she analysed the data and wrote the paper.





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