

[Short communication](#)

First photo evidence of stone marten *Martes foina* (Erxleben, 1777) in Rolwaling and Lapchi valleys of Gaurishankar Conservation Area, Nepal

Madhu Chetri^{1,2*}  | Bibash Chaudhary¹ | Shankar Man Thami¹¹National Trust for Nature Conservation, PO Box. 3712, Khumaltar, Lalitpur, Nepal²Inland Norway University of Applied Sciences, Norway* **Correspondence:** mchetri@gmail.com

Suggested citation: Chetri M., Chaudary B. and Thami S.M. 2024. First photo evidence of stone marten *Martes foina* (Erxleben, 1777) in Rolwaling and Lapchi valleys of Gaurishankar Conservation Area, Nepal. *Nepalese Journal of Zoology*, 8(1):76–80.
<https://doi.org/10.3126/njzv8i1.67113>

Article history:**Received:** 12 May 2024**Revised:** 07 June 2024**Accepted:** 08 June 2024

Publisher's note: The statements, opinions and data contained in the publication are solely those of the individual author(s) and do not necessarily reflect those of the editorial board and the publisher of the NJZ.

**Copyright:** © 2024 by the authors**Licensee:** Central Department of Zoology, Tribhuvan University, Kathmandu, Nepal

Abstract

Stone marten (*Martes foina*) is a fascinating, elusive and crepuscular small carnivore mammal belonging to the family Mustelidae. They are widely distributed throughout Europe and in western and central Asia. Little information is available on the distribution pattern and habitat requirement of the species in the Nepal Himalaya. Based on the camera trap study, we reported the first photo evidence of the presence of stone marten in the Lapchi and Rolwaling valleys of the Gaurishankar Conservation Area. This finding has opened new avenues for further ecological research and to investigate human-induced threats to the species in the region.

Keywords: Camera trap photo record; Lapchi Valley; Marten; Mustelidae; Rolwaling Valley

of the Himalayas (Jnawali et al. 2011), information on its ecology is not known from the Nepal Himalayas.

Literature survey shows that the species inhabits a variety of habitats, including forests, grasslands, and urban areas, where they feed on a varied diet ranging from small mammals such as voles, squirrels, birds, reptiles, honey, nuts, and fruits (Papakosta et al. 2014). Their adaptability to different environments has enabled them to thrive in both natural and human-altered landscapes (Herr 2008), but they are also encountered in woods and rocky areas (Waechter 1975, Delibes 1983, Skirnisson 1986, Kruger 1990, Broekhuizen & Müskens 2000). Factors such as habitat loss, fragmentation, and hunting pose significant threats to their population, leading to concerns about their long-term survival (Herr 2008). They serve as indicators of environmental health as they are sensitive to changes in their habitat use and food sources. The change in their population structure reflects broader shifts in biodiversity and ecosystem stability. Earlier research has indicated that stone marten are generalists (Połuszný 2007) and they play a crucial role in controlling small mammal populations. Despite their ecological importance, martens remain understudied in comparison to other species, limiting our ability to implement effective conservation strategies. In some countries, for example in India and Russia, stone marten are hunted for their fur, and in some parts of their distributional ranges, they are also persecuted as a pest (Abramov et al. 2016). However, major conservation threats to the species are unknown and the population is thought to be stable (Abramov et al. 2016).

1 | Introduction

Stone marten or beech marten (*Martes foina*) is locally known as *Himali Malsapro* (in Nepali). It is a fascinating, elusive and crepuscular small carnivore mammal belonging to the family Mustelidae, widely distributed throughout Europe and in western and central Asia (Papakosta et al. 2014). They are lighter in color compared to other martens found in the Himalayas. The color ranges from chocolate to drab tawny brown. Its throat is white to pale yellow. The species is considered as Least Concern (LC) in the IUCN Red List of Threatened Species (Abramov et al. 2016). The species has been recorded from sea level to 2,000 m in Israel (Werner 2012), from the lowlands to 3,400 meters in Kazakhstan, and up to 4,200 meters in Nepal. In India, it has been found above 1,300 m (Choudhury 2013) and up to 3,950 m (Sathyakumar et al. 2011). In Nepal, although the species is considered fairly common in the adjoining Langtang National Park and common in the temperate and alpine zones

Stone martens show different patterns of habitat use. The species can be found in poorly wooded slopes, rocky cliffs, landslides covered by xeric and bushy vegetation, and rocky slopes with scattered small woods (Heptner & Naumov 1974). Even, this species is closely found around human settlement (95.2% of captures were within 500 m of human settlement) in Alsace (Waechter 1975), also in Denmark, Western Germany, and Czechoslovakia (Deblies 1983). In Nepal, they occur within different protected areas such as Shey Phoksundo, Makalu Barun, and Langtang National Parks and the districts of Doti, Bajhang, and Bajura (Jnawali et al. 2011). Kutwal et al. (2013) found a dead specimen hanging on the door of a resident at Shyo of Manaslu Conservation Area. Earlier, Pandey et al. (2021) highlighted the presence of stone marten from the Rolwaling Valley in the Gaurishankar Conservation Area, but photo evidence was missing. In this study, we describe the first photo evidence of the presence of stone marten in the Rolwaling and Lapchi valleys of the Gaurishankar Conservation Area.

longitude and 27°34.2' to 28°10' north latitude with an area of 2179 sq. km. The GCA has three physiographic zones of high Himalayas, High Mountain, and Middle Mountain. It includes three districts, viz. Sindhupalchok, Dolakha, and Ramechhap. Since its inception in 2010, the National Trust for Nature Conservation-Gaurishankar Conservation Area Project is managing the area and has initiated important conservation work in partnership with the concerned stakeholders and local communities. Approximately, 67302 (2015 estimation) people are living within the GCA (GCA 2013).

The GCA has a rich floral and faunal assortment along with cultural heritage. The abundant natural resources consist of 722 types of wild floral species, 18 major vegetation types, 77 mammal species (Chetri et al. 2022), 12 species of amphibians, 29 species of reptiles, 27 species of fishes, and 271 species of birds. Forest including scrublands covers 47.5% while agricultural land covers 5.3%, grasslands account for 22.6%, and barren land and others cover 24.6% of the total area (GCA 2013).

Rolwaling Valley, considered a sacred landscape or 'Beyul' (Sacherer 2011), lies on the northern fringe of Gaurishankar Rural Municipality of Dolakha District. Rolwaling is scarcely inhabited, with approximately 70 households belonging to the Sherpa ethnic group (GCA 2013). Local people raise domestic yak *Bos gruniens*, sheep and goats. Wildlife habitat, below 3,000 m, includes mixed broadleaved forests of *Tsuga*, *Quercus*, and *Rhododendron*, while above 3,000 m, shrubberies such as *Juniperous*, *Rhododendron*, *berberies*, *Hippophae*, and *Cotoneaster* sp. In terms of wildlife, this valley

2 | Materials and methods

2.1 | Study area

Gaurishankar Conservation Area (GCA) lies between the Langtang National Park in the west, Sagarmatha National Park in the east, and the Tibetan Autonomous Region of the People's Republic of China (Fig. 1). The government of Nepal declared the Gaurishankar region as a "Conservation Area" in January 2010. It extends between 85° 46.8' to 86°34.8' east

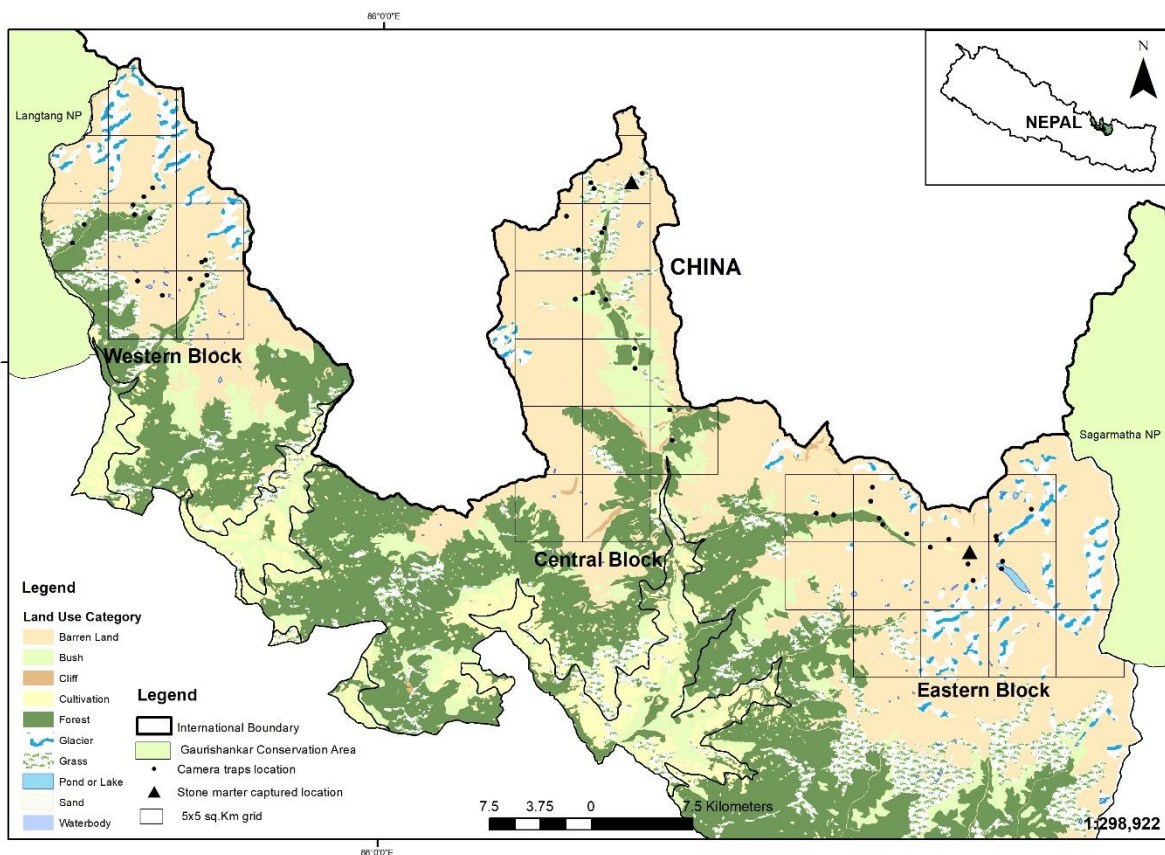


Figure 1. Location of the study area with grid cells (eastern, central, western block), and the camera traps captured location of stone marten in Gaurishankar Conservation Area, Nepal.

Table 1. Details of stone marten recorded sites in Gaurishankar Conservation Area, Nepal.

Block	Area Name	Elevation (m)	Number of photographs	Date of photographs	Time
Central	Deurali/Lapchi Valley	3995	1	19.09.2023	2:20 am
Eastern	Dudhkunda trail/Rolwaling Valley	4240	3*	11.10.2023	1:35 pm
Eastern	Dudhkunda trail/Rolwaling Valley	4240	1*	20.10.2023	7:32 am

* Captured by the same camera trap

supports Himalayan tahr *Hemitragus jemlahicus*, Himalayan goral *Naemorhedus goral*, musk deer *Moschus leucogaster*, Himalayan serrow *Capricornis thar*, Royle's pika *Ochotona roylei*, Himalayan monal *Lophophorus empejanus*, blood pheasant *Ithaginis cruentus*, and snow cock *Tetragalus* sp. The predator guild includes snow leopard *Panthera uncia*, Himalayan wolf *Canis lupus*, and red fox *Vulpes vulpes* (Pandey et al. 2021). Similarly, the Lapchi Valley is at the foot of the Lapchikhang mountain range, which is an important pilgrimage destination for Tibetan Buddhists and is known for the mediation caves of the most famous Tibetan saint and poet, JetsunMilarepa. It comprises sub-tropical to nival bi-climatic zones. musk deer, Himalayan bear *Ursus thibetanus*, Assamese macaque *Macaca assamensi*, snow leopard *Panthera uncia*, and leopard cat *Prionailurus bengalensis* are some of the nationally threatened species living in GCA (Chetri et al. 2022). Major precipitation in the area includes rain during the summer monsoon from June to August and snow in winter from January to March (GCA 2013).

2.2 | Methods

The entire GCA was divided into three blocks eastern, central and western blocks. Within the selected blocks, we overlaid 5×5 km grid cells using ArcGIS (Fig. 1). The selected grid cells lie within an elevation range of 3000 to 6000 m as the purpose was to monitor the snow leopards in the region. In the eastern and central blocks, we selected 12 grids from each while in the western block only eight grids were for camera trap installation (Fig. 1). The eastern block is located in Rolwaling and the northern part of Ramechhap, the central block occupies Lapchi Valley and the western block lies in the periphery of Jugal mountain. In the eastern block, out of the identified 12 grids, cameras were installed in six grid cells. Likewise, in the central and western blocks, only seven and six grids were covered due to accessibility problems. Our target was to install a pair of camera traps in all the accessible grids but due to steep terrain, it was not possible. A total of 55 cameras were installed for the purpose of monitoring (23 in the eastern, 18 in the central and 14 in the western block). The cameras were deployed from September 16 to October 13, 2023 (27 days) in the eastern block. Also, from September 25 to October 10, 2023 (16 days) in the central block and from December 24, 2023 to March 15, 2024 (82 days), a single camera remained in the field until April 30, 2024 (128 days) in the western block. Out of all the cameras in the eastern block, two cameras were lost, and another two SD cards were found missing. Similarly, we lost two camera traps and one SD card from the central block and one camera trap from the western block.

3 | Results

Out of 55 camera traps (eastern block–Rolwaling Valley: 23 camera traps, central block–Lapchi Valley central block: 18 camera traps, and western block: 14 camera traps), only two camera traps from central and eastern blocks were able to capture the photographs of the stone marten (Table 1). One photograph was obtained from Deurali of the central block, located in the southeast aspect on September 19, 2023. Similarly, four photographs of stone martens were obtained from a single camera trap along the Na to Dudhkunda route (eastern block) located at a southern aspect on October 11, 2023 (3 photos during midnight) and October 20, 2023 (one photo in the morning). The elevation range of the two locations is 3995 to 4240 m. The photographs obtained from the field were sent to experts for further confirmation. Based on morphology and body coloration the species was identified as stone marten (Fig. 2a & 2b). In both Lapchi and Rolwaling valleys, the camera trap that captured the photos of stone martens was in rocky areas sparsely surrounded by shrubs dominated by rhododendron *Rhododendron anthopogon*, juniper *Juniperus indica* and barberry *Berberis aristata*.



Figure 2. Stone marten. Pale grayish brown coarser pelt, white or buffy streak below the chin running down the neck to the chest. Little to no fur on the soles of the feet, long limbs, and a bushy tail (Photo by: NTNC-GCAP).

4 | Discussion

Gaurishankar Conservation Area is not well explored in terms of biodiversity research. Since 2022, GCA has initiated the camera trap survey to monitor the biodiversity in the region. However, stone martens were not captured in 2022 which indicates that the species are sparsely distributed within GCA. This could be due to several factors such as habitat destruction and disturbances from the linear infrastructure development (GCA 2022). GCA is developing as a hydropower hub which has not only threatened biodiversity but also impacted the settlement as the area is very prone to landslides. Haphazard road construction and removal of trees for tower construction and transmission lines have impacted both social aspects as well as the biodiversity of the region. In the future, multiple challenges may emerge for biodiversity protection and the region's landscape.

According to Wereszczuk and Zalewski (2015), stone martens are morphologically medium-sized mustelids with long, thin bodies. Their weight varies from 0.8–1.4 kg for females to 0.8–2.5 kg for males; however, this varies greatly with climatic conditions and is smaller in a colder climate. Jnawali et al. (2011) described that the body color of the stone marten was chocolate to drab tawny brown, the throat was white to pale yellow, and the legs and tail were darker than the body. The occurrence of this species and its exact distribution in Nepal were unknown until the geospatial information. This is the first photographic evidence of the species from both Rolwaling and Lapchi Valley of the Gaurishankar Conservation Area. For the last 10–15 years, camera traps have been widely used in wildlife research and monitoring in protected areas of Nepal. Camera trap monitoring work has been initiated in the Gaurishankar Conservation Area since early 2019. With this initiation, GCA has reported the presence of the Siberian weasel *Mustela sibirica*, Asiatic golden cat *Catopuma temminckii*, Himalayan wolf *Canis lupus* and snow leopard *Panthera uncia* from the region (Koju et al. 2020, Koju et al. 2021, Pandey et al. 2021, Chetri et al. 2022, Chetri et al. 2024).

Stone marten inhabits both woody and rocky areas and is considered to be an adaptable predator (Sacchi & Meriggi 1995). Similar to this result, we photographed stone marten in both locations with rocky and woody vegetation. Deurali/Lapchi Valley and Dudhkunda trail/Rolwaling Valley camera trap locations were mostly rocky areas (hard rocks and big boulders) and sparsely surrounded by shrubs like sparsely surrounded by shrubs dominated by rhododendron *Rhododendron anthopogon*, juniper *Juniperus indica* and barberry *Berberis aristata*. The Deurali (in Lapchi Valley) and Dudhkunda (in Rolwaling Valley) are highly disturbed areas. Recently, the wildlife habitat in these areas has changed due to human-induced impact and linear infrastructure

development activities such as hydropower construction, illegal logging, access road construction and disturbances. Such development activities pose substantial threats to stone marten and other associated species. The present findings have opened new avenues for further ecological research on Stone marten and other associated species in the Gaurishankar Conservation Area.

5 | Conclusions

This study provides the first photographic evidence of Stone marten *Martes foina* in the Rolwaling and Lapchi valleys of the Gaurishankar Conservation Area (GCA), Nepal, highlighting its presence in previously undocumented locations. It was photographed at an elevation between 3995 and 4240 m, indicating its adaptability to high-altitude environments. Despite its known occurrence in adjacent protected areas, i.e. Langtang National Park, the species is rare in GCA, signifying sparse distribution, possibly due to habitat fragmentation and disturbances. This research has opened a new avenue for further in-depth research on Stone marten populations, species distribution, habitat use, and ecological requirements. Given the threats from habitat destruction and infrastructure development, focused conservation strategies are crucial for the long-term conservation of Stone marten and the overall biodiversity within GCA.

Acknowledgements

The National Trust for Nature Conservation would like to thank the support of the "With Snow Leopards" Small Grant (SLSG), which was initiated by the Tencent Foundation and Shan Shui Conservation Center, and supported by Huatai Foundation, Amity Foundation, and Peking University Center for Nature and Society. We would like to thank all local assistants involved during the camera trap survey work. In addition, we are also thankful to those who provided information during the questionnaire surveys.

Authors' contributions

M.C. designed the research, B.C. and S.M.T designed the map for the survey. All authors are involved in data collection. M.C. wrote the manuscript, S.M.T. prepared the final map. All authors contributed to the drafts and gave final approval for publication.

Conflicts of interest

The authors declare no conflict of interest.

References

- Abramov A.V., Kranz A., Herrero J., Choudhury A. and Maran T. 2016. *Martes foina*. *The IUCN Red List of Threatened Species* 2016: e.T29672A45202514. <https://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T29672A45202514.en>. Accessed on 04 March 20
- Broekhuizen S. and Müskens G.J.D.M. 2000. Utilization of rural and suburban habitat by pine marten *Martes martes* and beech marten *M. foina*: species-related potential and restrictions for adaptation. *Lutra*, 43:223–227.

- Chetri M., Ale, P.B. and Odden M. 2024. First photo evidence of Siberian Weasel *Mustela sibirica* Pallas, 1773 (Mammalia: Carnivora: Mustelidae) in Gaurishankar Conservation Area, Nepal. Journal of Threatened Taxa, 16:25252–25255, <https://doi.org/10.11609/jott.8642.16.5.25252-25255>
- Chetri M., Regmi P.R., Dahal T.P. and Thami S. 2022. A checklist of mammals of Gaurishankar Conservation Area, Nepal. Nepalese Journal of Zoology, 6:56–62.
- Choudhury A. 2013. The mammals of North east India. Guwahati: Gibbon Books, p 205.
- Delibes M. 1983. Interspecific competition and the habitat of the stone marten *Martes foina* (Erxleben, 1777) in Europe. Acta Zoologica Fennica, 174:229–231.
- GCA 2013. Gaurishankar Conservation Area Management Plan (2013–2017). National Trust for Nature Conservation, Nepal, p 276.
- GCA 2022. Gaurishankar Conservaion Area Management Plan (2022/23-2026/27). National Trust for Nature Conservation, Nepal, p 264.
- Gorsuch, W.A. and Larivière, S. 2005. Vormela peregusna. Mammalian Species, 779:1–5. <https://doi.org/10.1644/779.1>
- Heptner V.G. and Naumov N.P. 1974. The mammals of the Soviet Union. Berlin, Germany (cited in Gorsuch and Larivière 2005).
- Herr J. 2008. Ecology and behaviour of urban stone martens (*Martes foina*) in Luxembourg. PhD Thesis, University of Sussex, Brighton, UK.
- Jnawali S., Baral H., Lee S., Acharya K., Upadhyay G., Pandey M., Shrestha R., Joshi D., Lamichhane B. and Griffiths J. 2011. The Status of Nepal's Mammals: The National Red List Series-IUCN. Department of National Parks and Wildlife Conservation, Kathmandu, Nepal, p 276.
- Katuwal H.B., Khanal B., Basnet K., Rai B., Devkota S., Rai S.K., Nobis M. and Scheidegger C. 2013. The mammalian fauna from the Central Himalaya, Nepal. Asian Journal of Conservation Biology, 2: 21–29.
- Koju N.P., Bashyal B., Pandey B.P., Shah S.N., Thami S. and Bleisch W.V. 2021. First camera-trap record of the snow leopard *Panthera uncia* in Gaurishankar Conservation Area, Nepal. Oryx, 55:173–176. <https://doi:10.1017/S003060532000006X>
- Koju N.P., Bashyal B., Pandey B.P., Thami S., Dhamala M.K. and Shah S.N. 2020. New record on Asiatic Golden Cat *Catopuma temminckii* Vigors & Horsfield, 1827 (Mammalia: Carnivora: Felidae): photographic evidence of its westernmost distribution in Gaurishankar Conservation Area, Nepal. Journal of Threatened Taxa, 12:15256–15261. <https://doi.org/10.11609/jott.5227.12.2.15256-15261>
- Kruger H.H. 1990. Home ranges and patterns of distribution of stone and pine martens. In Transactions of the 19th International Congress of Game Biologist Trondheim, Norway, pp. 348–349.
- Pandey B.P., Thami S.M., Shrestha R. and Chalise M.K. 2021. On the occurrence of the Himalayan Wolf *Canis lupus*, L. 1758 (Mammalia: Carnivora: Canidae) in the Gaurishankar Conservation Area, Nepal; its existence confirmed through sign and visual evidence in Rolwaling Valley. Journal of Threatened Taxa, 13:18967–18974.
- Papakosta M., Kitikidou K., Bakaloudis D. and Vlachos C. 2014. Dietary variation of the stone marten (*Martes foina*): A meta-analysis approach. Wildlife Biology in Practice, 10: 85–101.
- Posłuszny M., Pilot M., Goszczyński J., and Gralak B. 2007. Diet of sympatric pine marten (*Martes martes*) and stone marten (*Martes foina*) identified by genotyping of DNA from faeces. Annales Zoologici Fennici, 1:269–284.
- Sacchi, O. and Meriggi, A. 1995. Habitat requirements of the stone marten (*Martes foina*) on the Tyrrhenian slopes of the northern Apennines. Hystrix, the Italian Journal of Mammalogy, 7:1–2.
- Sacherer J. 2011. Rolwaling: A sacred Buddhist valley in Nepal. Planet Earth and Cultural Understanding Series, p 153.
- Sathyakumar S., Bashir T., Bhattacharya T. and Poudyal K. 2011. Assessing mammal distribution and abundance in intricate eastern Himalayan habitats of Khangchendzonga, Sikkim, India.
- Skírnisson K. 1986. Untersuchungen zum Raum-Zeit-System freilebender Steinmarder (*Martes foina* Erxleben, 1777). Beitrage zur Wildbiologie (Germany), (6).
- Waechter A. 1975. Ecologie de la fouine en Alsace. Revue d'Ecologie, Terre et Vie, 3: 399–457.
- Wereszczuk A. and Zalewski A. 2015. Spatial niche segregation of sympatric stone marten and pine marten—avoidance of competition or selection of optimal habitat? PLoS One, 10(10):e0139852.
- Werner N.Y. 2012. Small carnivores, big database – inferring possible small carnivore distribution and population trends in Israel from over 30 years of recorded sightings. Small Carnivore Conservation, 47:17–25.