

# The potential presence of Javan Langur (*Trachypithecus auratus* Geoffroy 1812) as wildlife ecotourism in Curug Lawe Seceptit Mount Ungaran



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**Abstract** Mount Ungaran has high biodiversity with various habitat types. One of them is Curug Lawe Seceptit which is located on the northern slope of Mount Ungaran with an altitude of 2050 mdpl. Curug Lawe Seceptit is one of the areas that has preserved forest vegetation, making it a habitat for various fauna, one of which is the Javan Langur (*Trachypithecus auratus*). This study was to determine the potential existence of Javan Langurs in Curug Lawe Seceptit Mount Ungaran as wildlife ecotourism. The method used in this observation is the exploration method carried out on the track to Curug Lawe Seceptit through direct encounters. This research was conducted from July to December 2024. The results showed that there were 4 groups of Javan Langur found 1 group in the Café Pucu'e Kendal area, 2 groups around the Viewing post area, and 1 group on the upper track of the Waterfall. This shows that Curug Lawe Seceptit has potential as one of the wildlife tracks on Mount Ungaran.

**Keywords:** ecotourism, Javan Langur, Curug Lawe Seceptit

## 1. Introduction

Mount Ungaran is one of the mountains in Central Java that is administratively located in Semarang Regency and Kendal Regency (Rahayuningsih, 2018) with coordinates of 7.18° S and 110.33° E (Kusuma et al., 2019). Mount Ungaran has an altitude of approximately 2050 meters above sea level with various types of habitats including primary forest, secondary forest, mixed forest, pine forest, tea plantations, coffee plantations, and rice fields (Febriyanto et al., 2020). This diversity of habitat types gives Mount Ungaran a diverse potential for flora and fauna (Rahayuningsih et al., 2017)

Curug Lawe Seceptit is one of the ecologically important areas on Mount Ungaran, functioning as a buffer zone for flora and fauna habitats due to its location surrounded by protected forests, production forests, and tea plantations (Purwinarko et al., 2024). These landscape characteristics help maintain ecosystem quality and support the persistence of various wildlife species, including the Javan langur. The Javan langur is an endemic primate species found on the islands of Java, Bali, and Lombok (Purba et al., 2023). Curug Lawe Seceptit provides important food resources for this species, including *Ficus variegata* (Rahayuningsih et al., 2020). The Javan langur is legally protected under the Decree of the Minister of Forestry and Plantations No. 733/Kpts-II/1999 and is classified as Vulnerable by the IUCN (IUCN, 2021) and listed in Appendix II of CITES (CITES, 2024). Despite its conservation status, the Javan langur population continues to decline due to habitat degradation and loss, poaching, land conversion, and illegal wildlife trade (Eliana et al., 2017). Therefore, effective conservation strategies are urgently needed, one of which is the development of ecotourism as a sustainable conservation approach.

The local community in Curug Lawe Seceptit plays an important role in protecting the forest area as part of efforts to reduce pressure on the Javan langur habitat while supporting tourism development. Currently, the management of Curug Lawe Seceptit is carried out by the local Pokdarwis (Tourism Awareness Group) and remains primarily focused on mass tourism (Purwinarko et al., 2024). However, considering the natural landscape of Curug Lawe Seceptit, which supports diverse flora and fauna, the area holds greater potential if developed as wildlife-based ecotourism. Wildlife constitutes a key attraction for visitors, as it offers opportunities to experience and appreciate biodiversity in its natural setting (Bastiang et al., 2023).

Ecotourism is currently one of the fastest-growing tourism sectors in Indonesia (Putri et al., 2022). It is a nature-based form of tourism that emphasizes experiential learning and direct interaction with natural environments (Erkol et al., 2017). Ecotourism is characterized by a strong commitment to environmental conservation, the well-being of local communities, and respect for local culture (Kiroh et al., 2022). As a result, ecotourism has the potential to serve as a driver of conservation efforts

for the Javan langur, as it is grounded in ecological principles and sustainable development frameworks (Fatem et al., 2024). Non-captive wildlife-based tourism involving the Javan langur allows visitors to observe the species in its natural habitat while providing educational value related to species conservation and ecological awareness (Fadhella et al., 2023).

Javan langur can be observed as part of primate watching tourism, which is a form of nature-based tourism that focuses on observing primates in their natural habitat, including species identification, behavioral observation, and ecological interpretation (Waters et al., 2023). Primate watching can have a positive impact on tourists, such as increased awareness, appreciation, reconnection with nature, and awareness of personal responsibility for environmental conditions. For primates, the impacts can be both positive and negative. Positive impacts include providing income for sustainable protection, management, and the primates habitat itself. Meanwhile, negative impacts can include the possibility of injury, stress, disruption to natural behavior and breeding patterns (Ballantyne et al., 2011).

The presence of Javan langurs in Curug Lawe Secepit can increase the attractions of natural tourism, which provides benefits in the management of the area and the conservation of Javan langurs, and the active participation of the local community can influence the socio-economic conditions of the community (Susanti et al., 2014). Therefore, the benefits are not limited to the conservation and education of the Javan langur, but the presence of tourists can also increase Local Government Revenue (PAD) (Vibriyanto et al., 2016). According to Kuswanda et al., (2019) more developed segments of society have a habit of spending their holidays traveling to areas that are still fresh and far from vehicle noise, such as open natural areas. The general tourism phenomenon in Curug Lawe Secepit Purwinarko et al., (2024) can be enhanced into a pattern of special interest tourism and ecological tourism by utilizing the presence of Javan langurs in Curug Lawe Secepit. Thus, the purpose of this study is to determine the potential of the presence of Javan langurs in Curug Lawe Secepit, Mount Ungaran, as wildlife ecotourism.

## 2. Materials and Methods

This research was conducted at Curug Lawe Secepit, Ngesrepbalong Village, Kendal Regency, Central Java (Figure 1). The research was conducted from July to December 2024. The instruments used were tally sheets, digital cameras, binoculars, and Global Positioning System (GPS). Data collection used the exploration method by walking along the track toward Curug Lawe Secepit. The observation track was divided into two segments, which were the upper track and the lower track. This division was determined based on the results of a preliminary survey with the local community regarding the locations most frequently passed by Javan langur groups. The encounter point was determined to be the area with the highest frequency of encounters, indicating that Javan langurs tend to be more active in that location. Observations were conducted from 7:00 a.m. to 5:00 p.m. for 10 days. The overall results of the observations were recorded on a tally sheet, recording the number of males, females, and juvenile in each group of Javan langurs encountered. The collected data were then presented in a table along with the locations where the Javan langur groups were found. Thus, the locations of Javan langur in Curug Lawe Secepit could be identified.

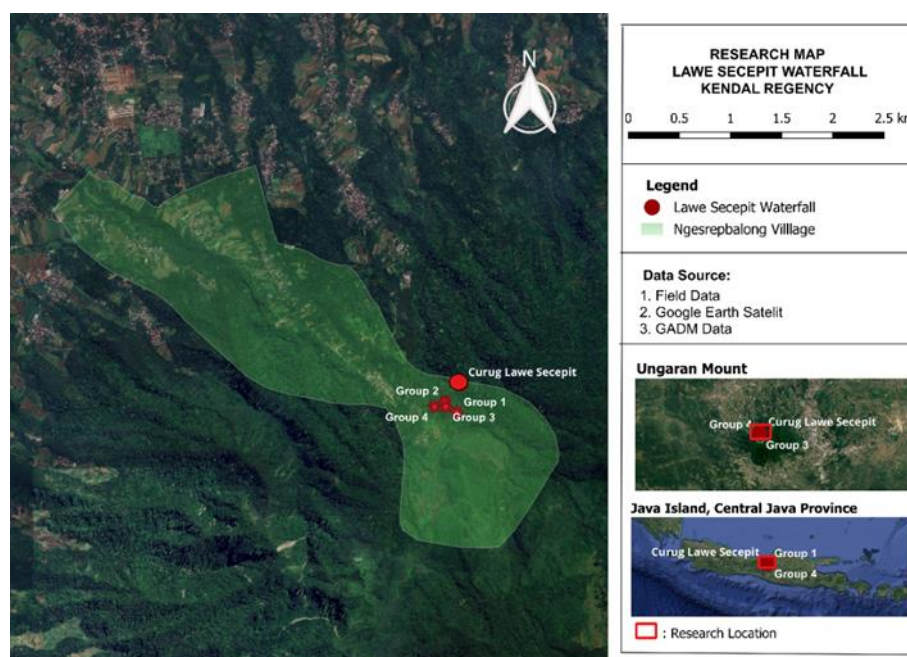


Figure 1 Research location.

## 3. Results and Discussion

Based on the results of research on two tracks at Lawe Secepit waterfall (Table 1.) There are 4 groups of Javan Langurs found consisting of 6 - 12 individuals. Group 1 was found on the upper track around the waterfall with a total of 12 individuals consisting of 2 males with one of them still a juvenile, 6 females, and 4 children. Group 2 was found at the lower track at the viewing post area with 10 individuals consisting of 1 male, 7 females, and 2 juveniles. Group 3 was also found at the lower track near the viewing post, a few metres away from group 2 with a total of 6 individuals consisting of 1 male, 3 females, and 2 juveniles. Group 4 was located in the lower track of the Pucu'e Kendal Café area with a total of 9 individuals consisting of 1 male and 8 females, including 1 juvenile female which can be seen from the difference in body size smaller than other members.

**Table 1** Javan Langurs Group in Lawe Secepit Waterfall.

Group	Encounter Times	Location	Individual of Javan Langur Group			Grand Total
			Male	Female	Infant	
1	07.00 am – 15.45 pm	Upper Waterfall	2	6	4	12
2	09.00 am – 15.00 pm	Viewpoint 1	1	7	2	10
3	08.30 am – 12.00 pm	Viewpoint 2	1	3	2	6
4	14.45 am – 17.00 pm	Cafe Pucu'e Kendal	1	8	0	9
Amount			5	24	8	37

Group 1 (Figure 2A) is usually found on the upper track near the waterfall, but is still visible from the lower track. Group 1 was spotted around 07.00 am - 15.45 pm. Tourists can see the Javan Langurs clearly in the morning at 07.00 - 09.00 am because at that time the sunlight starts to shine and the Javan Langur starts its activities by sunbathing, grooming, and eating. During the day, some of the Javan Langurs could not be seen from the lower track because they spent their time under trees and bushes to rest. Group 2 Javan Langurs (Figure 2B) could be found in the viewing post area from 09:00 am to 15:00 pm. As with group 1, during the day group 2 tended to be in the trees resting, indicated by the slumped position and lack of movement of the Javan Langurs. Group 2 started locomotion at 12.30 pm towards Café Pucu'e Kendal. Group 3 Javan langurs (Figure 2C) can be found a few metres near the viewing post (viewing post 2) towards the waterfall. The encounter with group 3 was seen between 08.30 and 12.00. Group 3 spent most of their time grooming and resting.

Group 4 Javan langurs (Figure 2D) could be found at Café Pucu'e Kendal, which is the entrance of Curug Lawe Secepit. The encounter rate with group 4 was relatively low. This is because group 4 was found only in the afternoon around 14.45 - 17.00 until the Javan langurs returned to the sleeping trees. Each group of Javan Langurs has different encounter times. This is an advantage for tourists to keep seeing Javan Langur at several points along the track to Lawe Secepit Waterfall.



**Figure 2** A) Group 1, B) Group 2, C) Group 3, D) Group 4.

Javan langur infants with orange hair in group 2 and several infants that have entered the development stage in group 1 could be a rare moment that attracts tourists (Figure 3). This phenomenon is not only visually attractive but can also be an educational resource in ecotourism to learn about the social dynamics and life cycle of primates endemic to Java, Indonesia.

The differences between male and female Javan langurs can be identified through the morphology of their reproductive organs, size, and coat color. Adult male Javan langurs are relatively larger than female Javan langurs, and the hair on their backs is not as black as that of female Javan langurs (Santoso et al., 2023). Javan langur infants have different hair pigmentation, characterized by an orange-yellow color, but this gradually darkens with age. This color change occurs over several months until the hair becomes completely black. The transition from yellow to orange hair occurs within 12.5 weeks after birth, and the hair becomes black within 26 weeks (Trisilo et al., 2021).



**Figure 3** The presence of a Javan langur infant in Group 2.

The presence of Javan langurs (*Trachypithecus auratus*) in the Curug Lawe Secepit area indicates substantial potential for wildlife-based ecotourism development. The high frequency of group encounters along the Curug Lawe Secepit trekking route increases opportunities for tourists to observe the species in its natural habitat. A suitable ecotourism activity in this area is primate watching, conducted by walking along established trekking routes while observing the presence and behavior of Javan langurs. This activity may be undertaken independently or facilitated by local guides to support educational objectives, visitor safety, and community empowerment. Morning periods represent the most appropriate time for primate watching, as individuals exhibit higher levels of daily activity during this time. Increased morning activity in Javan langurs is associated with internal thermoregulatory processes and responses to external environmental conditions, particularly relatively lower ambient temperatures (Hikmawan & Srimulyaningsih, 2023). As the air temperature rises during the day, Javan Langurs tend to reduce their activity and increase their resting behavior as a form of thermoregulation strategy.

The Curug Lawe Secepit area is characterized by a mountain forest habitat with a multi layered vegetation structure and high canopy density, dominated by various food tree species and broad-canopy trees, including *Ficus trichocarpa*, *Ficus fistulosa*, *Hibiscus tiliaceus*, and *Canarium sp.* These habitat conditions support the arboreal behavior of the Javan langur. During the morning and evening, individuals exhibit higher levels of arboreal activity, including movement, foraging, and social interactions. In contrast, during midday, Javan langurs predominantly rest along ravines or cliff edges vegetated with food plant species such as *Calliandra houstoniana* and *Coffea arabica*, which function as both shelter and food resources. This activity pattern indicates that morning periods provide the highest probability for tourists to encounter and observe natural Javan langur behavior, whereas daytime visits are associated with lower observation rates. Consequently, primate watching based ecotourism management should prioritize morning visitation schedules to enhance visitor experience while minimizing disturbance to the natural behavior of Javan langurs.

The development of sustainable ecotourism in Curug Lawe Secepit is needed from mass tourism to special interest tourism patterns and ecological tourism. This is because mass tourism tends to have a negative impact by not caring about the supporting capacity of the area and environment carrying capacity (Rachmawati et al., 2013). Javan Langur is an attractive ecotourism potential for tourists. The development of sustainable ecotourism in Curug Lawe Secepit can help Javan langur conservation efforts because it is one of the strategies that can support nature conservation by integrating tourism activities, nature conservation, environmental education, and local community empowerment (Angela, 2023). However, tourism activities in conservation areas can also have negative impacts Marschall et al., (2017) both to the environment and the Javan langur itself. One important aspect to consider is to pay attention to the daily behaviour of langurs and apply conservation principles to wildlife in their habitat with the aim that the impact of human activities on animals can be reduced (Rusita et al., 2019).

Given the diurnal activity pattern of Javan langurs, with peak arboreal activity occurring during morning hours, primate watching activities at Curug Lawe Secepit should be scheduled primarily in the morning to maximize encounter probability while reducing prolonged disturbance during less active periods. To further minimize anthropogenic impacts, visitor

management should incorporate strict behavioral protocols, including minimum observation distances and noise regulations based on the species' sensitivity to human presence and acoustic stimuli. The involvement of trained local guides is essential to ensure visitor compliance and to communicate the shy nature and stress vulnerability of Javan langurs during trekking activities. Additionally, brief pre-visit educational sessions addressing acceptable behavior, trail etiquette, and prohibitions on direct interactions such as feeding can reduce stress related risks and support sustainable wildlife observation.

Conservation-based wildlife ecotourism on Javan Langur is one of the alternatives in the strategy to protect Javan Langur through tourism activities. The presence of Javan Langurs in Lawe Secepit Waterfall has a uniqueness that is based on the interaction of Javan Langurs and their habitat in nature, their daily activities, as well as recognising the characteristics of the age strata of the Javan Langur group which allows tourists to get education and leads to a learning process during the tour (Rusita et al., 2019). Strategies and policies in managing ecotourism-based conservation areas are important components to be developed in the ecotourism industry. The presence of strategies and policies that apply can increase the number of visits, thereby increasing the value of local income (Al Hakim et al., 2022). The concept of strategies that can be carried out in the management of ecotourism-based Javan Langur conservation is understanding and assessing the environment, with this understanding helping in the development of conservation programmes and protection of existing ecosystems (Fauziah et al., 2024).

The management of ecotourism areas in Lawe Secepit Waterfall in conservation efforts is certainly inseparable from community participation as a driver and guardian of the stability of an ecotourism development (Panu & Hadi, 2024). Local wisdom refers to the traditional knowledge and practices of indigenous peoples as one of the key components of sustainable ecotourism management (Andriana et al., 2022). Nature tourism makes an important contribution to conservation and community economic fulfilment through employment (Haris et al., 2017). Nature tourism makes an important contribution to conservation and community economic fulfilment through employment.

The role of the community in its implementation must of course be accompanied by appropriate skills in the field of tourism/ecotourism. So that the community must be given training that is relevant to tourism activities (Manahampi et al., 2015). Community participation in the management of Curug Lawe Secepit as ecotourism can include various activities such as forest patrols, animal monitoring, and the development of environmental education programmes for tourists (Lasaiba, 2022). Thus, the active involvement of the community not only gives them an understanding of the importance of protecting natural resources, but also increases the sense of responsibility that supports conservation efforts.

In addition to local community capacity, the realization of sustainable ecotourism requires support from multiple stakeholders. Tourism development at Curug Lawe Secepit was not initiated solely by the local community; rather, it has involved collaboration and assistance from various parties. Semarang State University has conducted biodiversity research and conservation-related activities in the Mount Ungaran area. Community service programs have also been implemented to support conservation efforts, including tree planting, the establishment of a seedling houses (Nugraha et al., 2022) and observation tagging of bird nesting trees (Astuti & Rahayuningsih, 2022). Furthermore, conservation activities at Curug Lawe Secepit have been supported by a local non-governmental organization (Akar Banir Foundation), which assists the community in implementing community based organic conservation initiatives. As a private-sector actor, PLN Indonesia Power has contributed through environmental awareness activities and sustainable programs, including the construction of a micro-hydropower plant to provide lighting for the tourism area. These combined efforts indicate that Curug Lawe Secepit is suitable for ecotourism development, facilitating more effective wildlife conservation Particularly for the Javan langur while generating economic benefits for the local community.

#### 4. Conclusions

The presence of Javan Langurs in Lawe Secepit Waterfall has potential as a sustainable ecotourism. The results showed that there were 4 groups of Javan Langurs which were divided into 2 tracks, the upper track and the lower track with different encounter times. This is an advantage for tourists to continue to see Javan Langur at several points along the tracks to Lawe Secepit Waterfall. The only group found on the upper track was group 1, totalling 12 individuals. While the groups found on the lower track were group 2 in the viewpoint 1 area totalling 10 individuals, group 3 in viewing post 2 totalling 6 individuals, and group 4 found in the Café Pucu'e Kendal area totalling 9 individuals. The development of sustainable ecotourism in Curug Lawe Secepit can be implemented as one of the strategies that can support the conservation of Javan Langur there.

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#### Ethical Considerations

Not applicable.

## Conflict of Interest

The authors declare no conflicts of interest.

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