

Implementation of The Endangered Tarsius Species Protection Program at Batu Putih Nature Tourism Park, Bitung City

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Abstract

Article Info :

Received:

01/03/2026

Revised:

21/03/2026

Accepted:

05/04/2026

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Tarsius are one of the species endemic to Sulawesi that require protection efforts through the implementation of conservation programs. This study aims to describe the implementation of Tarsius protection programs, identify the challenges faced by conservation institutions, and explain community involvement in supporting Tarsius protection in Batu Putih Nature Tourism Park, Bitung City. This study applies a qualitative approach using three data collection techniques: observation, interviews, and documentation. The data obtained is then analyzed through the stages of data reduction, data presentation, and drawing conclusions. To ensure the validity of the research findings, source triangulation or technique triangulation is used as a method to test data accuracy. The results reveal that Tarsius protection efforts are carried out through activities such as area patrols, socialization with the community, wildlife population monitoring, habitat protection, and. The size of the area that the manager is responsible for. On the other hand, community involvement has a positive impact through participation in conservation activities, protecting the area, and increasing awareness of Tarsius preservation. Based on these findings, it can be concluded that the success of Tarsius protection heavily depends on the implementation of conservation programs supported by synergy between conservation organizations and the community.

Keywords: Conservation, Tarsius Protection, Community, Batu Putih Nature Tourism Park



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INTRODUCTION

Biodiversity is an important natural asset that plays a fundamental role in maintaining ecosystem balance and supporting the sustainability of life. Indonesia is recognized as one of the world's megadiverse countries, characterized by a high diversity of flora and fauna, including numerous endemic species that require continuous protection. However, the sustainability of biodiversity is increasingly challenged by anthropogenic pressures, including land-use conversion, illegal logging, habitat destruction, and unsustainable exploitation of natural resources. These activities can alter ecological processes, reduce habitat quality, and diminish the ecological functions of forest ecosystems, thereby increasing the vulnerability of wildlife species to population decline and local extinction. Consequently, biodiversity conservation requires not only the protection of individual species but also the sustainable management of their habitats and ecosystems (Pangemanan et al., 2022). One of the endemic wildlife species that requires particular conservation attention is the tarsius, a small nocturnal primate endemic to Sulawesi and several surrounding islands. Tarsius occupy an important ecological position as natural predators of various insects and therefore contribute to the maintenance of ecological balance within their habitats. Their survival is closely associated with the availability and quality of forest habitats that provide suitable conditions for shelter, foraging, reproduction, and other essential activities. Habitat degradation and fragmentation resulting from human activities, together with hunting and other forms of disturbance, have consequently become important threats to Tarsius populations. The conservation of Tarsius therefore cannot be separated from efforts to maintain the integrity of their natural habitats and reduce anthropogenic pressures on the ecosystems in which they occur (Lowing et

al., 2013; Polak et al., 2024). In this context, Batu Putih Nature Tourism Park in Bitung City represents an important conservation landscape because it provides natural habitat for *Tarsius* while simultaneously functioning as a protected area managed by the Natural Resources Conservation Agency (Balai Konservasi Sumber Daya Alam/BKSDA). The management of such an area involves a complex relationship between biodiversity protection, ecosystem management, institutional capacity, and human activities surrounding the conservation area. Conservation is essentially an effort to manage biological natural resources and their ecosystems to ensure the long-term sustainability of species, habitats, and ecological functions. In Indonesia, conservation is directed toward the protection of life-support systems, the preservation of biodiversity, and the sustainable utilization of biological natural resources. In wildlife conservation, these principles extend beyond species protection to include habitat preservation, the control of activities that threaten wildlife, institutional strengthening, and the involvement of local communities (Anthon Fathanudien, 2015).

The implementation of conservation has increasingly emphasized an integrated approach that seeks to reconcile biodiversity protection with the social and economic interests of communities living in or around conservation areas. One approach that reflects this perspective is the Integrated Conservation and Development Program (ICDP), which seeks to reduce the perceived conflict between conservation and development by integrating conservation objectives with community development interests. Within this framework, cooperation between conservation managers and local communities can be strengthened through formal arrangements governing the rights and responsibilities of communities in utilizing natural resources, including mechanisms commonly referred to as Community Conservation Agreements (CCA) (Manullang, 1999). Such an approach is particularly relevant in conservation areas where human interaction with natural resources is unavoidable and where long-term conservation success depends on cooperation among multiple stakeholders. From an ecological perspective, conservation may be implemented through different models and methods according to the characteristics of the species, ecosystem, geographical setting, and social conditions of a particular area. Conservation generally encompasses both *in-situ* and *ex-situ* approaches. *In-situ* conservation emphasizes the protection of species within their natural habitats, whereas *ex-situ* conservation involves maintaining species outside their natural habitats under controlled conditions, such as in zoos, breeding facilities, or wildlife rescue centers. For *Tarsius* conservation in Batu Putih Nature Tourism Park, the *in-situ* approach is particularly important because the survival of the species depends directly on the continued availability and ecological quality of its natural habitat. Accordingly, conservation efforts need to address not only the protection of *Tarsius* as individual wildlife but also the maintenance of forest structure, habitat continuity, food availability, and the reduction of human disturbances within and around the conservation area (Bismark, 2012).

The effectiveness of conservation in Batu Putih Nature Tourism Park is also strongly influenced by the role of conservation institutions. As the authority responsible for the management of the conservation area, BKSDA has an important role in implementing wildlife protection programs, monitoring the condition of biodiversity, managing habitats, regulating human activities, and coordinating conservation efforts with other stakeholders. This institutional role is particularly significant in Indonesia, where protected areas constitute an essential component of biodiversity conservation despite the country's relatively limited proportion of land formally designated for conservation. Indonesia's global significance in biodiversity conservation is reflected in its exceptionally high species richness, with the country containing a substantial proportion of the world's biological diversity despite occupying only a relatively small portion of the Earth's land surface (Wodi, 2012). Therefore, effective institutional management is necessary to translate conservation policies and objectives into practical protection programs at the local level. Nevertheless, institutional conservation efforts cannot be separated from the social context surrounding protected areas. Local communities interact directly or indirectly with conservation landscapes and may influence the condition of natural resources through their livelihood activities, resource utilization, and participation in conservation programs. Community involvement can take various forms, including participation in area protection, involvement in conservation activities, cooperation with conservation managers, environmental awareness initiatives, and support for conservation-based ecotourism. Active participation can strengthen a sense of ownership and responsibility toward the environment and facilitate the implementation of conservation measures at the local level. Previous research has demonstrated that



community participation is an important factor in supporting the preservation and sustainable management of natural resources (Pansing et al., 2020; Qodriyatun, 2019). Thus, collaboration between conservation institutions and communities represents an important component of sustainable conservation management.

Despite the growing body of research concerning *Tarsius* ecology, habitat characteristics, and population conditions, studies that simultaneously examine the implementation of wildlife protection programs, institutional challenges, and community involvement remain relatively limited, particularly in the context of Batu Putih Nature Tourism Park. Understanding these dimensions is important because the effectiveness of species conservation is not determined solely by ecological conditions but also by how conservation programs are implemented, how institutional challenges are addressed, and how local communities are positioned as partners in conservation. A comprehensive understanding of these interrelated aspects can provide a stronger basis for developing conservation strategies that are ecologically sound, institutionally effective, and socially inclusive. Therefore, this study aims to analyze the implementation of protection programs for the endemic *Tarsius* species in Batu Putih Nature Tourism Park, identify the challenges encountered in the implementation of these programs, and examine the forms and significance of community involvement in supporting *Tarsius* conservation. The findings are expected to contribute to the development of more integrated and sustainable conservation management strategies that strengthen the protection of *Tarsius* while fostering constructive collaboration between conservation institutions and local communities.

MATERIALS AND METHODS

This study employed a qualitative research approach to obtain an in-depth understanding of the implementation of conservation programs for the endemic *Tarsius* in Batu Putih Nature Tourism Park, Bitung City, North Sulawesi, Indonesia. The qualitative design was selected because the research focused on exploring experiences, perceptions, institutional roles, implementation processes, challenges, and forms of community involvement in *Tarsius* conservation rather than measuring the phenomenon through numerical indicators. This approach enabled the researchers to examine how conservation programs were implemented by relevant authorities, how local communities participated in biodiversity protection, and how different stakeholders contributed to the sustainability of *Tarsius* conservation within a protected ecosystem. The research was conducted in Batu Putih Nature Tourism Park, which forms part of the Tangkoko conservation landscape and represents an important natural habitat for endemic *Tarsius* in North Sulawesi. The site was selected purposively based on its ecological importance and its strategic role as a location for wildlife protection and habitat conservation programs managed by the North Sulawesi Natural Resources Conservation Agency (Balai Konservasi Sumber Daya Alam/BKSDA). The area also provided an appropriate setting for examining interactions among conservation institutions, surrounding communities, and researchers involved in *Tarsius* conservation.

Research informants were selected through purposive sampling based on their knowledge, experience, and direct involvement in the management and conservation of Batu Putih Nature Tourism Park. A total of 15 informants participated in the study, consisting of four BKSDA officers, seven local residents living around the conservation area, and four researchers who had conducted studies within the Batu Putih conservation landscape. The inclusion of these groups was intended to provide complementary perspectives on conservation implementation. BKSDA officers provided information regarding conservation policies, wildlife protection programs, habitat management, monitoring activities, and institutional challenges. Local residents contributed information concerning their interaction with the conservation area, participation in conservation activities, perceptions of *Tarsius* protection, and factors influencing community support. Researchers provided scientific perspectives concerning ecological conditions, conservation knowledge, and the contribution of research to *Tarsius* habitat protection. The combination of these perspectives enabled the researchers to develop a comprehensive interpretation of conservation practices and stakeholder relationships within the study area.

Data were collected through field observation, in-depth interviews, and documentation. Field observations were conducted to obtain direct information regarding environmental conditions, habitat characteristics, conservation activities, stakeholder interactions, and practices associated with wildlife protection. Relevant findings were recorded systematically through field notes. In-depth interviews

were conducted using a semi-structured format, allowing the researchers to maintain consistency in the main research themes while providing flexibility to explore information emerging during the interviews. The interviews addressed the implementation of Tarsius protection programs, institutional responsibilities, conservation challenges, community participation, stakeholder collaboration, and opportunities for strengthening sustainable conservation practices. Documentation was used to complement information obtained from observations and interviews. Documentary materials included institutional records, conservation program documents, reports, photographs, field documentation, research materials, and other relevant information concerning Tarsius management and protection. The combination of these techniques allowed the study to integrate direct observations, stakeholder experiences, and documentary evidence.

The collected data were analyzed using the interactive model of Miles, Huberman, and Saldaña, consisting of data reduction, data display, and conclusion drawing and verification. Data reduction involved selecting, categorizing, simplifying, and organizing information according to the research objectives, particularly information concerning conservation programs, institutional roles, habitat protection, implementation challenges, and community involvement. The reduced data were then displayed thematically to identify recurring patterns, relationships, similarities, and differences among informants. Conclusions were developed through an iterative process in which emerging interpretations were continuously compared with empirical evidence. Data credibility was strengthened through source and technique triangulation. Source triangulation involved comparing information from BKSDA officers, local residents, and researchers, while technique triangulation involved comparing findings from observations, interviews, and documentation. Differences among sources were examined by considering the context and position of each informant before conclusions were established. This systematic integration of purposive sampling, observation, interviews, documentation, interactive analysis, and triangulation strengthened the credibility and scientific accountability of the findings concerning endemic Tarsius conservation in Batu Putih Nature Tourism Park (Umam, 2023).

RESULTS AND DISCUSSION

The protection of the endemic Tarsius species in the Batu Putih Nature Tourism Park offers a revealing case of how wildlife conservation unfolds at the intersection of ecological necessity, institutional capacity, and community life. Situated in Batu Putih Bawah Sub-district, Bitung City, North Sulawesi, and forming part of the wider Tangkoko conservation landscape, the 615-hectare reserve is home to *Tarsius spectrumgurskyae*, one of Sulawesi's many endemic primates. The area is bordered by the Maluku Sea to the east, by Batu Putih Atas to the north, Kasawari Subdistrict to the south, and the Tangkoko Protected Forest to the west, giving it a topography that ranges from coastal lowlands to hills and supports the tropical, high-rainfall vegetation that Tarsius depend on. According to 2025 data the sub-district has 1,889 residents whose livelihoods span fishing, farming, private employment, and guiding within the reserve itself, a demographic detail that foreshadows the deep entanglement between conservation practice and local economic life that runs through the entire study.

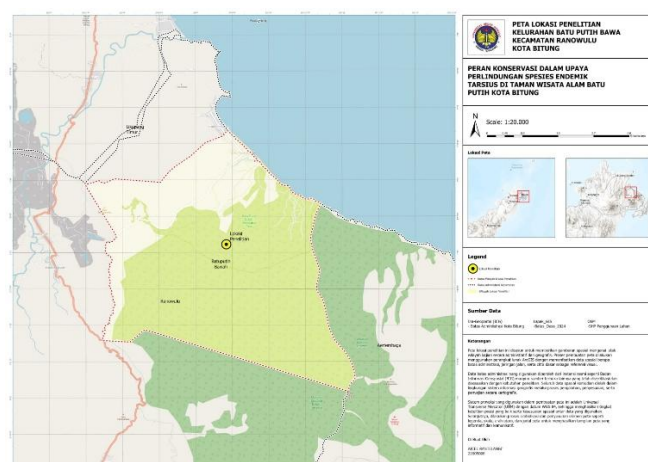


Figure 1. Reseach Location

The research demonstrates that protecting an endemic primate population within such a landscape cannot be reduced to a single activity or a single institutional actor. Rather, conservation in Batu Putih emerges as an integrated combination of area protection, wildlife monitoring, environmental education, prevention of illegal activity, and sustained collaboration among stakeholders. Routine patrols and area security form the operational backbone of this effort. These patrols are directed specifically at identifying and preventing hunting, the setting of snares, illegal logging, and other disturbances caused by human presence within the reserve. Alongside this enforcement dimension, wildlife and habitat monitoring is carried out to generate ongoing information about the condition of *Tarsius* and the ecological state of their surroundings, while education and socialization efforts are extended to both visitors and local residents in order to build awareness of conservation regulations and of the ecological significance of Sulawesi's endemic fauna. Taken together, these activities show that *Tarsius* protection in Batu Putih is not confined to safeguarding individual animals; it is inseparable from maintaining the ecological integrity of the habitat on which the species' survival depends.

This emphasis on habitat integrity resonates with the broader condition of primate conservation across Sulawesi. Supriatna et al. (2020) reported that all seventeen primate species found on the island are endemic, and that continuing deforestation has steadily eroded the habitat available to several of them, *Tarsius* included. Their study stresses the need to integrate conservation with development in ways that acknowledge both the social and ecological dimensions of habitat management, a framing that aligns closely with what the Batu Putih findings reveal. The presence of illegal logging and other forms of habitat disturbance identified within the reserve confirms that species protection there cannot be separated from the broader task of maintaining forest structure, continuity, and the ecological conditions that sustain *Tarsius* activity. In this sense, the local findings from Batu Putih function as a microcosm of the island-wide pattern described by Supriatna et al. (2020), reinforcing the argument that endemic primate conservation across Sulawesi depends on the simultaneous protection of species and their forest habitat rather than on species-focused interventions alone.

The patrol and monitoring system implemented in Batu Putih carries both a preventive and a responsive character. Patrols allow conservation officers to detect emerging threats, intervene before illegal activities cause lasting damage, and respond directly to disturbances already underway within the protected area. Yet the research is careful to note that the value of these patrols should not be measured simply by how frequently they occur. Their real significance lies in their capacity to reduce threats, strengthen area security, and contribute to the long-term maintenance of wildlife populations and habitat quality. This distinction matters because it implies that patrol activity ought to be accompanied by systematic documentation of the types, locations, and frequency of disturbances encountered in the field. Such documentation would allow managers to identify zones under heavier conservation pressure and to design protection strategies that are targeted rather than uniformly distributed across the reserve. This point is more than a technical recommendation; it reflects a broader principle found throughout the discussion, namely that conservation effectiveness depends on translating raw operational effort into structured knowledge that can guide future action.

Despite this operational framework, the implementation of the protection program in Batu Putih continues to face a cluster of interlocking challenges. Among community members, conservation awareness remains uneven, and practices such as tree cutting, wildlife hunting, and the use of snares and firearms persist in some areas. Visitor education presents its own difficulties, particularly with certain categories of visitors who are less receptive to conservation messaging. Compounding these social challenges is the sheer physical extent of the area requiring surveillance, together with limited coordination among the actors responsible for responding to conservation problems as they arise. These findings make clear that conservation effectiveness in Batu Putih is shaped not only by ecological variables but by institutional and social conditions as well. The persistence of hunting and logging within the reserve indicates that direct anthropogenic pressure remains a serious and ongoing issue in area management, a pattern that again echoes the wider Sulawesi context described by Supriatna et al. (2020), whose work similarly identified continuing forest loss as a major threat to primate habitat and called for conservation strategies that explicitly integrate ecological protection with human activity and local development. The consistency between the Batu Putih findings and this broader regional evidence reinforces the argument that conservation management in Sulawesi more generally needs to address the

underlying human dimensions of environmental degradation, rather than relying on regulatory enforcement in isolation.

The specific problem of snares and firearms deserves particular attention because these practices pose a direct and immediate threat to wildlife survival. Snares can injure or kill animals outright, while hunting reduces population numbers and disrupts the ecological relationships that sustain a functioning habitat. More broadly, the persistence of such practices illustrates the limits of relying solely on formal protective measures in a landscape where human economic activity continues to press against the boundaries of the protected area. Effective protection therefore requires a combination of enforcement, environmental education, community engagement, and continuous monitoring working together rather than as separate tracks of activity. The challenges identified by informants in Batu Putih show that conservation officers are, in practice, required to perform functions spanning law enforcement, ecological monitoring, environmental education, visitor management, and community relations simultaneously. This multidimensional burden underscores why strengthening institutional capacity is essential if conservation policy is to be translated effectively into field-level practice, a conclusion that is further supported by Setiawan (2021), whose work highlights the importance of institutional capacity in enabling the sustainable management and protection of wildlife. The convergence between this literature and the Batu Putih evidence suggests that capacity constraints are not incidental to the challenges observed in the field but are, in fact, one of their principal underlying causes.

The scale of the conservation working area compounds these institutional pressures in very practical ways. A relatively large area demands sufficient personnel, mobility, equipment, and coordination if potential disturbances are to be detected and addressed before they escalate. Where human resources are limited, the intensity and spatial coverage of monitoring activities inevitably contract. It is precisely in this situation that collaboration with local communities becomes an important complementary mechanism rather than a peripheral add-on. Community members living around the conservation area possess local knowledge of environmental conditions, wildlife occurrence, and the activities taking place around the reserve boundaries, knowledge that institutional staff, with their limited numbers, cannot fully replicate on their own. Integrating this local knowledge into conservation monitoring extends the effective reach of institutional protection while simultaneously creating a channel through which communities can become active participants in conservation rather than passive subjects of regulation. Indeed, community involvement emerges as one of the most consistently significant dimensions of Tarsius conservation in Batu Putih, and the findings describe several concrete forms this involvement takes. Local residents participate through meetings with conservation managers, through service as conservation guides, through direct assistance in area protection, through involvement in disaster management, through engagement with conservation-oriented non-governmental organizations, and through help facilitating visitors moving through the reserve. Beyond these active roles, community participation is also expressed negatively, so to speak, through the deliberate avoidance of hunting or consuming wildlife, through efforts to minimize human-wildlife conflict, and through ongoing cooperation with government agencies and conservation managers in maintaining environmental sustainability more broadly. These various forms of participation demonstrate that local communities in Batu Putih hold real potential to function as conservation partners rather than merely as recipients of externally imposed conservation policy.

This finding aligns closely with the work of Zhang et al. (2020), who found that community participation was an important predictor of pro-environmental behavior among residents living around protected areas. Their research showed that higher levels of community participation were associated with stronger pro-environmental behavior, and that participation itself could mediate the relationship between residents' attachment to place, their perceptions of livelihood, and their subsequent environmental behavior. Read against this evidence, the participation observed in Batu Putih should not be understood simply as supplementary assistance in conservation tasks. Instead, it functions as an important mechanism for strengthening environmental responsibility and reinforcing conservation-oriented behavior over time. When community members are directly involved in protecting the area and in conservation-related activities more broadly, they appear to develop a stronger sense of responsibility toward the landscape and its biodiversity, a psychological and social dynamic that formal regulation alone cannot easily produce.

The importance of participation that goes beyond token involvement is reinforced by Huber et al. (2023), whose systematic review of fifty-two empirical cases of participation in protected-area governance found that participation contributes to social and ecological outcomes most reliably when it involves meaningful power devolution, a diversity of actors, external support, and the genuine devolution of rights. Their work also stresses that the appropriate form and degree of participation must be adapted to the specific local context rather than applied as a generic template. This perspective is directly relevant to Batu Putih, because it implies that community involvement there needs to extend beyond occasional attendance at socialization events. The existing roles already occupied by residents, as guides, as area supporters, as conservation partners, and as facilitators for visitors, provide a foundation on which more meaningful collaborative governance between the managing authority and surrounding communities could be built, provided that this foundation is deliberately strengthened rather than left to develop informally.

One of the more striking dimensions of community involvement documented in the study is the role residents play as conservation guides, because this role creates a direct intersection between conservation objectives and local economic activity. The findings indicate that some community members have moved away from hunting-related livelihoods and toward conservation-compatible roles such as guiding visitors through the reserve. This transition carries significant implications for the long-term sustainability of conservation efforts, because it forges an economic relationship between the health of the conservation area and the improvement of local livelihoods. When communities gain legitimate economic opportunities that depend on a thriving conservation landscape, biodiversity protection becomes more closely aligned with local self-interest rather than standing in tension with it. At the same time, the discussion is careful to note that livelihood benefits of this kind need to be managed with attention to fairness, since poorly distributed benefits could generate new forms of pressure on the very area they are meant to protect.

This relationship between livelihood opportunity and conservation participation finds further support in Zhang et al. (2020), whose research showed that perceived changes in livelihood capital were associated with stronger pro-environmental behavior, particularly among communities exhibiting higher levels of participation. This suggests that conservation programs are likely to prove more sustainable when ecological objectives are paired with opportunities that genuinely strengthen community welfare rather than treated as separate policy tracks. In Batu Putih, then, the involvement of residents as guides and in visitor services should be understood as more than an economic side activity; it functions as a potential conservation mechanism in its own right. Such roles give community members a direct incentive to preserve the ecological quality and attractiveness of the area, while also deepening the interactions between visitors, local residents, and conservation managers in ways that reinforce shared stewardship of the landscape.

Even so, the discussion cautions against treating community participation as automatic evidence of successful collaborative conservation. Huber et al. (2023) emphasize that the outcomes of participation depend heavily on how that participation is structured, on who is granted the opportunity to participate, and on how decision-making authority and responsibilities are distributed among the various stakeholders involved. Applied to Batu Putih, this means the community participation already documented in the reserve needs to be deliberately strengthened through more consistent communication, more clearly defined roles, genuine opportunities for community involvement in conservation planning, and formal mechanisms through which local knowledge and concerns can be incorporated into management decisions. Such measures would transform participation from a largely activity-based and somewhat ad hoc form of involvement into a more institutionalized structure of collaborative conservation governance, one capable of sustaining itself even as individual personnel, funding levels, or external pressures change over time.

The results and discussion drawn from the study situate these local dynamics within a wider set of theoretical claims about conservation practice. The overall pattern observed in Batu Putih indicates that conservation efforts must be applied in an integrated manner, combining species protection, sustainable habitat management, and close supervision of the human activities capable of disrupting the reserve's ecological balance. Patrols, monitoring, socialization, and the prevention of illegal activity are not merely technical or bureaucratic tasks; they form part of a broader effort to sustain *Tarsius* habitats and populations over the long term. This interpretation is consistent with the work of Anggur et al. (2021),

who found that *Tarsius* populations face mounting pressure from habitat destruction and human activity, and who argued that this pressure requires ongoing monitoring, regulation, and strengthened enforcement if it is to be effectively managed. The threats documented in Batu Putih, particularly snares, hunting, and logging, further indicate that conservation success depends heavily on the sustained capacity of area managers to maintain security over time rather than through episodic intervention. Zamzami et al. (2021) similarly identified snares as a persistent threat to wildlife within conservation areas and noted that habitat damage caused by human activity intensifies the pressure faced by wildlife populations more broadly, a finding that corroborates the pattern observed at Batu Putih almost point for point.

The institutional and social challenges surfaced in the research, including low public awareness, the difficulty of educating certain visitors, the sheer scale of the surveillance area, and limited coordination among responsible actors, together indicate that conservation cannot rely on regulation alone to achieve its objectives. What is required instead is a body of human resources capable of translating formal policy into concrete field action through monitoring, education, and rapid response to disturbances as they occur. This is precisely the point emphasized by Setiawan (2021), whose work underscores the centrality of institutional capacity to the sustainable management and protection of wildlife, and whose argument helps explain why the challenges identified in Batu Putih persist despite the existence of a formally structured protection program.

Community involvement, examined through this same theoretical lens, demonstrates that conservation outcomes become notably stronger when communities are positioned as genuine partners in area management rather than as external parties subject to conservation rules. Participation through conservation activities, area monitoring, service as guides, and collaboration with conservation institutions all point toward a meaningful sharing of responsibility between formal managers and the surrounding community. This pattern is consistent with Harlan et al. (2025), who argue that collaborative management of conservation areas depends on community participation if the protection of natural resources is to be carried out effectively and sustainably over time. The social and economic dimensions of this involvement further strengthen its long-term viability. The shift observed among some residents from hunting toward guiding, together with the broader opening of employment opportunities tied to conservation, demonstrates that conservation activity can generate livelihood alternatives that are more environmentally compatible than the practices they replace. Setiadi et al. (2023) similarly found that a conservation approach integrating ecological, social, and economic dimensions can support ecosystem sustainability while simultaneously delivering tangible benefits to local communities, a conclusion that maps closely onto the livelihood transitions documented in Batu Putih.

Taken as a whole, the evidence assembled across these findings supports a single overarching argument, namely that the protection of *Tarsius* in Batu Putih Nature Tourism Park cannot rest on a predominantly enforcement-oriented approach. Patrols and area security remain necessary, but on their own they are insufficient to address threats that are simultaneously ecological, institutional, and social in origin. What emerges instead is the need for an integrated and collaborative conservation model, one that combines continuous habitat and wildlife monitoring, patrols that are targeted according to documented patterns of threat rather than distributed evenly across the reserve, environmental education directed at both visitors and residents, stronger institutional coordination among the various actors responsible for area management, meaningful community participation structured through clear roles and genuine decision-making input, and sustainable livelihood opportunities that align local economic interests with conservation objectives. Local communities, in this model, are positioned not merely as beneficiaries of conservation policy or as subjects bound by its regulations, but as active partners whose knowledge, capacity, and economic interests can meaningfully shape conservation planning and implementation.

The broader evidence from across Sulawesi, particularly the findings of Supriatna et al. (2020) regarding the continuing importance of habitat protection for the island's endemic primates, together with the international evidence assembled by Zhang et al. (2020) and Huber et al. (2023) on the capacity of meaningful participation to strengthen pro-environmental behavior and improve the social and ecological outcomes of protected-area governance, converges with the local evidence from Batu Putih to point toward a common conclusion. Sustainable protection of an endemic species such as the *Tarsius*

depends on treating ecological, institutional, and social dimensions as interlocking parts of a single system rather than as separate concerns to be managed independently. An integrated approach of this kind matters not only because it addresses the immediate threats documented in the field, from snares and illegal logging to gaps in visitor education, but because it strengthens the long-term ecological, institutional, and social sustainability of the conservation area as a whole. In this sense, the case of Batu Putih illustrates a pattern likely to recur across many of Sulawesi's protected landscapes, where the fate of endemic wildlife is inseparable from the capacity of institutions to govern effectively and the willingness of surrounding communities to become genuine stakeholders in the landscapes they inhabit.

CONCLUSION

The protection of the endemic *Tarsius* species in Batu Putih Nature Tourism Park demonstrates that conservation success cannot be achieved through a single, purely enforcement-based approach, but requires the integration of three interrelated dimensions: an ecological dimension, an institutional dimension, and a social dimension. Within the ecological dimension, habitat continuity across the Tangkoko Batu Putih landscape is the primary determinant of species survival. Within the institutional dimension, patrol intensity, monitoring capacity, and inter-agency coordination determine the effectiveness of threat detection and response in the field. Within the social dimension, community awareness, economic incentives, and participation structures determine the extent to which conservation regulations are genuinely observed at the site level.

The findings of this study show that these three dimensions cannot be addressed in isolation. Patrols and area security serve to prevent hunting, snaring, and illegal logging, but their long-term effectiveness depends on the systematic documentation of threat patterns rather than on merely increasing patrol frequency. Education and outreach serve to change the behaviors that place pressure on habitat, yet these efforts remain constrained by the extent of the area requiring surveillance and by the limited readiness of some visitors and community members to accept conservation messaging. Community involvement, meanwhile, proves to be an important link between the ecological and institutional dimensions: residents who have shifted from hunting to guiding, who assist with area security, or who participate in disaster-response activities and non-governmental conservation organizations extend the reach of formal management beyond what limited personnel could achieve on their own.

Accordingly, the protection of *Tarsius* in Batu Putih requires a shift away from an approach dominated by rule enforcement toward an integrated, collaborative conservation model. This model encompasses continuous monitoring of habitat and wildlife, patrols directed by documented threat patterns, environmental education for both communities and visitors, strengthened inter-agency coordination, institutionalized community participation with clearly defined roles and genuine decision-making space, and livelihood opportunities that align local economic interests with conservation objectives. Positioning local communities as active partners rather than mere objects of regulation is an essential condition for the long-term ecological, institutional, and social sustainability of this conservation area.

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