Assessing the Ecotourism Potential of Birdwatching in Tebet Eco Park, an Urban Green Space in South Jakarta, Indonesia

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Abstract

As one of the world's megadiverse countries, Indonesia holds vast potential for developing nature-based tourism, particularly avitourism. This study examines the birdwatching ecotourism potential of Tebet Eco Park, an urban green space in South Jakarta, by analyzing bird species' diversity, richness, dominance, and evenness within the park. Bird surveys were conducted from October to December 2024 using standardized observation methods along designated transects. A total of 24 bird species from 21 families were recorded. The Shannon-Wiener diversity index (H' = 2.46) and the Margalef richness index (R = 3.44) indicate moderate species diversity and community stability. Streptopelia chinensis and Pycnonotus aurigaster were the most dominant species, while Zosterops melanurus and Psittacula alexandri were identified as species of conservation concern. Several birds, such as Nectarinia jugularis, were noted for their colorful plumage or distinctive vocalizations, making them attractive for recreational birdwatching. The findings demonstrate that Tebet Eco Park has strong potential to be developed as a sustainable, accessible, and educational birdwatching ecotourism destination within an urban setting.

Keywords: Birdwatching; Urban Green Space; Avitourism; Species Diversity; Tebet Eco Park; Ecotourism

INTRODUCTION

Indonesia is globally recognized as one of the world's megadiverse countries, harboring approximately 17% of all bird species (Supriatna, 2008; Setiawan, 2022). The Indonesian Institute of Sciences (LIPI) reports 1,711 bird species, with 510 identified as endemic (Prawiradilaga, 2019). Birds play a crucial ecological role in regulating insect populations, dispersing seeds, and maintaining the balance of ecosystems. Beyond their ecological functions, birds also offer social and psychological benefits through their aesthetic presence in landscapes and their contributions to nature-based recreation and mental well-being (Fuller et al., 2007; Kong et al., 2007; Hedblom et al., 2014).

Among various forms of ecotourism, birdwatching (avitourism) is gaining global traction as a non-intrusive, educational, and conservation-oriented activity (Liu et al., 2021). Easily accessible to a wide range of participants due to minimal equipment requirements, birdwatching is increasingly practiced in urban environments, particularly within urban green spaces (Kurnia, 2021; Kaban et al., 2018). These spaces support biodiversity conservation and provide valuable opportunities for urban residents to reconnect with nature.

In Jakarta, a rapidly urbanizing metropolis, 243 bird species have been recorded in various green spaces, demonstrating the city's capacity to sustain avian biodiversity despite high urban pressures (Mardiastuti et al., 2020). Prior studies in Taman Tabebuya and Hutan Kota Pesanggrahan Sangga Buana indicate that even small-scale urban parks can host diverse bird species (Mucharror, 2021; Hutami et al., 2023).

One urban park with significant ecotourism potential is Tebet Eco Park, a 7.3-hectare area in South Jakarta designed with ecological, educational, and

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recreational functions. Although preliminary studies (Larasati et al., 2024) have identified 12 bird species within this park, no comprehensive ecological assessment has been conducted to evaluate its full birdwatching potential. This study addresses this gap by analyzing the diversity, richness, dominance, and abundance of bird species in Tebet Eco Park. Additionally, the study seeks to identify bird species with high tourism value based on conservation status, plumage coloration, and acoustic characteristics. The findings aim to contribute to the scientific understanding of urban biodiversity and support the development of sustainable birdwatching ecotourism in urban settings.

LITERATURE REVIEW

Ecotourism and the Emergence of Urban Birdwatching

Ecotourism is broadly defined as responsible travel to natural areas that promotes environmental conservation, supports the well-being of local communities, and provides educational experiences (Avenzora, 2008). As a branch of nature-based tourism, it is designed to balance ecological sustainability with economic and socio-cultural benefits. Among various forms of ecotourism, birdwatching—or avitourism—has gained significant global attention. Characterized by the non-consumptive observation of wild birds, birdwatching is considered a low-impact activity that appeals to environmentally conscious tourists (Callaghan et al., 2018; Hvenegaard, 2002). It offers dual benefits: personal enjoyment and broader support for conservation, environmental education, and local economic development (Biggs et al., 2021; De Salvo et al., 2022). Traditionally conducted in rural or protected areas, birdwatching is now expanding into urban landscapes, driven by the accessibility of city parks and growing public interest in biodiversity. In this context, urban birdwatching has emerged as a practical and inclusive conservation tool, especially where infrastructure limits access to remote natural sites (Kurnia, 2021). Bird species that are visually striking or vocally distinct—commonly found even in urban environments—often serve as ecological ambassadors, reinforcing public appreciation and policy support for biodiversity (Hedblom et al., 2014; Clucas et al., 2015).

Role of Urban Green Spaces in Supporting Avian Biodiversity

Urban green spaces (UGS)—such as public parks, forests, community gardens, and ecological corridors—serve as important refuges for biodiversity within rapidly urbanizing regions. Despite fragmentation and anthropogenic pressures, these spaces often support diverse bird communities by providing foraging, nesting, and migratory stopover sites (Hostetler et al., 2005; Strohbach et al., 2013). Empirical studies from multiple urban contexts confirm this potential. For example, 243 bird species have been documented in Jakarta in various green spaces, indicating notable ecological resilience (Mardiastuti et al., 2020). Localized research has shown that even small-scale parks, such as Taman Spatodea and Tabebuya Park, host high avian richness (Hutami et al., 2023), while similar studies in China highlight the ecological value of urban woodlots (Chen et al., 2006). Moreover, birds in urban areas exhibit behavioral flexibility and ecological tolerance, making them well-adapted to fragmented habitats (Bonier et al., 2007). These findings suggest that urban green spaces mitigate biodiversity loss and offer promising opportunities for promoting ecotourism and public engagement with nature through birdwatching.

Research Gap and Study Relevance

While urban birdwatching is gaining global traction, especially as a tool for conservation and education (Afanasiev, 2022; Iswandaru et al., 2023), site-specific ecological data remains scarce from Indonesian cities. Current avitourism efforts are largely focused on forested or rural areas, with limited emphasis on urban parks. Tebet Eco Park, a multifunctional green space in South Jakarta, is known to support birdlife (Larasati et al., 2024). However, no comprehensive ecological assessment has been conducted to evaluate its bird species diversity or potential as a birdwatching destination. This study aims to address that gap, providing empirical data to support sustainable urban ecotourism development and inform biodiversity-friendly city planning.

METHODS

This study was conducted at Tebet Eco Park, a 7.3-hectare urban green space in South Jakarta, Indonesia (Figure 1). Administratively, the park is divided into two zones: the Northern Zone, which borders Menteng Dalam, Tebet Barat, Tebet Timur, and Kebon Baru; and the Southern Zone, adjacent to Bukit Duri, Tebet Timur, and Manggarai. As a multifunctional public park that integrates ecological, educational, and recreational elements, Tebet Eco Park offers a suitable environment for studying bird diversity and assessing its potential for urban ecotourism, particularly birdwatching.
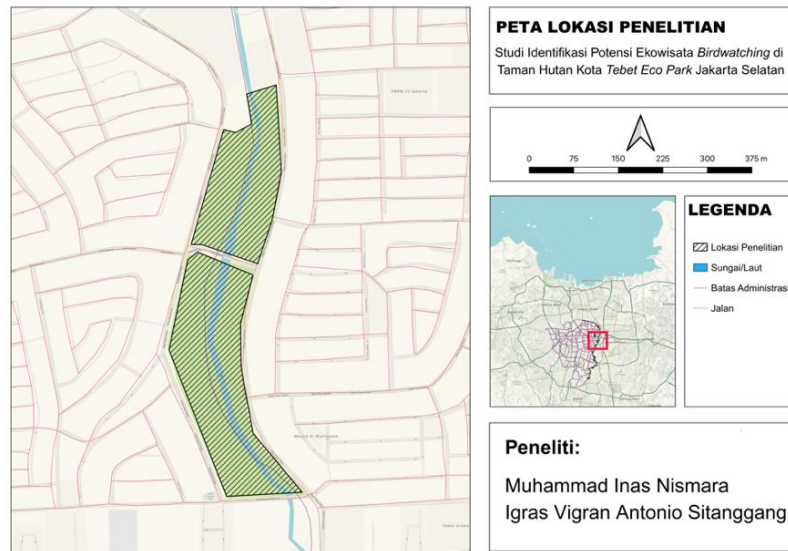
Figure 1. Map of Research Location
Source: Research data, 2025

A descriptive, quantitative approach was employed, utilizing direct observation through the fixed-path transect method. Observations were conducted across both park zones from October to December 2024. Data were collected during three specific time intervals—morning (07:00–10:00 WIB), midday (12:00–14:00 WIB), and afternoon (15:00–17:00 WIB)—to capture variations in bird activity throughout the day. Each observation session lasted approximately 180 minutes, and observers systematically recorded bird sightings along pre-established paths. Equipment included binoculars, field notebooks, and the Merlin Bird ID mobile application to aid visual and acoustic species identification. The observer recorded species name, number of individuals, behavior (if notable), and location within the park for every bird encountered.

Species identification adhered to the taxonomic classification of MacKinnon et al. (2010) and nomenclature guidelines provided by Sukmantoro et al. (2007). Additional classification concerning conservation status, endemism, and legal protection was referenced from the IUCN Red List (2024), the CITES Checklist (2024), and Indonesia's Ministry of Environment and Forestry Regulation No. 106/2018. Quantitative analysis involved several standard ecological indices. Species diversity was assessed using the Shannon-Wiener Diversity Index (H'), calculated as:

$$P_i = \frac{n_i}{N}$$

$$H' = \sum_{i=1}^{s} \left(\frac{n}{k}\right) Pi^{ln_2} Pi^2$$

Where pi is the proportion of individuals of species i relative to the total number of individuals (N), and S is the total number of species. Diversity levels were interpreted according to Odum (1993):

H'<1: low diversity
H'=1–3: moderate diversity
H'>3: high diversity

Species richness was evaluated using Margalef's Richness Index (R), defined as:

$$R = \frac{S-1}{LN\ (N)}$$

S is the total number of species, and N is the number of individuals observed. Richness levels were classified as follows:

R<2.5: low richness
R=2.5–4: moderate richness
R>4: high richness

To assess species dominance, the study employed Helvoort's Dominance Index (Di), calculated as:

$$D = \frac{N_i}{N} \times 100\%$$

where ni is the number of individuals of species i, and N is the total number of individuals across all species. Based on this index:

Di<2%: not dominant
Di=2–5%: sub-dominant
Di>5%: dominant

Species abundance was evaluated using encounter frequency per 10 observation hours and categorized using (Bibby et al., 1998) as follows:
< 0.1%: Very Rare
0.1–2.0%: Uncommon
2.1–10.0%: Frequent
10.1–40.0%: Common
40.0%: Abundant

All data were processed using descriptive statistics and summarized into comparative tables for further interpretation in the context of ecotourism development.

RESULTS AND DISCUSSION

A total of 24 bird species, representing 21 families, were recorded during the study period at Tebet Eco Park. The species observed varied in abundance, dominance, and distribution across the northern and southern zones of the park. Quantitative analysis of bird community structure revealed moderate levels of diversity and richness.

Species Diversity and Richness

Based on the Shannon-Wiener Diversity Index, the avian community at Tebet Eco Park demonstrated moderate species diversity, with a calculated index of *H'*=2.46. This suggests a relatively balanced species distribution with no single species overwhelmingly dominating the community. Similarly, the Margalef Richness Index yielded a value of R=3.44, indicating moderate species richness (see Table 1). These values reflect a stable avian community structure that is favorable for developing birdwatching ecotourism.
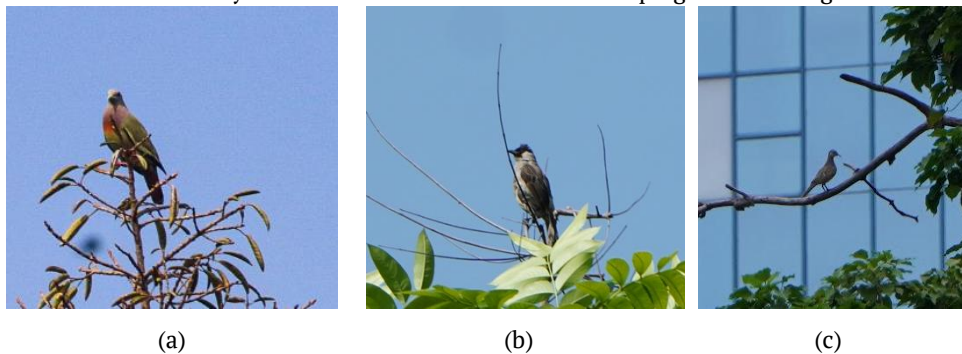

| (a) | (b) | (c) |

Figure 2. Representative Bird Species Observed in Tebet Eco Park
(a) Treron vernans (Pink-necked Green Pigeon); (b) Pycnonotus aurigaster (Sooty-headed Bulbul); (c) Streptopelia chinensis (Spotted Dove)
Sources: Research data, 20205

Dominant and Abundant Species

Analysis of species dominance showed that Streptopelia chinensis (Spotted Dove) was the most dominant species, accounting for 23.57% of all individual sightings. It was followed by Pycnonotus aurigaster (Sooty-headed Bulbul) with 19.29%, and Passer montanus (Eurasian Tree Sparrow) with 12.86%. According to Helvoort's criteria, S. chinensis was classified as dominant, while P. Aurigaster and P. montanus were considered subdominant. All three species were also categorized as common to abundant based on (Bibby et al., 1998) encounter frequency classification.

Table 1. Species Abundance, Dominance, and Relative Frequency in Tebet Eco Park

No.	Species Name	Local Name	n_i	Dominance (%)	Abundance Category
1	*Streptopelia chinensis*	Tekukur	33	23.57%	Abundant
2	*Pycnonotus aurigaster*	Cucak kutilang	27	19.29%	Common
3	*Passer montanus*	Burung-gereja erasia	18	12.86%	Common
4	*Collocalia linchi*	Walet linci	16	11.43%	Common
5	*Lonchura punctulata*	Bondol peking	8	5.71%	Frequent
6	*Nectarinia jugularis*	Burung-madu sriganti	7	5.00%	Frequent

No.	Species Name	Local Name	n_i	Dominance (%)	Abundance Category
7	*Megalaima haemacephala*	Takur ungkut-ungkut	7	5.00%	Frequent
8	*Meiglyptes tristis*	Caladi ulam	3	2.14%	Frequent
9	*Treron vernans*	Punai gading	3	2.14%	Frequent
10	*Orthotomus sutorius*	Cinenen pisang	2	1.43%	Frequent
11	*Cisticola juncidis*	Cici padi	2	1.43%	Frequent
12	*Dendrocopos moluccensis*	Caladi tilik	2	1.43%	Frequent
13	*Lalage nigra*	Kapasan kemiri	1	0.71%	Uncommon
14	*Eudynamys scolopaceus*	Tuwur asia	1	0.71%	Uncommon
15	*Dicaeum trochileum*	Cabai jawa	1	0.71%	Uncommon
16	*Psittacula alexandri*	Betet biasa	1	0.71%	Uncommon
17	*Agropsar sturninus*	Jalak cina	1	0.71%	Uncommon
18	*Zosterops palpebrosus*	Kacamata biasa	1	0.71%	Uncommon
19	*Oriolus chinensis*	Kepudang	1	0.71%	Uncommon
20	*Apus nipalensis*	Kapinis rumah	1	0.71%	Uncommon
21	*Pericrocotus cinnamomeus*	Sepah kecil	1	0.71%	Uncommon
22	*Aegithina tiphia*	Cipoh kacat	1	0.71%	Uncommon
23	*Hirundo tahitica*	Layang-layang batu	1	0.71%	Uncommon
24	*Gerygone sulphurea*	Remetuk laut	1	0.71%	Uncommon
	Total		**140**	**100%**	

Notes: Dominance (%) is calculated as $ni/N \times 100\%$ where n_i is the number of individuals of species i, and N is the total number of all individuals observed (140).
Abundance Categories follow (Bibby et al. (1998): Abundant: > 40.0%; Common: 10.1–40.0%; Frequent: 2.1–10.0%; Uncommon: 0.1–2.0%; Very Rare: < 0.1%
Source: Research data, 2025

Conservation Value and Tourism Potential

In addition to community structure, the study also assessed each species' conservation and tourism potential based on conservation status, endemism, plumage coloration, and vocal appeal. Most species observed were listed as Least Concern (LC) by the IUCN, although two species warranted conservation attention: 1) Psittacula alexandri (Alexandrine Parakeet) – Near Threatened (NT); and 2) Zosterops palpebrosus (Oriental White-eye) – Vulnerable (VU). Moreover, three species—Collocalia linchi (Glossy Swiftlet), Dendrocopos moluccensis (Crimson-winged Woodpecker), and Dicaeum trochileum (Scarlet-backed Flowerpecker)—were classified as endemic to Indonesia. Species with high birdwatching potential were identified based on their acoustic distinctiveness and colorful plumage. For instance, Nectarinia jugularis (Olive-backed Sunbird) was noted for its vibrant coloration and melodious song, making it a strong ecotourism attraction.

Table 2. Conservation Status and Ecotourism Potential of Bird Species Observed in Tebet Eco Park

Species Name	IUCN	CITES	Prot.	End.	S	C
Streptopelia chinensis	LC	–	–	–	–	–
Pycnonotus aurigaster	LC	–	–	✓	✓	–
Passer montanus	LC	–	–	–	–	–
Collocalia linchi	LC	–	–	✓	–	–
Lonchura punctulata	LC	–	–	–	–	–
Nectarinia jugularis	LC	–	–	✓	✓	✓
Megalaima haemacephala	LC	–	–	–	–	✓
Meiglyptes tristis	LC	–	–	–	–	✓
Orthotomus sutorius	LC	–	–	✓	✓	–
Cisticola juncidis	LC	–	–	✓	✓	–
Dendrocopos moluccensis	LC	–	✓	✓	✓	✓
Lalage nigra	LC	–	–	–	–	✓
Treron vernans	LC	–	–	–	–	–
Eudynamys scolopaceus	LC	–	–	✓	✓	–
Dicaeum trochileum	LC	–	✓	✓	✓	–
Psittacula alexandri	NT	II	✓	–	–	✓
Agropsar sturninus	LC	–	–	✓	✓	–
Zosterops palpebrosus	VU	–	✓	✓	✓	✓
Oriolus chinensis	LC	–	✓	✓	✓	✓
Apus nipalensis	LC	–	–	–	–	–

Species Name	IUCN	CITES	Prot.	End.	S	C
Pericrocotus cinnamomeus	LC	–	✓	✓	✓	✓
Aegithina tiphia	LC	–	–	✓	✓	–
Hirundo tahitica	LC	–	–	–	–	–
Gerygone sulphurea	LC	–	–	✓	✓	–

Legend: IUCN: Conservation status — LC = Least Concern, NT = Near Threatened, VU = Vulnerable; Prot.: Protected under Indonesian law (P.106/2018); End.: Endemic to Indonesia; S: Songbird (melodious vocalization); C: Colourful plumage; ✓ = attribute present; – = not applicable / not recorded
Source: Research data, 2025

Discussion

The results of this study demonstrate that Tebet Eco Park, despite its relatively small size and urban setting, hosts a moderately diverse bird community, with 24 species from 21 families recorded. The Shannon-Wiener index (H' = 2.46) and Margalef richness index (R = 3.44) indicate moderate diversity and community stability, suggesting the park is a valuable ecological niche amidst Jakarta's urban sprawl. These values align with findings from other urban green spaces in Jakarta, such as Taman Tabebuya and Hutan Kota Pesanggrahan, which have also reported moderate to high bird diversity in limited green space (Hutami et al., 2023; Mucharror, 2021). Notably, several species recorded in this study are typical of urban-adapted environments. Streptopelia chinensis and Pycnonotus aurigaster, identified as the most dominant and abundant species, have been widely documented as successful urban dwellers (Bonier et al., 2007). Their dominance is likely driven by behavioral flexibility, generalist feeding strategies, and adaptability to fragmented habitats. However, the presence of more sensitive and conservation-relevant species, such as Psittacula alexandri (NT) and Zosterops palpebrosus (VU), reveals that the park may also serve as a refuge for species under threat, adding conservation value to its ecotourism potential.

From an avitourism perspective, the park hosts several species with high visual or acoustic appeal, including Nectarinia jugularis, Megalaima haemacephala, and Dendrocopos moluccensis. These characteristics are central to successful birdwatching destinations, as aesthetic value and detectability are key motivators for birdwatchers (Callaghan et al., 2018; Hedblom et al., 2014). Moreover, the occurrence of three endemic species adds a unique selling point to the site, particularly for international tourists seeking species not found elsewhere. Tebet Eco Park presents a unique urban ecotourism model compared to traditional birdwatching locations in rural or protected areas. Its accessibility, infrastructure, and proximity to residential areas make it ideal for short-duration, low-cost birdwatching experiences. As (Kurnia, 2021) noted, urban green spaces can serve as practical entry points for public engagement in biodiversity conservation and nature-based recreation, especially in densely populated cities.

Nevertheless, the park's urban context also presents conservation challenges. The presence of species listed as vulnerable or near threatened underscores the importance of mitigating human disturbance, preventing habitat degradation, and regulating illegal bird trade—especially in light of the widespread trafficking of parrot species in Indonesia (Chng et al., 2015; Collar et al., 2020). This highlights the need for management strategies that balance recreational use with habitat protection, such as zoning, visitor education, and installing birdwatching signage or interpretive materials. Collaboration with community groups such as the Jakarta Birdwatcher Society could promote guided tours, citizen science projects, and youth engagement programs to support ecotourism development further. These efforts increase park visitation and help build a conservation-minded public. Additionally, the park authority may consider adopting an urban biodiversity monitoring program, using birds as indicator species to assess environmental health over time.

CONCLUSION

This study demonstrates that Tebet Eco Park, a relatively small urban green space in South Jakarta, possesses significant potential to be developed as a birdwatching ecotourism destination. A total of 24 bird species from 21 families were recorded, with the Shannon-Wiener diversity index (H' = 2.46) and Margalef richness index (R = 3.44) indicating moderate species diversity and richness. The presence of urban-adapted species (e.g., Streptopelia chinensis) and conservation-relevant species (e.g., Psittacula alexandri, Zosterops palpebrosus) highlights the ecological importance of this park.

Moreover, several species identified in the park exhibit tourism-attractive traits, such as melodious vocalizations and vibrant plumage, making them ideal for urban avitourism. The occurrence of endemic and legally protected birds further adds to the park's uniqueness as a site for public education, citizen engagement,

and sustainable nature-based recreation. These findings support integrating urban biodiversity conservation with ecotourism planning in Indonesia's metropolitan areas.

Recommendation

To enhance Tebet Eco Park's role as an urban birdwatching destination, the following recommendations are proposed: 1) Install Interpretive Signage and Birdwatching Trails: Develop informative panels with species names, photos, conservation status, and QR codes linking to bird calls or behavioral videos. Design birdwatching paths to minimize disturbance while maximizing viewing opportunities; 2) Engage Local Communities and Birdwatching Organizations: Collaborate with the Jakarta Birdwatcher Society and local schools to organize guided tours, citizen science programs, and environmental education activities, especially for youth and first-time birders; 3) Implement Habitat Enhancement and Protection Measures: Maintain vegetative diversity and water sources to support avian habitat quality. Enforce regulations against bird capture or trade, especially for protected species (e.g., Psittacula alexandri); 4) Incorporate Bird Monitoring into Urban Planning: Use birds as indicator species in long-term urban ecological monitoring. This data can support adaptive park management and inform green space development across the city; 5) Promote Urban Avitourism through Public Awareness Campaigns: Highlight the accessibility and conservation value of urban birdwatching through social media, tourism platforms, and park visitor centers to broaden public interest and support.

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