The Potential of Birds as Objects for Avitourism Interpretation in the Mandalika Special Economic Zone

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Abstract: Birds provide various environmental benefits, including serving as tourist attractions in certain areas. Concerns over environmentally unfriendly tourist behaviors threaten bird communities, necessitating educational activities. Avitourism interpretation is an eco-friendly tourism approach that educates visitors on the importance of bird conservation in nature. This study aims to identify bird species and their distribution that have the potential to serve as interpretation objects for avitourism in the Mandalika Special Economic Zone. This study used the Mackinnon Species List method for bird data collection and literature review to determine potential objects for avitourism interpretation. Data analysis was conducted using descriptive-quantitative analysis. Based on the findings, 37 bird species were identified as having potential for interpretation as objects. These include bird species with high conservation status, endemic birds, birds with unique morphological characteristics, migratory birds, birds associated with cultural significance, and birds with the highest encounter frequencies. 65% of bird species identified as interpretation objects are distributed along the Novotel Mangrove trail. Based on avitourist preferences, the recommended trail for interpretation is the Novotel Mangrove trail for all categories of avitourists, particularly beginners with a preference for birds with unique morphological features and high encounter frequencies. Meanwhile, for intermediate and advanced avitourist categories, the Gerupuk Mangrove, Songgong Mangrove, Merese Plantation, and Merese Hill trails are also recommended because they feature endemic bird species, species with high conservation status, and migratory birds that can only be found in those trails.

Keywords: Avitourism interpretation; bird; The Mandalika SEZ

Introduction

Birds hold significant value and diversity in performing various functions within the environment. Bird communities in a specific area are utilized as one of the indicators to assess environmental quality (Francis et al., 2017). The role of birds in the environment is crucial for maintaining ecosystem balance, such as controlling pests and dispersing plant seeds (Mulyani & Iqbal,

2020). The presence of bird communities in an area is also leveraged as a tourism attraction, which can enhance the local economy (Asefa, 2016). Bird communities are increasingly gaining prominence in the tourism sector; however, their existence in the wild is increasingly threatened by irresponsible human activities. Human activities can lead to habitat loss and changes in the trophic structure of bird communities (Haddad et al., 2015; Peter et al., 2015). Activities such as

illegal hunting, land conversion, and environmental pollution have significantly contributed to the decline in bird populations and even species extinction. These activities occur partly due to a lack of knowledge about the importance of bird communities in nature.

Interpretation activities are one solution to minimize the threat of declining bird populations in the wild due to human activities. Interpretation is the process of delivering messages and impressions to enhance listeners' understanding and appreciation of the objects being described (Rachmawati et al., 2021). According to Ham (1992) Interpretation is an educational activity aimed at revealing the meaning and relationships of an object through direct experiences or illustrative media. Interpretation can provide opportunities to prevent the decline in bird populations by raising awareness of bird conservation through meaningful experiences such as birdwatching or avitourism.

Avitourism is the activity of observing birds in their natural habitats (Tan et al., 2023). Avitourism was first introduced by Edmund Selous in 1901 as a form of bird conservation tourism (Szczepańska et al., 2015). This activity accommodates individuals who enjoy birdwatching and serves as an effort to conserve birds in their in situ habitats. Birdwatchers (avitourists) typically travel to observe bird morphology or to seek rare, endemic birds with high conservation status, depending on the avitourist's level of expertise.

The Mandalika Special Economic Zone (SEZ) has the potential to become an avitourism destination as it serves as an important habitat providing ecosystem services for bird communities. According to Salahuddin (2021) 65 bird species have been identified in the area, including migratory, endemic, and protected species.

However, the existence of these birds is increasingly threatened by the construction of hotels, highways, and other tourism facilities, as well as irresponsible tourist activities. One of the efforts to prevent threats to bird communities in the Mandalika Special Economic Zone (SEZ) is by educating tourists through avitourism interpretation. Interpretation in avitourism is expected to provide a way of utilizing ecosystems while preserving the environment, aiming to foster emotional and intellectual connections while developing awareness, appreciation, and a deeper understanding of bird communities.

To ensure the optimal implementation of avitourism interpretation, it is essential to study the potential of birds in the Mandalika Special Economic Zone (SEZ) as interpretation objects. The study aims to identify bird species with potential as interpretation objects and to map their distribution, thereby facilitating tourists in obtaining comprehensive information.

Method

Time and Place of Research

This research was conducted in the Mandalika Special Economic Zone (SEZ), Central Lombok Regency, West Nusa Tenggara Province, in August 2024. Eight bird observation trails were selected as observation points in the Mandalika SEZ: Novotel Mangrove, Gerupuk Mangrove, Songgong Mangrove, Gerupuk Plantation, Merese Plantation, Merese Hill, Fishermen's Village, and Tourism Village (Figure 1). These eight trails represent the bird habitat types found in the Mandalika SEZ, including savanna, mixed plantations, mangroves, and urban areas.
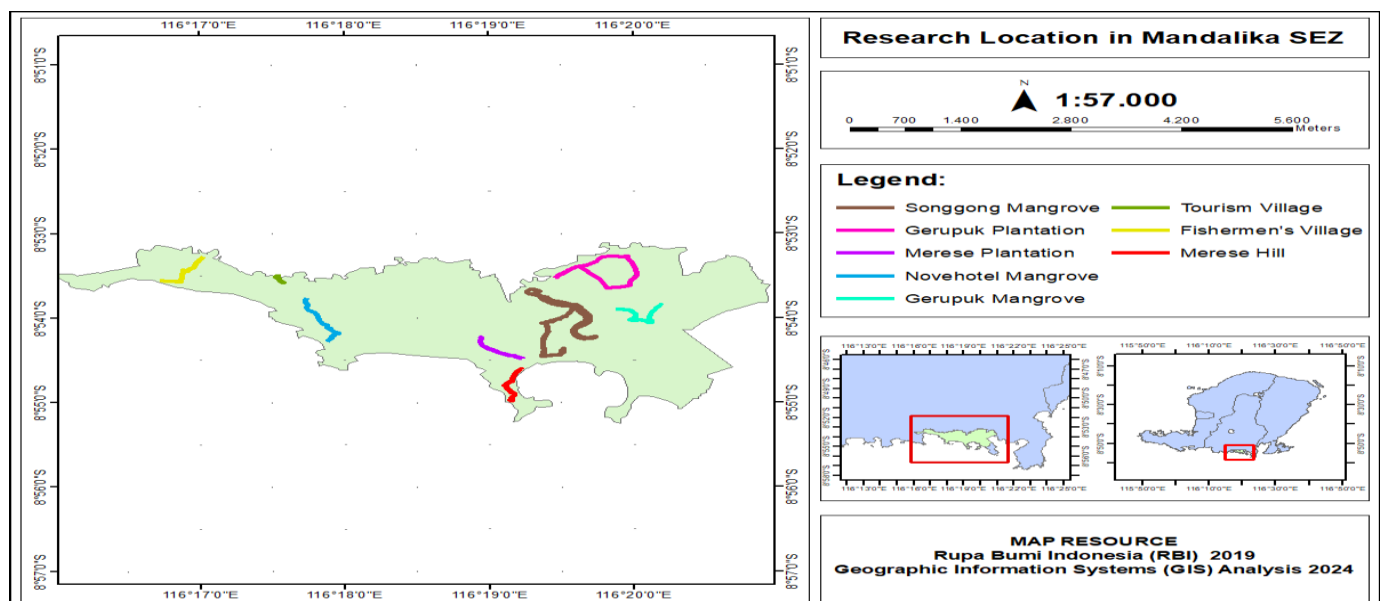

Figure 1. Research Location Map

Tools and Materials

The tools and materials used in this research included a Canon 70D KIT 18-300mm camera, binoculars, Avenza Maps 5.3.3, data sheets, writing instruments, the *Birds of Wallacea Field Guide* book, and data on bird species in the Mandalika SEZ. Several software programs were used for data analysis, including Microsoft Excel 2021 and ArcMap 10.8.

Data Colection Procedure

Bird data collection included bird species names, the number of individuals per species, the time of bird encounters, and the coordinates of bird encounter locations, using the MacKinnon Species List method. The MacKinnon Species List method was used to determine bird species richness by recording the species encountered in a species list. (MacKinnon et al., 2010). Bird data were collected from each observation trail explored, and every bird species encountered was counted and recorded on the bird species list sheet. Each species was recorded only once on each bird species list sheet, and each sheet consisted of only 10 bird species. If the bird species list sheet reached 10 species, a new list sheet was created for the 11th species. Observations continued as long as new bird species were encountered on a species list, but they were stopped when no new species were found. Observations were conducted on each trail from 06:00 to 09:00 WITA and 15:00 to 18:00 WITA. The recorded bird species were then identified for their potential as avitourism interpretation objects based on criteria such as endemism, conservation status, migratory status, encounter frequency, cultural relevance, and unique morphology using a literature review.

Data Analysis

The collected bird data were analyzed for their potential as avitourism interpretation objects using a scoring method based on six indicators of avitourism interpretation potential: endemism, conservation status, migratory status, encounter frequency, cultural relevance, and unique morphology (Jien et al., 2021; Mokhter et al., 2022). Each indicator was assigned a minimum score of 1 and a maximum score of 4, based on predetermined criteria (Table 1). Bird species identified as having potential for avitourism interpretation were those with a total score across all indicators of ≥12. This threshold was determined as it exceeds half of the maximum total score, which is 24. The encounter frequency of bird species can be calculated using the following formula (Dillak et al., 2020):

$$F = \frac{fi}{N} \tag{1}$$

Explanation:
F = Encounter frequency of the species
fi = Number of species lists where a particular species was found
N = Total number of species lists

After identifying bird species with potential as interpretation objects through scoring analysis, the distribution of these bird species was analyzed using the overlay method with ArcMap 10.8 software. This process involves overlaying the administrative map of the Mandalika Special Economic Zone (SEZ) with the coordinate points of bird species identified as potential interpretation objects.

Table 1. Assessment Criteria for Bird Species with Potential as Avitourism Interpretation Objects

Indicator	Criteria	Score	Information
Endemicity	Endemic to NTB	4	This type of bird is only found in NTB
	Endemic to Wallacea	3	This type of bird is only found in the Wallacea line area
	Endemic to Indonesia	2	This type of bird can only be found in Indonesia
	Not Endemic	1	Types of birds that can be found outside Indonesia Morphological Uniqueness
Color (Garnett et al., 2018)	Colorful (Bright colors like red, yellow, blue, green, and gold)	4	Types of songbirds and/or large and/or colorful
	Patterned (Having contrasting color patches)	3	Types of songbirds and/or medium-sized and/or patterned
	Monochrome (Not bright colors such as brown, white, black, and grey)	2	Types of songbirds and/or small in size and/or monochrome
Size (Coates, 2000)	Large (>40 cm)	1	Excluding songbirds and/or small-sized and/or monochrome birds
	Medium (17-40 cm)		
	Small (<17 cm)		
Relation to Culture	It has traditional values (terms, dances, songs, symbols, traditional ceremonies, stories, poetry),	4	This type of bird has 3 useful values.
		3	This type of bird only has 2 useful values.
		2	This type of bird only has 1 useful value.

Indicator	Criteria	Score	Information
	economic values (food, pets, medicine), and ecological values.		
		1	This type of bird has no useful value.
Migration Status (Son, 2023)	*Complete Migrant*	4	Bird species where >90% of individuals leave the breeding site
	Partial Migrants	3	Bird species where <90% of individuals leave the breeding site
	Irruptive Migrants	2	Types of birds that have irregular migration habits
	Non-migrants	1	Types of birds that do not migrate or types of resident birds
Conservation Status	Critically Endangered	4	EN status based on the IUCN Redlist and/or Protection based on the Minister of Environment and Forestry Regulation No. P.106 of 2018
	Threatened	3	VU status based on the IUCN Red List and/or Protection based on LHK Regulation No. P 106 of 2018
	Prone to	2	Has NT status based on the IUCN Red List and/or Protection based on LHK Regulation No. P 106 of 2018
	Low Risk	1	Is LC based on the IUCN Redlist, and/or does not have Protection status based on LHK Regulation No. P.106 of 2018
Frequency of Encounters (Dillak et al., 2020)	Overflowing	4	Birds have an encounter frequency value of 0.72-1.00
	Often	3	Birds have an encounter frequency value of 0.48-0.71
	General	2	Birds have an encounter frequency value of 0.24-0.47
	Seldom	1	Birds have an encounter frequency of 0.1-0.23

Result and Discussion

Bird Species with Potential as Interpretation Objects in the Mandalika SEZ

The Results of field observations revealed that 63 bird species belonging to 33 families were identified across the eight trails in the Mandalika Special Economic Zone (SEZ). Of these 63 bird species, 37 were found to have potential as avitourism interpretation objects based on an evaluation of six avitourism attraction potential indicators: endemism, conservation status, migratory status, cultural relevance, unique morphology, and encounter frequency for each species (Table 2).

Table 2 Assessment of Bird Species with Potential as Avitourism Interpretation Objects

Bird Species	Conservation Status	Endemicity	Morphological Uniqueness	Migration Status	Relation to Culture	Frequency of Encounters	Total Score
Western Great-egret	2	1	4	4	3	1	15
Blue-tailed Bee-eater	1	1	4	4	3	2	15
Siberian Sand-plover	4	1	3	3	2	2	15
Whimbrel	2	1	4	4	3	1	15
Small Blue Kingfisher	1	2	4	1	3	3	14
Sacred Kingfisher	1	1	4	4	2	2	14
Purple Heron	1	1	4	4	3	1	14
Pacific Reef-egret	1	1	4	4	3	1	14
Olive-backed Tailorbird	1	2	4	1	3	3	14
Greater-crested Tern	2	1	4	4	2	1	14
Javan Myna	3	2	4	1	3	1	14
Collared Kingfisher	1	1	4	1	3	3	13
White-shouldered Triller	1	2	3	1	3	3	13
Javan Plover	2	2	3	1	3	2	13
Black-naped Tern	2	1	3	4	2	1	13
Eurasian Tree Sparrow	1	1	3	1	4	3	13
Grey-tailed Tattler	2	1	3	4	2	1	13
Lemon-bellied White-eye	1	2	4	1	2	3	13
Red-chested Flowerpecker	1	4	4	1	2	1	13
Sunda Teal	2	1	4	1	4	1	13

Bird Species	Conservation Status	Endemicity	Morphological Uniqueness	Migration Status	Relation to Culture	Frequency of Encounters	Total Score
Spotted Kestrel	2	2	3	1	4	1	13
Common Sandpiper	1	1	3	4	3	1	13
Brahminy Kite	2	1	4	1	3	1	12
Cave Swiftlet	1	1	1	1	4	4	12
Greater Sand-plover	1	1	3	4	2	1	12
Pacific Golden-plover	1	1	3	4	2	1	12
Pale-headed Munia	1	3	4	1	1	2	12
Blue-eared Kingfisher	1	1	4	1	4	1	12
Scaly-crowned Honeyeater	1	4	4	1	1	1	12
Black-shouldered Kite	2	1	3	1	4	1	12
Rainbow Bee-eater	1	1	4	4	1	1	12
Black-naped Monarch	1	1	4	1	2	3	12
Wood Sandpiper	1	1	3	4	2	1	12
Garden Sunbird	1	1	4	1	2	3	12
Elegant Pitta	2	3	4	1	1	1	12
Little Egret	1	1	4	1	3	2	12
Scarlet-headed Flowerpecker	1	2	4	1	3	1	12

A total of 15 bird species with high conservation status were identified in the Mandalika Special Economic Zone (SEZ). Birds with high conservation status are those protected under Regulation of the Minister of Environment and Forestry (Permen LHK) No. P.106 of 2018 and listed as Near Threatened, Vulnerable, Endangered, or Critically Endangered on the IUCN Red List (Sukistyanawati et al., 2016). Among these 15 species, 10 are protected species, 3 are categorized as Near Threatened, and the remaining species are classified as Vulnerable and Endangered. Birds with high conservation status attract tourists due to the unique experience they offer and their role as a source of information for individuals interested in conservation. Birdwatchers prioritize observing rare or previously unseen birds as a way to gain new experiences and knowledge (Stemmer et al., 2022). Although birds with high conservation status are often difficult to spot in the wild, they hold a unique appeal for birdwatchers, offering a sense of accomplishment and appreciation for tourists who manage to find them.

The richness of endemic species in the Mandalika Special Economic Zone (SEZ) serves as a significant attraction to promote avitourism. Birds with limited distribution have a unique appeal for tourists, particularly international visitors, who are often unfamiliar with endemic bird species. Endemism in a region adds value to the development of avitourism (Sari et al., 2020). There are 13 endemic bird species with potential as avitourism interpretation objects in the Mandalika SEZ. Of these, 9 species are endemic to Indonesia, 2 are endemic to Wallacea, and 2 are endemic to West Nusa Tenggara. Endemic birds are species that can only be found in specific areas, making them a key attraction for avitourism. They are particularly

appealing to birdwatchers who are concerned with conservation, as their limited distribution often classifies them as protected species (Ocampo-Peñuela & Winton, 2017). Endemic birds in the Mandalika Special Economic Zone (SEZ), aside from being a tourist attraction, also require serious attention to their conservation. Therefore, interpretation is needed to gain public support for their preservation.

Morphological uniqueness is one of the key indicators of avitourism interpretation appeal. Birds with bright plumage, large size, or those classified as songbirds are particularly attractive to tourists, especially beginners in birdwatching (Garnett et al., 2018; Maldonado et al., 2018). Several bird species in the Mandalika Special Economic Zone (SEZ) possess unique morphological characteristics that have the potential to attract avitourism. These include 12 species of songbirds, 7 large-sized bird species, and 10 species with bright plumage. Birds of large sizes and striking plumage are often targeted by wildlife photographers, while birds with unique and melodious songs are typically favored by bird-song enthusiasts. Birds with unique morphological features, such as colorful plumage, generally attract both birders and non-birders, making them a popular target for wildlife photographers (Mubarik et al., 2020)

The Mandalika Special Economic Zone (SEZ) is one of the locations designated as a destination for observing migratory birds. There are 15 species of migratory birds with the potential as avitourism interpretation objects in the Mandalika SEZ. Migratory birds are one of the attractions of avitourism because their presence can only be observed at certain times. Studies show that the presence of migratory bird species can influence tourists' destination choices (Vas, 2017). Not only appealing to

birdwatchers, migratory birds also draw the attention of several countries, particularly in conservation efforts, as their life cycles span across nations (Aditya et al., 2019). Migratory birds are considered shared wildlife for the regions they traverse, making their conservation a collaborative effort involving both local and international communities. Therefore, the migratory birds in the Mandalika Special Economic Zone (SEZ) hold significant potential to be utilized as interpretation objects.

The connection between birds and culture provides opportunities for developing avitourism by leveraging cultural values and local traditions related to birds. Bird communities have long been considered part of Indonesian culture, carrying ecological, economic, and socio-cultural significance (Mulyadi & Dede, 2020). All bird species with avitourism potential in the Mandalika Special Economic Zone (SEZ) are culturally linked, whether in economic, socio-cultural, or ecological aspects. Some bird species are used as food ingredients in certain regions and are even believed to be omens or myths associated with good or bad events. Tourists are generally attracted to birds with unique stories to interpret, such as species believed to be omens, used as food ingredients, or as traditional medicines. Birds connected to folklore, traditional medicines, food, and local beliefs hold significant points of interest in the benefits of ecotourism (Mokhter et al., 2022)

The encounter frequency of bird species is one of the considerations in evaluating birds with potential as avitourism interpretation objects. There are 8 bird species identified as potential interpretation objects based on their high encounter frequency. The high encounter frequency of these species is attributed to

their ability to adapt to various environmental conditions (Zaen & Rita, 2018). Birds that are easily encountered offer significant opportunities to attract tourists through enjoyable and educational birdwatching experiences, especially for tourists new to avitourism. Beginner birdwatchers tend to prefer species that are easy to observe (Kurnia, 2021).

The Mandalika Special Economic Zone (SEZ) holds the potential for developing avitourism interpretation, as several bird species meet the criteria to serve as avitourism attractions. According to MacKinnon et al. (2010) Areas with unique and rare attractions, such as distinctive and fascinating wildlife, strongly support their appeal as tourist destinations. In addition to being a tourist destination, the Mandalika SEZ can also contribute to bird and habitat conservation efforts, thereby serving as an educational platform for visitors.

Distribution of Bird Species with Potential as Interpretation Objects in the Mandalika SEZ

The distribution of bird species demonstrates a close relationship between the ecological needs of species and their habitat characteristics, which are typically affected by factors such as habitat suitability and ecosystem quality (Sultika et al., 2017). Based on observations, 62% of bird species with potential as avitourism interpretation objects are distributed along the Novotel Mangrove trail, comprising 23 species (Table 3). Bird species with potential as interpretation objects are distributed across almost all bird observation trails. However, some species can only be found in specific trails such as Novotel Mangrove, Fishermen's Village, Gerupuk Mangrove, Merese Plantation, Merese Hill, and Songgong Mangrove (Figure 2).

Table 3 Distribution of Bird Species with Potential as Interpretation Objects in Eight Research Routes

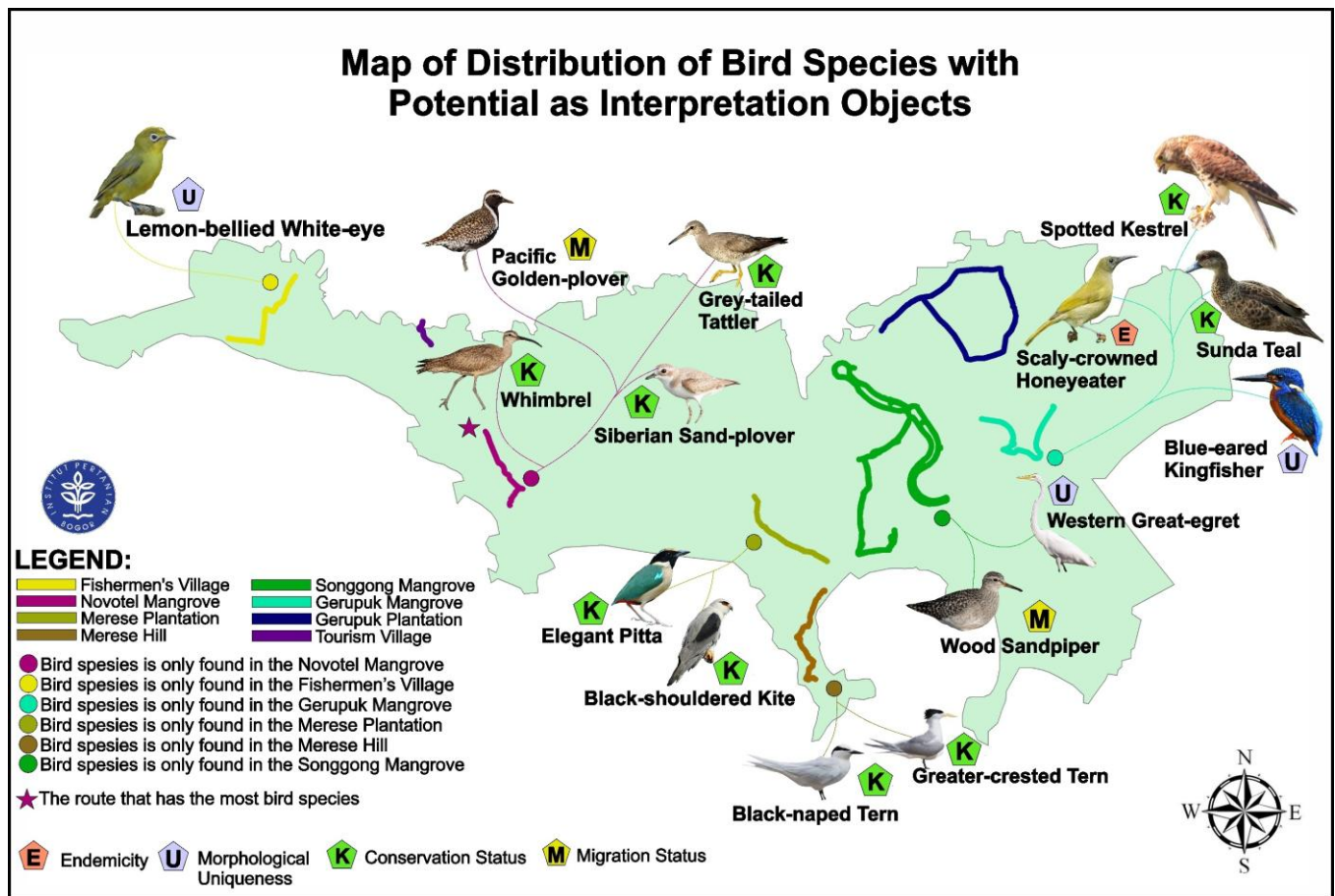| Route	Number of Bird Species	Bird Characteristics					
		Conservation Status	Endemicity	Morphological Uniqueness	Migration Status	Frequency of Encounters	Relation to Culture
Novotel Mangrove	24	4	8	14	10	6	1
Gerupuk Mangrove	19	3	7	13	5	6	4
Songgong Mangrove	17	3	5	12	8	6	1
Merese Hill	15	3	6	10	6	6	1
Fishermen's Village	11	0	4	8	3	5	1
Tourism Village	11	1	5	9	0	6	1
Merese Plantation	11	3	4	10	2	6	2
Gerupuk Plantation	10	0	4	8	1	6	1

Figure 2. Map of the Distribution of Bird Species with Potential as Interpretation Objects

The high number of birds in the Novotel Mangrove trail is due to the habitat conditions around the trail, which feature extensive mangrove vegetation and wetlands. These conditions provide ample food sources, such as fish, small crabs, and other aquatic organisms, for the birds in the area. The mangrove ecosystem is home to both waterbirds and terrestrial birds and serves as a stopover area for migratory birds. This is because the mangrove ecosystem offers abundant food supplies for birds, and the mangrove vegetation provides shelter (Latupapua & Solelisa, 2024). The remote location of the Novotel Mangrove trail, far from tourist activities, is another factor contributing to the high number of bird species found there, as it minimizes disturbances to bird activities. The high species richness in a particular location is also attributed to the diversity of habitat vegetation and the minimal human activity, allowing birds to carry out their activities, such as foraging, seeking shelter, and interacting (Putra et al., 2021; Hutami et al., 2022; Lestari & Kurnia, 2023). The Novotel Mangrove trail is home to many migratory bird species, some of which can only be found along this trail, including the Siberian Sand-plover, Pacific Golden-plover, Whimbrel, and Grey-tailed Tattler. Another bird species found in the Novotel Mangrove trail is the Javan

Flowerpecker. The Javan Flowerpecker is an endemic Indonesian bird classified under the order Passeriformes, or songbirds. Additionally, an endemic bird species of Lombok Island, the Lombok Flowerpecker, can also be found along this trail.

Figure 3. Novotel Mangrove Route

The Gerupuk Mangrove trail ranks as the second-highest trail in terms of the number of bird species with potential as avitourism interpretation objects, with 51%

or 19 species of the total bird species identified as interpretation objects, predominantly consisting of waterbird species (Figure 4). This is due to the extensive mangrove vegetation along the Gerupuk Mangrove trail, which provides abundant food sources. Mangrove plants have unique adaptations, thriving on muddy substrates in tidal areas, making them highly favorable feeding grounds for waterbirds. (Apriliyani et al., 2020). Several bird species can only be found along this trail, including an endemic bird species of Lombok Island, the Scaly-crowned Honeyeater. The presence of the Scaly-crowned Honeyeater in the Gerupuk Mangrove trail is attributed to the diverse vegetation around the trail, which provides food sources such as nectar from flowers, coconut trees, and other plants. Additionally, certain waterbird and raptor species can only be found along the Gerupuk Mangrove trail, such as the Spotted Kestrel and the Sunda Teal. These bird species utilize the wetlands for foraging, feeding on crustaceans and invertebrates. (Shihab et al., 2024).
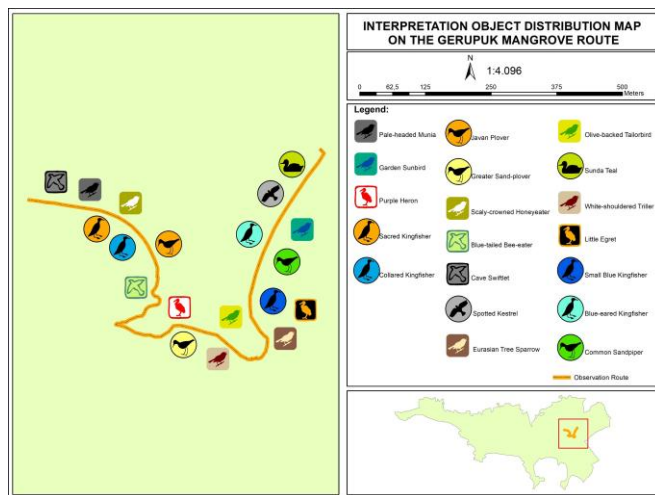

Figure 4. Gerupuk Mangrove Route

The Songgong Mangrove trail hosts 51% of bird species with potential as avitourism interpretation objects, or 19 species in total, two of which can only be found along this trail: the Western Great Egret and the Wood Sandpiper (Figure 5). The Songgong Mangrove trail is partially covered with mangrove vegetation and has extensive wetlands, providing a variety of biota such as fish, crabs, and shrimp as food sources for these two bird species. The Western Great Egret is known as a territorial bird, often hunting fish, shrimp, frogs, and various aquatic insects by standing upright and striking its prey from above (Jannah et al., 2019). The Wood Sandpiper is a migratory bird that breeds in Northern Eurasia and migrates to Southeast Asia during the winter, commonly found in wetland areas (Fajrin et al., 2019).
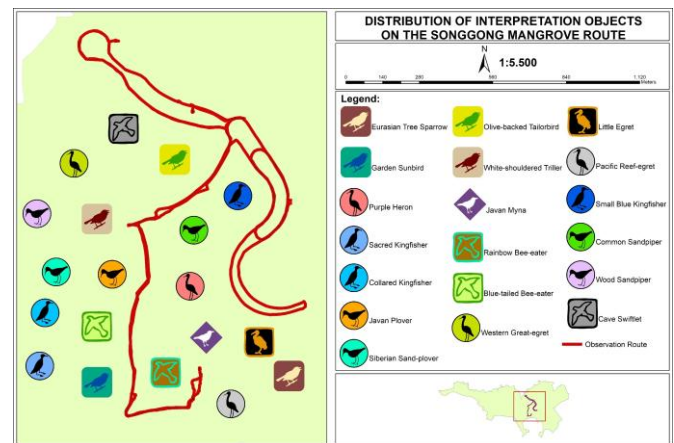

Figure 5 Songgong Mangrove Route

The Merese Plantation trail is among the trails with the fewest bird species identified as avitourism interpretation objects, accounting for 29% or 11 bird species (Figure 6). The Merese Plantation trail experiences high levels of human activity as it serves as the main access route for locals and tourists heading to residential areas or tourist attractions in the Mandalika SEZ. This activity disrupts the birds' behavior around the trail. Bird diversity and abundance are influenced by human activities in the surrounding area, which can cause noise and light pollution that negatively impact bird survival (Setiawati et al., 2023). The Merese Plantation trail hosts Wallacean endemic bird species and protected bird species that can only be found along this trail, namely the Black-shouldered Kite and the Elegant Pitta. The presence of these two species, which have different habitats, is due to the trail's conditions, which include open areas for the Black-shouldered Kite, such as hillsides along the trail, and shrub and bush vegetation suitable for the Elegant Pitta. The Black-shouldered Kite is a predatory bird whose habitat is in open areas with scattered trees or sparse canopy cover, while the Elegant Pitta is a shy bird often found in the depths of forests (Ramli & Fauzi, 2018; Yue et al., 2020).
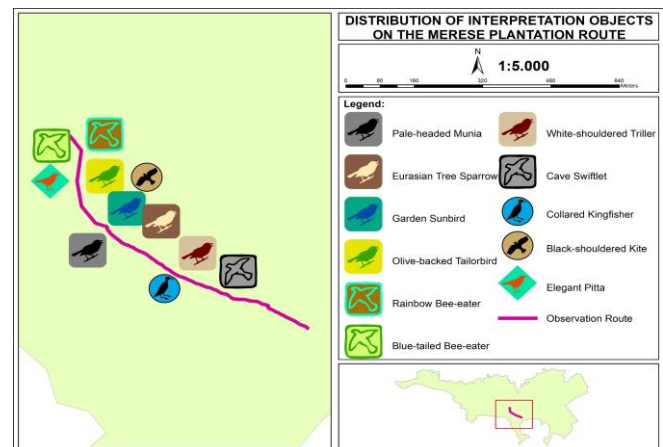

Figure 6. Merese Plantation Route

The Merese Hill trail is the only trail located in a highland area among the seven other observation trails, featuring extensive savanna that directly borders the open waters of the Indian Ocean. The Merese Hill trail hosts 41% of the bird species richness, with potential as avitourism interpretation objects, comprising 15 bird species, including two migratory bird species found exclusively in this location (Figure 7). The Greater-crested Tern and the Black-naped Tern are migratory bird species that can only be observed along the Merese Hill trail due to its open water areas, which align with the specific foraging patterns of these species. These two bird species typically forage in small groups and are often seen flying far offshore to hunt for food. The Greater-crested Tern and the Black-naped Tern usually feed by diving to depths of up to 0.8 meters to catch fish (Setiawati et al., 2023).
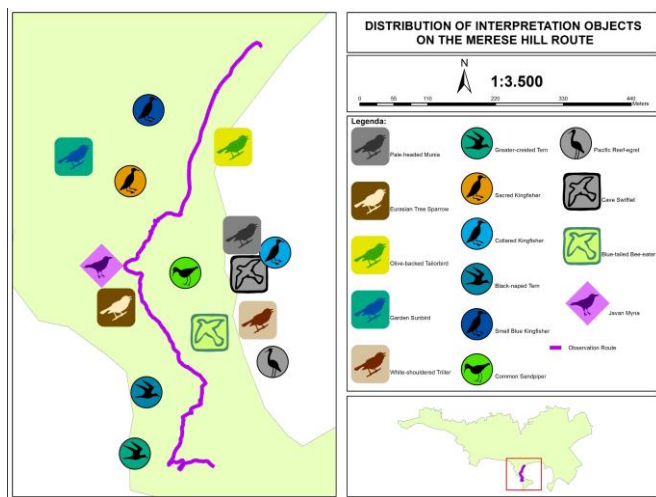

Figure 7. Merese Hill Route

The Fishermen's Village trail hosts 27% of bird species with potential as avitourism interpretation objects, or 10 bird species, one of which can only be found on this trail, the Lemon-bellied White-eye (Figure 8). The Lemon-bellied White-eye is a songbird characterized by a distinctive white ring around each eye, resembling glasses. This bird is popular due to its loud song and is often used in bird singing competitions. The Lemon-bellied White-eye can be found on the Fishermen's Village trail because of the presence of shrub and forest vegetation, which provide food sources such as insects, seeds, and nectar. The Lemon-bellied White-eye is commonly found in open coastal forests, forest edges, shrubs, and gardens, where it feeds on fruits and insects among the trees (Gafur et al., 2016).
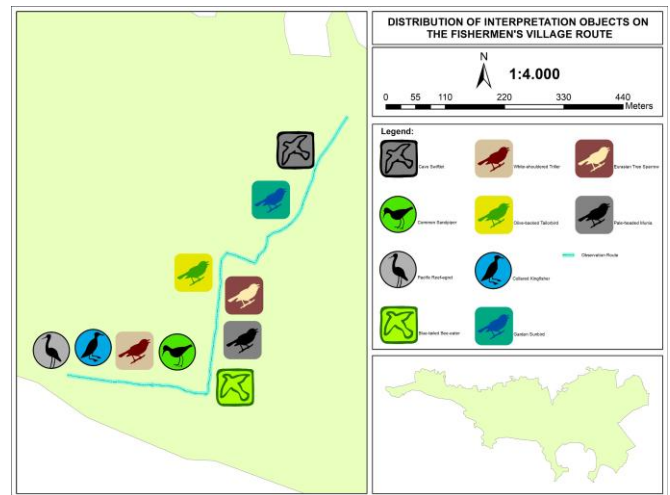

Figure 8 Fishermen's Village Route

The Mandalika Special Economic Zone (SEZ) has potential as an avitourism destination, given the variety of bird species that can serve as interpretation objects. Several trails can be utilized as interpretation routes, classified based on the preferences of tourists or birdwatchers. According to McFarlane (1994), birdwatchers (avitourists) are divided into three categories based on their experience and bird preferences as observation objects. Based on the eight observation trails, the Novotel Mangrove trail is recommended for all categories of avitourists, particularly beginner avitourists. The high number of bird species with potential as avitourism interpretation objects on the Novotel Mangrove trail makes it an ideal option, offering a wide variety of birds with diverse characteristics that cater to the preferences of different avitourist categories. For beginner avitourists, the interpretation objects include birds with unique morphological features (colorful plumage, large size, and songbirds) and high encounter frequencies. Beginner avitourists tend to prefer observing bird groups that are easy to find and morphologically appealing, such as large-bodied and colorful birds (Kurnia, 2021; Yankov, 2022). In addition to being recommended as an avitourism interpretation trail for beginner avitourists, the presence of endemic, migratory, and rare bird species, and birds with cultural connections makes the Novotel Mangrove trail suitable for intermediate and advanced avitourists. Intermediate and advanced avitourists often prefer observing groups of endemic, rare, hard-to-find, or migratory birds (Faulina, 2019). Birdwatchers are frequently involved in activities that combine nature observation with an understanding of local culture (Prijono, 2017). Besides the Novotel Mangrove trail, several other trails are recommended for intermediate and advanced avitourists, including Mangrove Gerupuk, Mangrove Songgong, Merese Plantation, and Merese Hill. These

trails host endemic bird species, birds with high conservation status, and migratory birds that can only be found in these specific locations.

Conclusion

The Mandalika SEZ hosts 38 bird species with potential as avitourism interpretation objects, comprising 15 species with high conservation status, 13 endemic species, 24 species with the highest morphological uniqueness, 15 migratory species, 7 species with strong cultural connections, and 9 species with abundant and frequent encounter frequencies. These birds are distributed across 8 observation trails, with the highest number of species found on the Novotel Mangrove trail, representing 65% of the total interpretation objects. There are trails recommended as interpretation routes based on avitourist preferences. The Novotel Mangrove trail is recommended for all categories of avitourists, particularly beginners, due to the high number of bird species present, both with unique morphological features and high encounter frequencies. For intermediate and advanced avitourists, in addition to the Novotel Mangrove trail, the Gerupuk Mangrove, Songgong Mangrove, Merese Plantation, and Merese Hill trails are also recommended, as they host endemic, high conservation status, and migratory bird species that can only be found along these specific trails.

Author Contributions
All authors have participated in this research. A.R.A. conducted the research design, data collection, data analysis, and drafted the initial manuscript. Y.A.M. and E.V. provided conceptual guidance, supervision, and reviewed and edited the manuscript. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest
The authors declare that there is no conflict of interest.

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