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Potential of Avitourism in Carey Island, Selangor

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Abstract

Avitourism or birdwatching is a growing segment of the nature-based tourism industry that provides several benefits to both travellers and destination towns. However, there is a lack of survey of the potential of avitourism conducted in Malaysia. Thus, this research was conducted to investigate the potential of avitourism in Carey Island, Selangor. This research aimed to provide an updated checklist of avian biodiversity and to investigate the potential of avitourism in Carey Island, Selangor, Malaysia. Overall, out of 36 bird species found in the area both from current and previous study. The study methods involved the collection of data from primary (direct observation techniques) and secondary sources (literature review). This study has revealed the existence of newly classified avian species such as the Cattle Egret (*Bubulcus ibis*), Pacific Swallow (*Hirunda Tahitica*), Brown Shrike (*Lanius cristatus*), Crested Serpent-Eagle (*Spilornis chee*), and Blue-tailed Bee-eater (*Merops philippinus*), which adds to our understanding of the varied wildlife that inhabits this area. Eight were shortlisted to be selected as flagship species based on eight criteria of a Good Nature Tourism Product including endemism, rarity, sighting reliability, morphological attractiveness, behavioural enticement, safety, linkage to local cultures, and ecological importance. The species are Common Kingfisher (*Alcedo atthis*), Chinese Pond Heron (*Ardeola bacchus*), Purple Heron (Ardea purpurea), Common Sandpiper (*Actitis hypoleucos*), Brown Shrike (*Lanius cristatus*), Cattle Egret (Bubulcus ibis), Crested Serpent-Eagle (*Spilornis chee*) and Blue-tailed bee-eater (*Merops philippinus*). This is next was further evaluated through the questionnaires that have been distributed to 63 respondents [1]. From the result, Common Kingfisher (*Alcedo atthis*) was chosen as the flagship species. The study found that Carey Island, Selangor, has a high potential to develop avitourism, as it offers numerous benefits to travellers and destination towns.

1. Introduction

A rapidly expanding segment of nature-based tourism is called avitourism, where bird watching is the primary reason for travel [1, 2]. Avitourism, also known as birdwatching tourism or birding tourism, is the term used to describe travel and leisure activities carried out by people with the main objective of seeing and appreciating birds in their natural habitats. Avitourism, for instance, may produce funds while stimulating economic growth in local communities. Birdwatchers frequently spend money on a place to stay, food, transportation, guides, and

equipment. This inflow of visitor spending has the potential to create employment, support local companies, and contribute to the destination's overall economic growth [3]. Avitourism has become increasingly popular in many countries including Malaysia. It is being used to promote community development and biodiversity conservation at the same time. However, not many studies on avitourism in Malaysia can be found on an online platform, which is a significant gap that prevents a thorough knowledge of the potential advantages and consequences of birdwatching tourism in Malaysia. Therefore, this study aims to produce an updated checklist of birds and to investigate the potential of avitourism in Carey Island, Selangor.

2. Material and Methods

2.1 Study Site

Carey Island, Selangor, was the site of this research study. Carey Island is part of Klang Isle (03°38 N and 101°00'E), one of the most well-known mangrove forest reserves in the Malacca Strait, which runs along the west coast of the Malaysia Peninsula [4]. It was about 14 kilometers off the coast of Port Klang and only the Mah Meri tribe lived there. It is well-known for its seafood, palm oil plantations, and as the first settlement for the Orang Asli Mah-Meri tribe, who have retained their own culture and way of life [5]. On the island, there are various palm oil farms and refineries. Sime Darby Plantation EcoGarden is an oil palm tourist in Carey Island. It is a 1,000-hectare oil palm plantation that is managed in sustainable practices. Over 100,000 oil palm trees on the farm are utilized to create palm oil. Sime Darby Plantation Ecogardens is an eco-friendly resort on Carey Island. Based on Fig. 1, it shows the location of the research area.

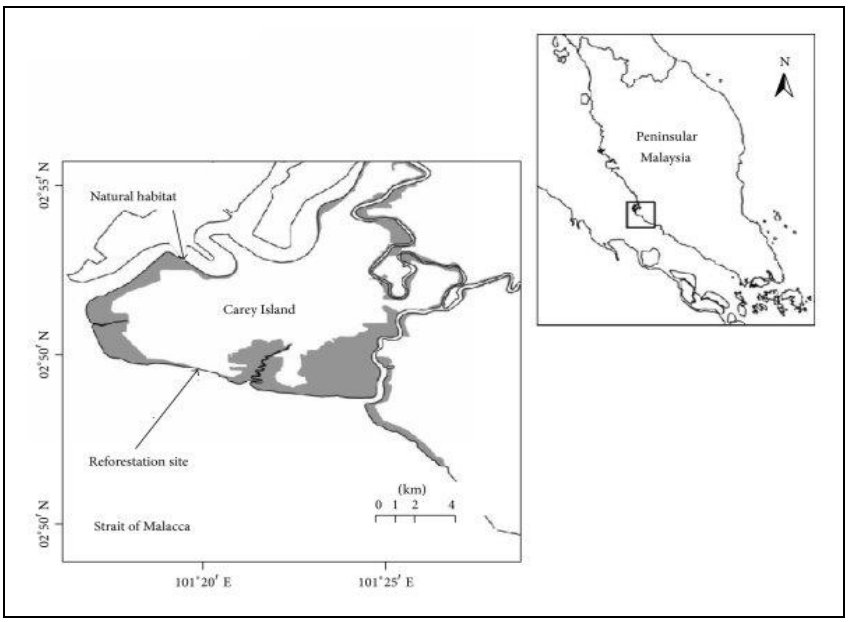

Fig. 1 *Location of the research area [4]*

2.2 Checklist of avian species

The bird species that can be found in the palm oil plantations of Carey Island were documented by gathering data from primary and secondary data sources. The primary bird data collection was conducted using active methods; direct observation with the assistance of a binocular or spotter scope was used around Sime Darby Plantation Eco Garden areas. In terms of secondary data collection, a thorough assessment of current material, including published research articles, reports, books, and prior checklists of bird species on Carey Island was gathered and recorded. This stage will assist in identifying the area's present knowledge and gaps in bird species data. The species name, date, time, location, and any behavioral observations were recorded for each species. The information gathered will be verified and validated by field guides, professional consultations, or internet resources to double-check species identification.

2.3 Identification of flagship bird species

From the checklist of the birds that will be produced, the next step is the identification of the flagship or charismatic species. A few bird species were selected as icons for avitourism purposes in Sime Darby plantation Eco Garden, Carey Island. Prior to that, all bird species gathered were evaluated based on the eight criteria for a good nature tourism product, such as endemism, rarity, sighting reliability, morphological attractiveness,

behavioral enticement, safety, linkage to local cultures, and ecological importance [6]. Next, the selected bird species were further evaluated to be chosen as a flagship species through a questionnaire that has been distributed to 63 respondents.

2.4 Potential of avitourism in Carey Island, Selangor

A questionnaire was distributed to evaluate the potential for conducting avitourism on Carey Island using Google Form [1]. The set of questionnaires for this study was structured by drawing upon the design and content of the questionnaire used in the previous study by using technique adapt and adopt [13]. The questionnaires consist of several sections which are Section A – Respondent Demography, Section B - Bird-related knowledge and experience in Carey Island, Selangor, Section C - Expectations of Respondents About Bird Tourism, and Section D - Respondents' Perceptions of Bird Tourism in Carey Island. Overall, 63 respondents participated in this survey [1].

3. Results and Discussions

3.1 Identification of birds in Carey Island, Selangor

The research was conducted in Carey Island, Selangor for only 3 days, starting on Thursday until Saturday on 20 September until 23 September 2023. Due to unpredictable weather changes and time constraints to make observations, only 12 species have been observed in this study. From a previous study [7], a total of 31 species were found at the Palm Oil Mill Effluent (POME) ponds area on Carey Island was shown in Table 1. The Palm Oil Mill Efluent (POME) region was visited by 31 different bird species from 11 distinct families. The majority of these birds (18 species, or 58%) are waterbirds (such as herons, egrets, bitterns, lapwings, grebe, waterhen, and moorhen), although others (6 species, or 19%) are shorebirds (such as sandpipers, snipes, and plover), which are more common during migration seasons. The remaining species are opportunist birds that are frequently found in human places, such as kingfishers, myna, swallows, and wagtails. This study has revealed the existence of newly classified avian species such as the Cattle Egret (*Bubulcus ibis*), Pacific Swallow (*Hirunda Tahitica*), Brown Shrike (*Lanius cristatus*), Crested Serpent-Eagle (*Spilornis chee*), and Blue-tailed Bee-eater (*Merops philippinus*), which adds to our understanding of the varied wildlife that inhabits this area. Overall, a total of 36 species of birds were found in the area using observation methods from the current and previous studies by [8], which is shown in Table 1. According to IUCN status, thirty-four species were listed as Least Concern, and one was listed as Vulnerable [11].

Table 1 *List of updated bird species found in the sampling area by the current and previous studies by [8]*

Bil	Common Name	Scientific Name	Local Name	Family	Distribution	IUCN Status	Current Study	Previous Study
1.	Common Kingfisher	*Alcedo atthis*	Raja Udang	Alcedinidae	Resident Migrant	Least Concern		√
2.	White-throated Kingfisher	*Halcyon smyrnensis*	Pekaka Dada Putih	Alcedinidae	Resident	Least Concern		√
3.	Collared Kingfisher	*Todiramphus chloris*	Pekaka Bakau	Alcedinidae	Resident Migrant	Least Concern		√
4.	Lesser Whistling Duck	*Dendrocygna javanica*	Belibis	Anatidae	Resident	Least Concern		√
5.	Grey Heron	*Ardea cinerea*	Pucung Seriap	Ardeidae	Resident	Least Concern		√
6.	Purple Heron	*Ardea purpurea*	Pucung Serandau	Ardeidae	Resident Migrant	Least Concern		√
7.	Chinese Pond Heron	*Ardeola bacchus*	Pucung Cina	Ardeidae	Migrant	Least Concern		√
8.	Javan Pond Heron	*Ardeola speciosa*	Pucung Jawa	Ardeidae	Resident	Least Concern		√

Table 1 (Continued)

Bil	Common	Scientific	Local	Family	Distribution	IUCN	Current	Previous

	Name	Name	Name			Status	Study	Study
9.	Cattle Egret	*Bubulcus ibis*	Bangau Kerbau	Ardeidae	Resident Migrant	Least Concern	√	
10.	Eastern Cattle Egret	*Bubulcus coromandus*	Bangau Pendek Timur	Ardeidae	Migrant	Least Concern		√
11.	Little Heron	*Butorides striata*	Maung-maung	Ardeidae	Resident	Least Concern		√
12.	Great Egret	*Ardea alba*	Bangau Besar	Ardeidae	Resident Migrant	Least Concern		√
13.	Chinese Egret	*Egretta eulophotes*	Bangau Cina	Ardeidae	Migrant	Vulnerable		√
14.	Little Egret	*Egretta garzetta*	Bangau Kecil	Ardeidae	Resident Migrant	Least Concern		√
15.	Intermediate Egret	*Mesophyx intermedia*	NA	Ardeidae	Migrant	Least Concern		√
16.	Cinnamon Bittern	*Ixobrychus cinnamomeus*	Pucung Bendang	Ardeidae	Resident Migrant	Least Concern		√
17.	Yellow Bittern	*Ixobrychus sinensis*	Pucung Kuning	Ardeidae	Resident Migrant	Least Concern		√
18.	Black-crowned Night-Heron	*Nycticorax nycticorax*	Pucung Kuak	Ardeidae	Resident	Least Concern		√
19.	Little-ringed Plover	*Charadrius dubius*	Rapang Gelang Kecil	Charadriidae	Migrant	Least Concern		√
20.	House Swallow	*Hirundo rustica*	Sualo Api	Hirundinidae	Migrant	Least Concern		√
21.	Pacific Swallow	*Hirunda tahitica*	Layang-layang Pasifik	Hirundinidae	Resident	Least Concern	√	
22.	Western Yellow Wagtail	*Motacilla flava*	Kedidi Kuning	Motacillidae	Migrant	Least Concern		√
23.	Little Grebe	*Tachybaptus ruficollis*	Grebe Kecil	Podocipedidae	Resident Migrant	Least Concern		√
24.	White-breasted Waterhen	*Amaurornis phoenicurus*	Ruak-Ruak	Rallidae	Resident Migrant	Least Concern		√
25.	Common Moorhen	*Gallinula chloropus*	Tiong Air/ Pangling Kecil	Rallidae	Resident	Least Concern		√
26.	Common Sandpiper	*Actitis hypoleucos*	Kedidi Pasir	Scolopacidae	Migrant	Least Concern		
27.	Common Snipe	*Gallinago gallinago*	Berkek Eko Kapas	Scolopacidae	Migrant	Least Concern		√
28.	Swinhoe's snipe	*Gallinago megala*	Berkek Tiruk	Scolopacidae	Migrant	Least Concern		√

Table 1 (Continued)

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Bil	Common Name	Scientific Name	Local Name	Family	Distribution	IUCN Status	Current Study	Previous Study
29.	Pintail Snipe	*Pintail Snipe*	Berkek Berbintik	Scolopacidae	Migrant	Least Concern		√
30.	Wood Sandpiper	*Tringa glareola*	Kedidi Kayu	Scolopacidae	Migrant	Least Concern		√
31.	Common Myna	*Acridotheres tristis*	Tiong Gembala Kerbau	Sturnidae	Resident	Least Concern		√
32.	Grey-headed Lapwing	*Vanellus cinereus*	Rapang Kelapa Kelabu	Charadriidae	Resident	Least Concern		√
33.	Red-wattled Lapwing	*Vanellus indicus*	Rapang Minta Duit	Charadriidae	Resident	Least Concern		√
34.	Brown Shrike	*Lanius cristatus*	Tirjup Coklat	Laniidae	Migrant	Least Concern	√	
35.	Crested Serpent-Eagle	*Spilornis cheela*	Helang Kuik	Accipitridae	Resident	Least Concern	√	
36.	Blue-tailed bee-eater	*Merops philippinus*	Beberek Ekor Biru	Meropidae	Resident Migrant	Least Concern	√	

Keynote: NA = Not Applicable

3.2 Determination of flagship species based on criteria of Good Nature Tourism Products and from the evaluation by the respondents

Out of 36 species, only 8 were shortlisted to be highlighted as flagship species in Carey Island, Selangor based on eight criteria of good nature tourism products, such as, endemism, rarity, sighting reliability, morphological attractiveness, behavioral enticement, safety, linkage to local cultures, and ecological importance [6]. The species are Common Kingfisher (*Alcedo atthis*), Purple Heron (*Ardea purpurea*), Chinese Pond Heron (*Ardeola bacchus*), Cattle Egret (*Bubulcus ibis*), Common Sandpiper (*Actitis hypoleucos*), Brown Shrike (*Lanius cristatus*), Crested Serpent-Eagle (*Spilornis chee*) and Blue-tailed bee-eater (*Merops philippinus*). Table 2 was constructed to make a comparison of each bird using Criteria of a Good Nature Tourism Product to examine their potential as the flagship species for avitourism in Carey Island, Selangor [6].

Table 2 *The Checklist of Criteria of a Good Nature Tourism Product fulfilled by Bird Species in Carey Island, Selangor*

Bird Species	Endemism	Rarity	Sighting of Reliability	Morphological Attractiveness	Behavioral Enticement	Safety	Linkage to local culture	Ecological Importance
Common Kingfisher			√	√	√	√		
Purple Heron			√	√		√		
Chinese Pond Heron						√	√	√
Cattle Egret			√			√		
Common Sandpiper					√	√		

Table 2 (Continued)

Bird Species	Endemism	Rarity	Sighting of Reliability	Morphological Attractiveness	Behavioral Enticement	Safety	Linkage to local culture	Ecological Importance
Brown Shrike			√			√		
Crested Serpent-Eagle			√			√		
Blue-tailed bee-eater			√	√		√		

Based on respondents' preferences, Fig. 2 shows the result that shows the respondent's agreement on the statement based on the attractiveness of the bird species. Table 3 shows the shortlisted bird species listed in the questionnaires.

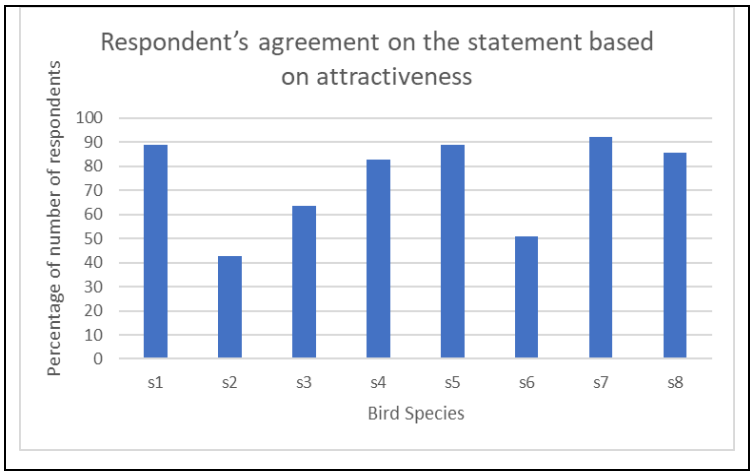

Fig. 2 *Graph illustrating the respondents' agreement with the statement dependent on attractiveness*

Table 3 *The species of the respondent's agreement on the statement based on attractiveness.*

S	Species
1.	Common Kingfisher (*Alcedo atthis*)
2.	Cattle Egret (*Bubulcus ibis*)
3.	Brown Shrike (*Lanius cristatus*)
4.	Crested Serpent Eagle (*Spilornis cheela*)
5.	Purple Heron (*Ardea purpurea*)
6.	Common Sandpiper (*Actitis hypoleucos*)
7.	Blue-tailed Bee-eater (*Merops philippinus*)
8.	Chinese Pond Heron (*Ardeola bacchus*)

Common Kingfisher (*Alcedo atthis*) has fulfilled four Criteria of a Good Nature Tourism Product, and it stands out, especially in the criteria of morphological attractiveness and behavioral enticement [6]. According to Fig. 3, the Common Kingfisher scored second as the most attractive bird based on respondents' perceptions. Thus, this species is qualified to be the flagship species for avitourism in Carey Island, Selangor.

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Fig. 3 *Common Kingfisher (Alcedo atthis) [8]*

3.3 Potential of Avitourism in Carey Island, Selangor

3.3.1 Section A – Respondent Demography

Table 3 shows an overview of the respondent's demography from the questionnaires.

Table 3 *The results of the respondent's demography from the questionnaires*

Categories	Sub-Categories	Percentage (%)
Gender	Male	36.5
	Female	63.5
Age Group	Less than 20 years old	3.2
	20-30 years old	82.5
	30-45 years old	6.3
	Above 45 years old	7.9
Occupation	Government	4.8
	Private	19
	Self-employed	0
	Unemployed	3.2
	Students	73
Level of Education	SPM (Sijil Pelajaran Malaysia)	4.8
	STPM/Diploma/Foundation/Matriculation	7.9
	Bachelor's Degree	77.8
	Master's Degree	7.9
	Doctor of Philosophy (PhD)	1.6

3.3.2 Section B - Bird-related knowledge and experience in Carey Island, Selangor

Fig. 4 and Table 4 show a summary of the respondent's feedback on bird-related knowledge and experience in Carey Island, Selangor.

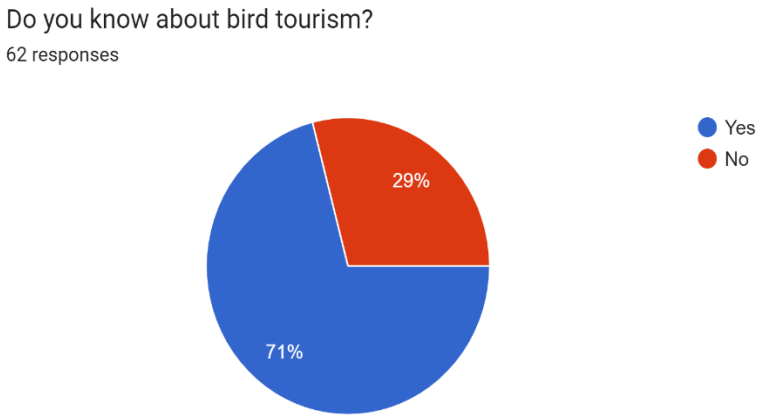

Fig. 4 *Graph of the number of respondents who know about bird tourism*

Table 4 *Questions on bird-related knowledge and experience in Carey Island, Selangor*

No	Questions	Percentage of respondents' agreement with the questions (%)
1.	Have you ever been to an observation area of birds or bird sanctuaries?	63.5
2.	Have you been involved in observing birds' activities? (example: Bird Race, Bird Festival, Raptor Watch)	33.3
3.	Do you know about the IUCN Red List of threatened bird species?	57.1
4.	Can you identify the characteristics of birds in specific (example: ecology, behaviour, morphology)?	46.0
5.	Do you know how to observe as well as identify the type of birds?	38.1
6.	Are you interested in bird tourism carried out on Carey Island?	82.5
7.	Bird tourism has the potential to be carried out on Carey Island.	90.5
8.	Will bird tourism be able to improve the level of bird protection on Carey Island?	88.9
9.	Birds are suitable to be used as a product of tourism.	90.5
10.	Bird tourism can generate resources and income for the people on Carey Island.	95.2
11.	Do you know about bird watching activities?	85.7
12.	Do you find that the reliability of bird sightings is an important factor when considering a bird watching site?	92.1
13.	Are you interested in going to Carey Island?	90.5
14.	Is Carey Island able to become an attractive tourist destination?	92.1
15.	Do you agree that Carey Island can be used as a bird watching site?	96.8

Based on Table 4, 36 of them knew what bird tourism (Avitourism) while 27 of them didn't know about that. Some of the respondents are aware and educated about the concept of avitourism, its potential benefits for conservation and local livelihoods [9]. Respondents may lack knowledge about avitourism and necessary skills such as tourism, communication, business, and marketing skills which can hinder their participation in and success with avitourism initiatives [10].

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3.3.3 Section C - Expectations of Respondents About Bird Tourism

Fig. 5 and Table 5 show a summary of the respondent's feedback expectations about bird tourism. Most of the respondents agree with the statement of the questions. They agreed bird tourism is interesting if they can find an endemic species, various species, rare, intriguing behavior, morphologically attractive, safe, culturally related bird species, and ecologically important. This is consistent with previous studies stressing the fascinating character of avitourism, emphasising its intrinsic attractiveness and value [12].

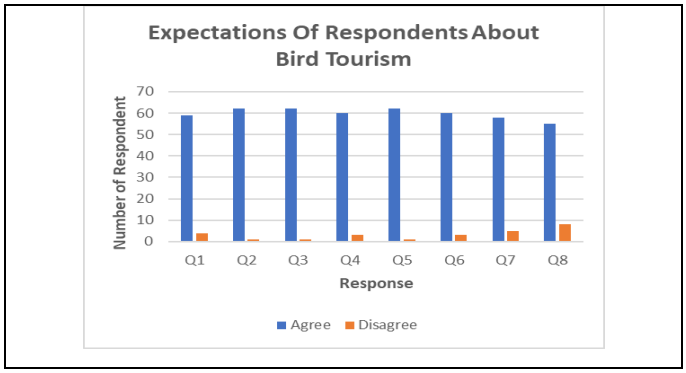

Fig. 5 *Graph of the respondents about expectations of bird tourism.*

Table 5 *The question about the respondent's expectations of bird tourism in Carey Island, Selangor.*

Q	Questions
1.	Can find new endemic species
2.	Can see a variety of different types of birds
3.	Have a chance to see rare species
4.	Can witness interesting bird behavior
5.	Can see the physical shape and color of the bird that is interesting
6.	Have a chance to interact with birds at a safe distance
7.	Can involve in festivals or celebrations in culture that involve birds, such as bird-watching events or bird-related parades
8.	When you believe that birds play a crucial role in maintaining the balance of ecosystems

3.3.4 Section D - Respondents' Perceptions of Bird Tourism in Carey Island

Fig. 6 and Table 6 show questions and a summary of the respondent's perception of bird tourism in Carey Island, Selangor. The majority of the respondents agree with the questions except for question 1 in which only 10 respondents have been in Carey Island while the rest have not been in the area yet. The positive answers have been received because the respondents tend to find the information about Carey Island first before they answer the questions, and they believed that Carey Island has the potential to evolved into one of Malaysia's top avitourism destination.

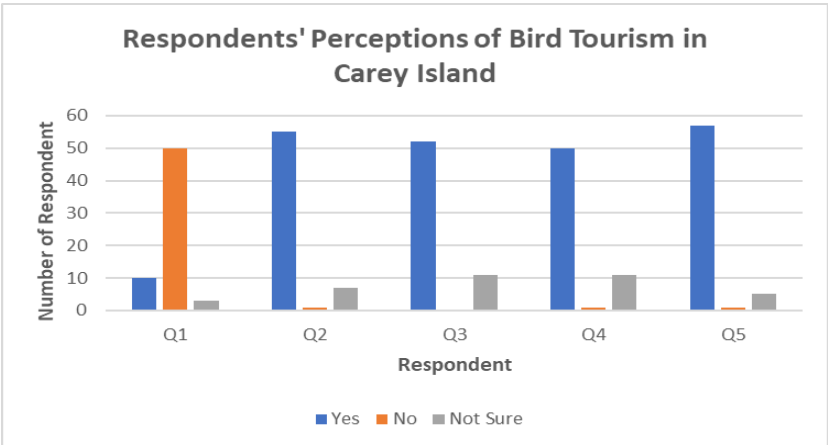

Fig. 6 *Graph of the respondent's perception of bird tourism*

Table 6 *The question about the respondent's perception of bird tourism in Carey Island, Selangor.*

Q	Questions
1.	You've been to Carey Island
2.	Are you interested in bird watching activities in the Carey Island area?
3.	Birds are suitable to be used as a product of tourism on Carey Island
4.	Bird watching activities are safe to do in the area on Carey Island
5.	Bird watching can be an enjoyable and educational activity for all people of all ages in Carey Island

Overall, the perspective of bird tourism is diverse, as evidenced by positive and negative consequences, economic prospects sustainability, and education. The perception of bird tourism encompasses its potential for joy and connection with nature, as well as its economic and conservation advantages, as well as worries about negative consequences and the need for sustainable and responsible methods. There is no particular percentage given in any studies or journals about public knowledge of avitourism. However, publications and journals indicate that birding and avitourism are growing more popular, and there are attempts underway to promote avitourism as a tool for conservation and development, particularly in rural regions in low and middle-income nations [3].

4. Conclusion

In a nutshell, Carey Island, Selangor, has an immense amount of opportunity for establishment as an avitourism attraction in Malaysia. A comprehensive update was conducted on the checklist of bird species in the area. A total of 36 species were found and documented in the area using observation methods, drawing upon insights from both the current and previous studies. This study has revealed the existence of newly classified avian species such as the Cattle Egret (*Bubulcus ibis*), Pacific Swallow (*Hirunda Tahitica*), Brown Shrike (*Lanius cristatus*), Crested Serpent-Eagle (*Spilornis chee*), and Blue-tailed Bee-eater (*Merops philippinus*), which adds to our understanding of the varied wildlife that inhabits this area. Common Kingfisher (*Alcedo atthis*) was chosen as a flagship species in this study based on the respondent's preference for its uniqueness, especially in terms of morphological attractiveness, behavioral enticement, sighting of reliability and safety and based on the most fulfilled criteria of a good nature tourism product. It is anticipated that Carey Island, Selangor, will be able to develop as a great location for avitourism, which will be able to promote avitourism, protect local flora and fauna, and improve the quality of life for locals by increasing job opportunities or revenue. This will be rendered likely by involving the participation and cooperation of various stakeholders, including the government, resorts, and most importantly, the local people.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: ***study conception and design, data collection, methodology, analysis and interpretation of results:*** *Amirah Syahmina Alwi, Nor Atiqah Norazlimi and Muhammad Shafiq Hamdin. All authors reviewed the results and approved the final version of the manuscript.*

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