The Birds of the Southern Islands of Singapore

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ABSTRACT. Birds serve many ecological functions such as pollination, seed dispersal, pest control, scavenging, and nutrient transfer between marine and terrestrial biomes. In Singapore, more than 400 bird species have been recorded, and field surveys in 2020–2021 together with a literature compilation showed that more than half of these species have been recorded in the Southern Islands. While many of the species are of conservation interest both nationally and internationally, their absolute population sizes in the Southern Islands are small. The conservation importance of the Southern Islands for land birds lies in low human impacts, undisturbed shores, habitats that are scarce in other parts of Singapore, and plant–bird interactions. The surrounding waters are seasonally important for various seabirds. The avian composition on each island is more likely to reflect current habitat area and quality rather than inter-island distances and dispersal.

Keywords. Conservation, island fauna, Aves, tropics

Introduction

In Singapore, 429 bird species are currently on the country's checklist (Bird Society of Singapore, 2025). Although the birds of Singapore face conservation challenges (Lim 1997, Yap & Sodhi 2004, Sodhi et al. 2008), certain species thrive in the remaining natural and urban habitats of the mainland and offshore islands, making for an attractive network of sites for bird watching (Yong et al., 2017). On mainland Singapore, patches of primary and secondary rainforest, wetlands and mudflats are conserved within nature reserves, nature parks, and recreational areas such as park connectors and urban green spaces. Among the offshore islands, Pulau Ubin to the north of mainland Singapore is the largest and best example of habitat management for birds and other wildlife.

The birds of the Southern Islands of Singapore have not garnered the same attention as their northern or mainland counterparts and can give fresh insights into Singapore's bird diversity.

Birds were surveyed as part of the Southern Islands Biodiversity Survey (SIBS), organized and conducted by the National Parks Board, Singapore. The background, objectives, coverage, general methodologies and data storage for the survey, and the physical characteristics of each island, are given by Tan et al. (2025). This paper summarises species distribution across various islands and discusses some of the general and specific conclusions.

Materials and Methods

Presence-absence surveys were carried out at 15 sites between Nov 2019 and Mar 2022. The sites surveyed were Pulau Berkas, Pulau Biola, Pulau Brani, Cyrene Reef, Pulau Hantu, Pulau Jong, Keppel Island, Pulau Tembakul (Kusu Island), Pulau Sekijang Pelepah (Lazarus Island), Pulau Salu, Pulau Semakau, Sentosa (Pulau Blakang Mati), Pulau Sekijang Bendera (St John's Island), Terumbu Pempang, and Pulau Tekukor. Each site was visited at least once and up to eight times depending on the island's size and accessibility. The absence of proper trails on many of the islands and limitations on island access precluded systematic counts or transects

but all birds seen or heard at each site were recorded. Observational data were supplemented by data collected from camera traps deployed on Sentosa (at Bukit Serapong) in Feb–Mar 2020, on Pulau Tekukor in Mar–May 2020 and on Pulau Semakau in Dec 2020–Feb 2021.

All published and unpublished records that we could find of birds in the Southern Islands were included in a Southern Islands fauna database (Tan et al., 2025), including internal records held by the National Parks Board. The earliest publication we consulted was dated 1995 and the latest dated 2020, with full reference details tagged to each entry in the database. The taxonomy of bird species followed the IOC World Bird List, version 14.2 (Gill et al., 2024). Global conservation status of each species was referenced from the IUCN Red List (2023) and Singapore status from Davison et al. (2024).

Basic topographical data on each island and reef (area, maximum elevation, length of coastline) are given by Tan et al. (2025). Miscellaneous information about past settlements and land use of each island is given by Muzaini et al. (2025).

Results

A total of 220 bird species were documented under the Southern Islands Biodiversity Survey (SIBS), which included records from both avifaunal surveys (108 species) and compiled literature (an additional 112 species) (Table 1; Figure 1). There were 83 passerines (38%). SIBS recorded only a few new species for the Southern Islands, such as the migratory White-throated Needletail (*Hirundapus caudacutus*) or escapees (Yellow-fronted Canary *Crithagra mozambica*), but added many new locality records to give a much fuller picture of bird diversity across the islands.

Of the 220 species recorded, at national level seven are Critically Endangered, 21 are Endangered, 32 are Vulnerable, and 34 are Near Threatened (Table 1). Ninety species are considered of Least Concern, one is Data Deficient, and 35 are otherwise not assessed or were not listed by the Singapore Red Data Book for various reasons, mostly introduced populations or escapees (Davison et al., 2024). According to the IUCN Red List at global level, 25 of the species recorded from the Southern Islands are Critically Endangered, Endangered, Vulnerable, or Near Threatened. The global and Singapore national conservation status of these birds signals their conservation value and significance.

The seven Critically Endangered species nationally include Ruddy Kingfisher *Halcyon coromanda*, Great-billed Heron *Ardea sumatrana*, Beach Stone-curlew *Esacus magnirostris*, Malaysian Plover *Anarhynchus peronii*, White-rumped Munia *Lonchura striata*, Black-headed Bulbul *Brachypodius melanocephalos,* and Black-tailed Godwit *Limosa limosa*. The two critically endangered species globally are Yellow-crested Cockatoo *Cacatua sulphurea*, which is introduced in Singapore, and Straw-headed Bulbul *Pycnonotus zeylanicus*. About 78% (172) of the species recorded are considered native (resident, migrant or vagrant) and 22% (28 species) are considered introductions or escapees.

Sentosa (SNT) had the highest recorded total with 183 bird species recorded. The next most speciose sites were Pulau Semakau (SMK) with 107 species, and Pulau Sekijang Benderah (St John's Island, SJI) with 89 species. Species totals for 14 island sites, i.e., excluding the reefs CYR and TPS (Fig. 1), indicate a strong correlation with land area (Spearman Rank $\chi^2 = 0.8374$, n=14, $\Sigma d^2 = 74$, $p<0.05$). During the field surveys three bird species were seen on Cyrene Reef (but an additional four are included in recent NParks records) and one on Terumbu Pempang.

The most widely recorded birds were Ornate Sunbird *Cinnyris ornatus* recorded across 14 sites, Black-naped Oriole *Oriolus chinensis* recorded across 13 sites, and Brahminy Kite *Haliastur indus* and Collared Kingfisher *Todiramphus chloris*, both recorded at 12 sites. Other widely recorded species include Rufous-tailed Tailorbird *Orthotomus sericeus* and House Crow *Corvus splendens*, each recorded at 11 sites, as well as Ashy Tailorbird *Orthotomus ruficeps*, Spotted Dove *Spilopelia chinensis*, Pink-necked Green Pigeon *Treron vernans*, Oriental Magpie-Robin *Copsychus saularis*, Asian Brown Flycatcher *Muscicapa dauurica,* and Yellow-vented Bulbul *Pycnonotus goiavier* each recorded at ten sites.

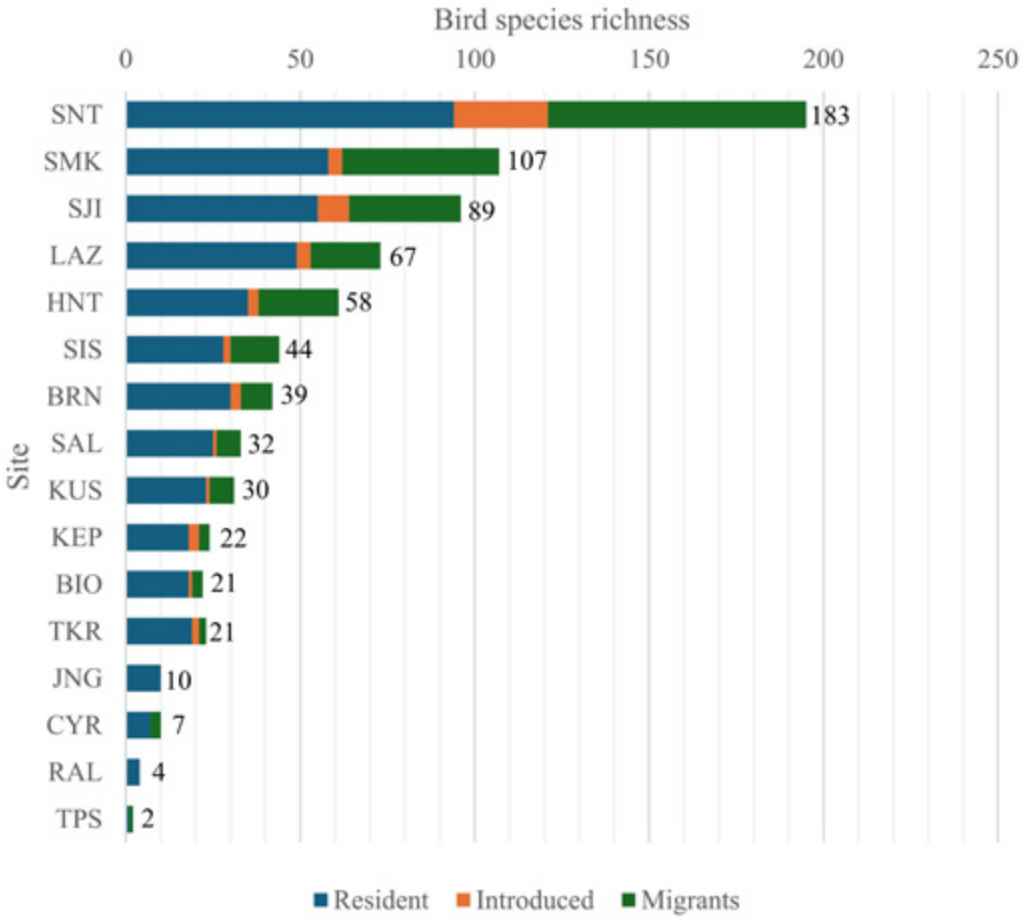


Figure 1. Recorded bird species richness of the Southern Islands, Singapore, by locality. Species numbers are shown in three categories: those with resident populations within Singapore boundaries (Resident), those known only as migrants, passage visitors or vagrants within Singapore boundaries (Migrants); and those represented in Singapore only by introduced, feral or escaped individuals (Introduced). 'Resident' therefore does not necessarily indicate that a species breeds in the Southern Islands or on any particular island. Total species numbers recorded from each island are indicated on the right. Totals of residents + introduced + migrant species may exceed absolute totals because various species have both resident and migrant populations in Singapore (e.g., *Ardea cinerea*, *Amaurornis phoenicurus*). Abbreviations of island names as listed in Table 1.

Table 1. Locations of bird records from published and unpublished sources and from Southern Islands Biodiversity Survey (SIBS) data. SIBS indicates taxa observed during Southern Islands Biodiversity Survey 2019-2022. Years correspond to most recent publication or NParks internal record. RDB3 = Singapore Red Data Book 3 Status, IUCN = International Union for Conservation of Nature Status, BIO = Pulau Biola, BRN = Pulau Brani, CYR = Cyrene Reef, HNT = Pulau Hantu, JNG = Pulau Jong, KEP = Keppel Island, KUS = Pulau Tembakul (Kusu Island), LAZ = Pulau Sekijang Pelepah (Lazarus Island), RAL = Pulau Satumu (Raffles' Lighthouse), SAL = Pulau Salu, SIS = Pulau Subar Laut and Pulau Subar Darat (Sisters' Islands), SJI = Pulau Sekijang Bendera (St John's Island), SMK = Pulau Semakau, SNT = Pulau Blakang Mati (Sentosa Island), TKR = Pulau Tekukor, TPS = Terumbu Pempang. Acronyms for RDB3/IUCN: EX = Globally Extinct, NE = Presumed Nationally Extinct, CR = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near Threatened, LC = Least Concern, DD = Data Deficient, NE = Not Evaluated, NA = Not Applicable, NL = Not Listed, ESC = Escapes or feral populations that are not self-sustaining.

Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Acanthizidae																		
Gerygone sulphurea	NT	LC	SIBS	SIBS		SIBS; 2002				SIBS; 2002		SIBS	2015	SIBS; 2002	2012	2020		
Family Accipitridae																		
Tachyspiza gularis	LC	LC	SIBS			(1)			(1)	SIBS		(1)	2019		SIBS; 2012	SIBS; 2020		
Tachyspiza soloensis	LC	LC								SIBS				(1)		2020		
Lophospiza trivirgata	NT	LC														2020		
Aviceda leuphotes	LC	LC														2020		
Butastur indicus	NT	LC								(1)				SIBS				
Buteo buteo	LC	LC													2012	2018		
Circus spilonotus	NL	LC													2012			
Clanga clanga	VU	VU														2018		
Elanus caeruleus	VU	LC													SIBS; 2012	SIBS		
Icthyophaga ichthyaetus	VU	NT												SIBS	SIBS	SIBS; 2020		
Icthyophaga leucogaster	LC	LC	SIBS			(1)				SIBS; (1)		(1)	2019	SIBS; 2017	SIBS; 2012	SIBS; 2020	SIBS	

(1): Nature Society Singapore Birdwatching Records (1986-2020); (2) Other National Parks Board records outside SIBS study period.

Table 1 continued. Locations of recorded avian species found in Southern Island sites from published and unpublished literature and Southern Islands Biodiversity Survey (SIBS) data. SIBS indicates taxa was observed during Southern Islands Biodiversity Survey 2019-2022. Year corresponds to most recent publication or NParks internal record with bird taxon observation.

Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Accipitridae																		
Haliastur indus	LC	LC	SIBS; (1)		SIBS	(1)	SIBS		SIBS; (1)	SIBS; (1)		SIBS; (1)	2019	SIBS; 2017	SIBS; 2012	SIBS; 2020	SIBS	
Milvus migrans	EN	LC														2018		
Nisaetus cirrhatus	VU	LC		SIBS; 2018						SIBS; (1)					2012	2020		
Pernis ptilorhynchus	LC	LC		SIBS		SIBS; (1)				SIBS				SIBS; (1)	SIBS; 2012	SIBS; 2020		
Family Acrocephalidae																		
Acrocephalus orientalis	VU	LC													2012	2018		
Family Aegithinidae																		
Aegithina tiphia	LC	LC		2018				SIBS	SIBS	SIBS; (1)				SIBS	2012	SIBS; 2020	SIBS	
Family Alcedinidae																		
Alcedo atthis	VU	LC				(1)									2012	2020		
Halcyon coromanda	CR	LC												(1)				
Halcyon pileata	VU	LC				(1)									2012	SIBS; 2018		
Halcyon smyrnensis	LC	LC		SIBS; 2018						SIBS; 2002				2002	SIBS; 2012	SIBS; 2020		

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Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Alcedinidae																		
Pelargopsis capensis	LC	LC										(1)			2012	2018		
Todiramphus chloris	LC	LC	SIBS; 2002	2018		SIBS; 2002		SIBS	SIBS; 2002	SIBS; 2002		SIBS; 2002	2019	SIBS; 2017	SIBS; 2012	SIBS; 2020	SIBS	
Family Apodidae																		
Aerodramus fuciphagus	NL	LC						(2)	(2)	(2)	(2)		(2)	(2)	2012	SIBS, 2018	(2)	
Aerodramus maximus	NT	LC													2012	SIBS; 2018		
Apus nipalensis	VU	LC													2012	SIBS; 2020		
Apus pacificus	LC	LC								SIBS						SIBS; 2018		
Cypsiurus balasiensis	NT	LC														2018		
Hirundapus caudacutus	LC	LC														SIBS		
Hirundapus giganteus	LC	LC														2018		

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Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Ardeidae																		
Ardea alba	VU	LC			(2)											2020		
Ardea cinerea	LC	LC	SIBS		(2)	(1)								2017	SIBS; 2012	SIBS; 2020		(2)
Ardea intermedia	LC	LC				SIBS				SIBS			2019		SIBS	SIBS		
Ardea purpurea	EN	LC	SIBS							SIBS		SIBS			2012	2018		
Ardea sumatrana	CR	LC	SIBS		(2)	SIBS; (1)	SIBS			(1)		SIBS; 2002	2019	2017	SIBS; 2012	SIBS; 2020		
Ardeola bacchus	LC	LC													2012	2018		
Ardea coromanda	VU	LC													SIBS	SIBS; 2020		
Butorides striata	NT	LC				(1)		SIBS	(1)	SIBS		2002		SIBS; 2017	2012	SIBS; 2020	SIBS	
Egretta eulophotes	EN	VU													2012			
Egretta garzetta	LC	LC			SIBS									2017	2012	2018		
Egretta sacra	EN	LC			SIBS; (2)	SIBS; (1)						SIBS; (1)			SIBS; 2012	2020		
Gorsachius melanolophus	NT	LC														2020		
Botaurus cinnamomeus	VU	LC														2018		
Botaurus flavicollis	LC	LC														2020		
Botaurus sinensis	VU	LC													2012	SIBS; 2020		

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Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Ardeidae																		
Nycticorax nycticorax	EN	LC														2020		
Family Bucerotidae																		
Anthracoceros albirostris	NT	LC												2017		SIBS; 2020		
Buceros bicornis	ESC	VU														2018		
Family Burhinidae																		
Esacus magnirostris	CR	NT										(1)						
Family Cacatuidae																		
Cacatua galerita	ESC	LC														2020		
Cacatua goffiniana	NA	NT												2012		SIBS; 2020		
Cacatua moluccensis	ESC	VU														2020		
Family Cacatuidae																		
Cacatua sulphurea	ESC	CR														2020		

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Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Campephagidae																		
Lalage nigra	LC	LC		2018		(1)				SIBS						2018		
Pericrocotus divaricatus	LC	LC		2018												2020		
Family Caprimulgidae																		
Caprimulgus affinis	LC	LC								SIBS; (1)				2017	2012	2018	SIBS	
Caprimulgus jotaka	LC	LC												2017		2018		
Caprimulgus macrurus	LC	LC				(1)		SIBS		SIBS				SIBS; 2017	2012	SIBS; 2020		
Family Charadriidae																		
Anarhynchus alexandrinus	EN	LC													2012			
Charadrius dubius	EN	LC													2012			
Anarhynchus leschenaultii	NT	LC													2012	2018		
Anarhynchus atrifrons	NT	LC													2012	2018		
Anarhynchus peronii	CR	NT								(1)					2012			
Pluvialis fulva	VU	LC				(1)						(1)		(1)	2012	2018		

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Family Charadriidae																		
Pluvialis squatarola	NT	LC													2012			
Vanellus indicus	NT	LC													SIBS	SIBS		
Vanellus miles	NA	LC														SIBS		
Family Chloropseidae																		
Chloropsis hardwickii	ESC	EN														2018		
Chloropsis moluccensis	NL	LC														2018		
Family Ciconiidae																		
Anastomus oscitans	LC	LC											(2)	(2)				
Family Cisticolidae																		
Cisticola juncidis	VU	LC													2012	2018		
Orthotomus atrogularis	LC	LC		2018				SIBS		SIBS; 2002		2002	2019	SIBS; 2017	2012	SIBS; 2020	2002	
Orthotomus ruficeps	LC	LC				SIBS; 2002	SIBS		SIBS	SIBS; 2002		SIBS	2019	SIBS; 2017	SIBS; 2012	SIBS; 2020	SIBS; 2002	
Orthotomus sericeus	NT	LC	2002	2018		(1)			2002	SIBS; 2002		2002	2019	2002	2012	2018	SIBS	
Orthotomus sutorius	LC	LC		SIBS		(1)			2002	2002		(1)	2015	2002	2002	SIBS; 2020		

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Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Cisticolidae																		
Prinia flaviventris	NT	LC													2002			
Family Columbidae																		
Chalcophaps indica	LC	LC														2020		
Columba livia	NA	LC		2018						SIBS					2005	2020		
Ducula bicolor	DD	LC				SIBS; (1)				2002		SIBS; 2002		(1)	2012	2020		
Geopelia striata	LC	LC		2018		(1)		SIBS		SIBS				SIBS; 2020	SIBS	SIBS; 2020		
Ptilinopus jambu	VU	NT				(1)										2018		
Spilopelia chinensis	LC	LC	SIBS; (1)	SIBS; 2018		SIBS; (1)		SIBS	SIBS; (1)	SIBS; (1)	2002			SIBS; 2017	SIBS; 2012	SIBS; 2020		
Streptopelia orientalis	ESC	LC											2019					
Treron curvirostra	VU	LC														2018		
Treron vernans	LC	LC	SIBS	2018		2002			SIBS; (1)	SIBS; 2002		SIBS	2019	SIBS; 2017	SIBS; 2012	SIBS; 2020		
Family Coraciidae																		
Eurystomus orientalis	LC	LC		SIBS; 2018					(1)	SIBS				2002		SIBS; 2020		

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Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Corvidae																		
Corvus macrorhynchos	VU	LC	(1)	2018		(1)	SIBS; 2002			2002		SIBS; 2002	2002	SIBS; 2002	SIBS; 2012	SIBS; 2020		
Corvus splendens	NA	LC	(1)	SIBS		2002		SIBS		SIBS; 2002		(1)	2019	2002	2012	SIBS; 2020	2002	
Family Cuculidae																		
Cacomantis sepulcralis	NT	LC														2018		
Cacomantis sonneratii	LC	LC														2018		
Centropus bengalensis	LC	LC								SIBS					2012	2018		
Centropus sinensis	NT	LC														SIBS; 2020		
Chalcites basalis	LC	LC														2018		
Chalcites minutillus	LC	LC		2018						SIBS					SIBS; 2005	SIBS; 2020		
Chrysococcyx xanthorhynchus	VU	LC				(1)										2018		
Clamator coromandus	LC	LC														2018		
Cuculus micropterus	LC	LC				(1)										2018		
Eudynamys scolopaceus	LC	LC		SIBS; 2018					2002	SIBS; 2002				SIBS; 2017	2012	SIBS; 2020		

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Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Cuculidae																		
Hierococcyx fugax	NT	LC														2018		
Hierococcyx nisicolor	NT	LC														2020		
Surniculus lugubris	VU	LC												2020		2018		
Family Dicaeidae																		
Dicaeum cruentatum	LC	LC		SIBS; 2018				SIBS	SIBS; 2002	SIBS; 2002				SIBS; 2017	2012	SIBS; 2020		
Family Dicruridae																		
Dicrurus annectens	NT	LC											2019			2020		
Dicrurus leucophaeus	LC	LC													2012			
Dicrurus paradiseus	LC	LC										2002				2020		
Family Estrildidae																		
Lonchura atricapilla	VU	LC													SIBS; 2012	SIBS		
Lonchura leucogastroides	NA	LC														2018		
Lonchura maja	LC	LC													2012	2018		

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Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Estrildidae																		
Lonchura punctulata	LC	LC						SIBS		SIBS				(1)	SIBS; 2012	SIBS; 2020		
Lonchura striata	CR	LC														2020		
Padda oryzivora	NL	EN														2018		
Family Falconidae																		
Falco peregrinus	LC	LC				(1)									2005	SIBS; 2018		
Family Fringillidae																		
Crithagra mozambica	ESC	LC								SIBS								
Family Glareolidae																		
Glareola maldivarum	EN	LC								SIBS					2012			
Family Hirundinidae																		
Cecropis daurica	NL	LC								SIBS					2012	2020		
Hirundo rustica	NT	LC	SIBS	SIBS		(1)				SIBS; (1)		SIBS	2019		SIBS; 2012	SIBS; 2020		
Hirundo javanica	LC	LC	(1)			SIBS; (1)			SIBS; (1)	SIBS; (1)		(1)	2019	(1)	SIBS; 2012	SIBS; 2020		

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Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Laniidae																		
Lanius cristatus	VU	LC				(1)				SIBS			2019	(1)	2012	2020		
Lanius tigrinus	NT	LC				(1)								(1)		2018		
Family Laridae																		
Onychoprion aleuticus	VU	VU												(1)				
Onychoprion anaethetus	EN	LC	(1)			(1)										2018		
Sterna hirundo	LC	LC														2018		
Sterna sumatrana	EN	LC											2015	(1)	(1)	2018		
Sternula albifrons	EN	LC			(2)		SIBS			(1)		SIBS		2017	2012	2020		
Thalasseus bengalensis	EN	LC	SIBS															
Thalasseus bergii	EN	LC	SIBS; (1)										2019	2020				
Family Leiotrichidae																		
Garrulax canorus	ESC	LC														SIBS; 2020		
Family Megalaimidae																		
Psilopogon haemacephalus	LC	LC		2018					SIBS	SIBS; 2002				SIBS; 2002	2005	2020		
Psilopogon lineatus	NA	LC						SIBS								SIBS; 2020		

(1): Nature Society Singapore Birdwatching Records (1986-2020); (2) Other National Parks Board records outside SIBS study period.

Table 1 continued. Locations of recorded avian species found in Southern Island sites from published and unpublished literature and Southern Islands Biodiversity Survey (SIBS) data. SIBS indicates taxa was observed during Southern Islands Biodiversity Survey 2019-2022. Year corresponds to most recent publication or NParks internal record with bird taxon observation.

Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Meropidae																		
Merops philippinus	LC	LC		2018		SIBS; (1)			(1)	SIBS			2019	SIBS; 2002	2012	SIBS; 2020		
Merops viridis	LC	LC						SIBS						(1)	2012	SIBS; 2020		
Family Monarchidae																		
Terpsiphone atrocaudata	NT	NT												(1)				
Terpsiphone incei	LC	LC														2020		
Terpsiphone sp.	NE	LC														2018		
Family Motacillidae																		
Anthus rufulus	LC	LC				(1)				SIBS; (1)					SIBS; 2012	SIBS; 2020		
Dendronanthus indicus	LC	LC				(1)										2018		
Motacilla cinerea	LC	LC													2012			
Motacilla tschutschensis	VU	LC								SIBS					2012	2018		
Family Muscicapidae																		
Copsychus malabaricus	EN	LC														2018		
Copsychus saularis	VU	LC				SIBS; 2002	SIBS		SIBS; 2002	SIBS; 2002		SIBS	2019	SIBS; 2017	2012	SIBS; 2020	SIBS	

(1): Nature Society Singapore Birdwatching Records (1986-2020); (2) Other National Parks Board records outside SIBS study period.

Table 1 continued. Locations of recorded avian species found in Southern Island sites from published and unpublished literature and Southern Islands Biodiversity Survey (SIBS) data. SIBS indicates taxa was observed during Southern Islands Biodiversity Survey 2019-2022. Year corresponds to most recent publication or NParks internal record with bird taxon observation.

Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Muscicapidae																		
Cyornis brunneatus	VU	VU												2017		2020		
Ficedula mugimaki	LC	LC												2020		2018		
Ficedula zanthopygia	LC	LC												(1)		2020		
Larvivora cyane	NT	LC											2019			2020		
Monticola solitarius	LC	LC											2019					
Muscicapa dauurica	LC	LC		2018		SIBS; (1)			SIBS	SIBS		SIBS	2019	SIBS; (1)	2012	SIBS; 2020	SIBS	
Muscicapa sibirica	NT	LC											(1)	SIBS		2020		
Family Nectariniidae																		
Aethopyga siparaja	LC	LC				(1)								2002		SIBS; 2020		
Anthreptes malacensis	LC	LC		SIBS		SIBS; 2002	2002	SIBS	SIBS; 2002	SIBS; 2002			2019	SIBS; 2002	SIBS; 2012	SIBS; 2020	SIBS	
Arachnothera longirostra	NT	LC												2002				
Cinnyris ornatus	LC	LC	SIBS; 2002	2018		2002	SIBS; 2002	SIBS	SIBS; 2002	SIBS; 2002	2002	2002	2019	SIBS; 2002	2012	SIBS; 2020	SIBS; 2002	
Leptocoma brasiliana	LC	LC								2002					2002	2018		

(1): Nature Society Singapore Birdwatching Records (1986-2020); (2) Other National Parks Board records outside SIBS study period.

Table 1 continued. Locations of recorded avian species found in Southern Island sites from published and unpublished literature and Southern Islands Biodiversity Survey (SIBS) data. SIBS indicates taxa was observed during Southern Islands Biodiversity Survey 2019-2022. Year corresponds to most recent publication or NParks internal record with bird taxon observation.

Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Nectariniidae																		
Leptocoma calcostetha	VU	LC													2012			
Family Oriolidae																		
Oriolus chinensis	LC	LC	2002	SIBS; 2018		SIBS; 2002	2002	SIBS	SIBS; 2002	SIBS; 2002		SIBS; 2002	2019	SIBS; 2017	SIBS; 2012	SIBS; 2020	SIBS	
Family Pachycephalidae																		
Pachycephala cinerea	EN	LC				(1)						2002			SIBS; 2012			
Family Pandionidae																		
Pandion haliaetus	LC	LC				(1)									2012	2018		
Family Passeridae																		
Passer montanus	LC	LC							SIBS; 2002		2002			SIBS; 2020	2012	2020		
Family Phasianidae																		
Gallus gallus	NT	LC														SIBS; 2020		
Pavo cristatus	ESC	LC												2002		SIBS; 2020		
Pavo muticus	ESC	EN														2018		

(1): Nature Society Singapore Birdwatching Records (1986-2020); (2) Other National Parks Board records outside SIBS study period.

Table 1 continued. Locations of recorded avian species found in Southern Island sites from published and unpublished literature and Southern Islands Biodiversity Survey (SIBS) data. SIBS indicates taxa was observed during Southern Islands Biodiversity Survey 2019-2022. Year corresponds to most recent publication or NParks internal record with bird taxon observation.

Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Phylloscopidae																		
Phylloscopus borealis	LC	LC		2018		(1)				SIBS			2019	SIBS; (1)	2012	SIBS; 2020		
Phylloscopus coronatus	LC	LC				(1)							2019			2018		
Family Picidae																		
Chrysophlegma miniaceum	LC	LC														2020		
Dinopium javanense	LC	LC							2002	SIBS			2019	2017		2020		
Micropternus brachyurus	LC	LC							SIBS				2015	SIBS; 2017		2020	SIBS	
Picus vittatus	LC	LC		2018												SIBS; 2020		
Yungipicus moluccensis	LC	LC								SIBS				SIBS	2012	2020		
Family Pittidae																		
Pitta moluccensis	LC	LC														2020		
Pitta sordida	LC	LC												(1)				
Family Psittacidae																		
Eclectus sp.	ESC	LC														2018		
Eos bornea	ESC	LC														2018		

(1): Nature Society Singapore Birdwatching Records (1986-2020); (2) Other National Parks Board records outside SIBS study period.

Table 1 continued. Locations of recorded avian species found in Southern Island sites from published and unpublished literature and Southern Islands Biodiversity Survey (SIBS) data. SIBS indicates taxa was observed during Southern Islands Biodiversity Survey 2019-2022. Year corresponds to most recent publication or NParks internal record with bird taxon observation.

Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Psittacidae																		
Loriculus galgulus	LC	LC		2018				SIBS						(1)		SIBS; 2020		
Psittacula alexandri	NL	NT				(1)								2012				
Psittacula krameri	NA	LC														SIBS; 2020		
Psittacula longicauda	NT	VU				(1)										2018		
Psittacus erithacus	ESC	EN														2018		
Tanygnathus megalorynchos	ESC	LC														2018		
Family Pycnonotidae																		
Hemixos cinereus	LC	LC												SIBS, 2020		2018		
Brachypodius melanocephalos	CR	LC													2012			
Pycnonotus aurigaster	NA	LC														2020		
Pycnonotus goiavier	LC	LC		SIBS; 2018		2002		SIBS	SIBS	SIBS; 2002			(1)	SIBS; 2017	SIBS; 2012	SIBS; 2020	SIBS; 2002	
Pycnonotus jocosus	NA	LC														SIBS; 2020		
Pycnonotus plumosus	LC	LC	2002			2002	2002		SIBS; 2002	SIBS; 2002		2002	2019	SIBS; 2002	2012	SIBS; 2020	SIBS; 2002	

(1): Nature Society Singapore Birdwatching Records (1986-2020); (2) Other National Parks Board records outside SIBS study period.

Table 1 continued. Locations of recorded avian species found in Southern Island sites from published and unpublished literature and Southern Islands Biodiversity Survey (SIBS) data. SIBS indicates taxa was observed during Southern Islands Biodiversity Survey 2019-2022. Year corresponds to most recent publication or NParks internal record with bird taxon observation.

Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Pycnonotidae																		
Pycnonotus zeylanicus	EN	CR		SIBS												2018		
Family Rallidae																		
Amaurornis phoenicurus	LC	LC				(1)		SIBS		SIBS		(1)			SIBS; 2005	SIBS; 2020		
Gallicrex cinerea	EN	LC														2018		
Rallina fasciata	NT	LC														2020		
Family Rhipiduridae																		
Rhipidura javanica	LC	LC		2018		(1)				SIBS			2019	2017	2012	SIBS; 2020		
Family Scolopacidae																		
Actitis hypoleucos	VU	LC				SIBS; (1)			SIBS; (1)	SIBS; (1)		SIBS; (1)	2019	2017	SIBS; 2012	SIBS; 2020	SIBS	
Arenaria interpres	EN	LC													2012			
Calidris ruficollis	NT	NT													2012			
Limosa limosa	CR	NT													2012			
Numenius arquata	EN	NT												2020				
Numenius phaeopus	NT	LC												2020	SIBS; 2012	SIBS; 2018		
Tringa glareola	EN	LC													SIBS	SIBS		
Tringa nebularia	VU	LC												2020	2012			

(1): Nature Society Singapore Birdwatching Records (1986-2020); (2) Other National Parks Board records outside SIBS study period.

Table 1 continued. Locations of recorded avian species found in Southern Island sites from published and unpublished literature and Southern Islands Biodiversity Survey (SIBS) data. SIBS indicates taxa was observed during Southern Islands Biodiversity Survey 2019-2022. Year corresponds to most recent publication or NParks internal record with bird taxon observation.

Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Scolopacidae																		
Tringa stagnatilis	EN	LC													2012			
Tringa totanus	VU	LC													2012			
Family Strigidae																		
Ketupa ketupu	VU	LC														2020		
Ninox scutulata	LC	LC														2018		
Otus lettia	NL	LC								SIBS						SIBS, 2020		
Strix seloputo	VU	LC											2019	SIBS; 2017		2018		
Family Sturnidae																		
Acridotheres cristatellus	ESC	LC												(1)		2018		
Acridotheres javanicus	NA	VU		SIBS; 2018		SIBS		SIBS	SIBS; (1)	SIBS; (1)			2019	SIBS; (1)	2012	SIBS; 2020		
Acridotheres melanopterus	NA	EN												(1)		2018		
Acridotheres tristis	LC	LC		2018		2002; (1)			SIBS; 2002	SIBS; (1)			2002	SIBS; 2002	2012	SIBS; 2020		
Agropsar sturninus	LC	LC														2020		
Aplonis panayensis	LC	LC		2018		2002				SIBS				SIBS; 2002	2012	SIBS; 2020	SIBS	

(1): Nature Society Singapore Birdwatching Records (1986-2020); (2) Other National Parks Board records outside SIBS study period.

Table 1 continued. Locations of recorded avian species found in Southern Island sites from published and unpublished literature and Southern Islands Biodiversity Survey (SIBS) data. SIBS indicates taxa was observed during Southern Islands Biodiversity Survey 2019-2022. Year corresponds to most recent publication or NParks internal record with bird taxon observation.

Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Sturnidae																		
Gracula religiosa	NT	LC												2017		SIBS; 2020		
Gracupica contra	ESC	LC												2017				
Family Sulidae																		
Sula sula	LC	LC												(1)				
Family Timaliidae																		
Malacocincla abbotti	LC	LC														SIBS; 2020		
Mixornis gularis	LC	LC		SIBS; 2018		(1)		SIBS						2017		SIBS; 2020		
Family Turdidae																		
Geokichla citrina	NT	LC														2020		
Geokichla sibirica	NT	LC														2018		
Turdus obscurus	NT	LC												(1)		2020		
Family Turnicidae																		
Turnix suscitator	LC	LC													2012			
Family Tytonidae																		
Tyto javanica	LC	LC														2018		

(1): Nature Society Singapore Birdwatching Records (1986-2020); (2) Other National Parks Board records outside SIBS study period.

Table 1 continued. Locations of recorded avian species found in Southern Island sites from published and unpublished literature and Southern Islands Biodiversity Survey (SIBS) data. SIBS indicates taxa was observed during Southern Islands Biodiversity Survey 2019-2022. Year corresponds to most recent publication or NParks internal record with bird taxon observation.

Taxa	RDB3	IUCN	BIO	BRN	CYR	HNT	JNG	KEP	KUS	LAZ	RAL	SAL	SIS	SJI	SMK	SNT	TKR	TPS
Family Zosteropidae																		
Zosterops simplex	VU	LC		SIBS, 2018				SIBS		SIBS			2019	2017	SIBS, 2012	SIBS, 2020		

(1): Nature Society Singapore Birdwatching Records (1986-2020); (2) Other National Parks Board records outside SIBS study period.

Discussion

The greatest over-water distances between any of the Southern Islands of Singapore are approximately 3.03 km (Pulau Jurong to Pulau Salu), 2.66 km (Pulau Bukom to Sentosa) and 1.68 km (Pulau Semakau to Pulau Sekijang Bendera). Most inter-island distances are less than 600 m and the islands closest to mainland Singapore (Pulau Jurong, Sentosa, Brani, Keppel) are all linked to the mainland by motorable – and, for birds, perchable – bridges. The two Sisters' Islands are only 100m apart. For a bird flying at 20km h^{-1}, the longest of those crossings would take about nine minutes, and the shorter crossings (100–250m) would take about 20–45 seconds. These are not challenging times and distances even for small weak-flying passerines, as shown by the fact that the twelve most widespread species listed above include a sunbird and two tailorbirds. The statistical correlation with island area suggests that the extent of habitat is an important factor influencing species diversity.

Sentosa, the largest of the Southern Islands, is also the best birdwatched island since it is readily accessible, and the island with the highest elevation (92 m: Tan et al., 2025, Table 1) with a varied history of settlement, cultivation and conservation (Muzaini et al., 2025). It has the largest bird species list (183 species, 83% of the total for the Southern Islands). Sentosa has areas developed into several resorts, golf courses, and luxury residences, but still has areas of hilly forest and coastal vegetation supporting a relatively diverse flora (Lua et al., 2025). Furthermore, the proximity of Sentosa to Labrador Nature Reserve, Berlayar Creek, and other parks and park connectors on mainland Singapore could facilitate the movement of birds between the mainland and Sentosa. Wang (2011) has proposed that birds may be blown over from the mainland to the smaller nearby islands, which suggests that each island's proximity to the mainland could be associated with its avian diversity. However, the bird list for Sentosa has also been inflated by the number of introduced species and escaped (or released) cagebirds, totalling 27 species.

Consequently, the conservation value of the Southern Islands for birds is reflected in the varied composition of the fauna in the totality of islands, rather than the specific fauna of any single island. Continuing opportunities for movement and exchange between the islands, and between mainland Singapore and the islands, will be important in maintaining bird diversity. Terrestrial habitat loss, whether by development eliminating vegetation (Pulau Jurong, Pulau Bukom) or by natural erosion (Pulau Berkas, Cyrene Reef), would reduce the sum of habitat available, increase distances between habitat patches, and reduce population viability within given patches. Typically, smaller tropical forest fragments are associated with depressed avifaunal population growth and increased rates of extinction (Sodhi et al., 2010; Korfanta et al., 2012).

The conservation value of the Southern Islands is also reflected in habitat types that are otherwise underrepresented or not represented in the rest of Singapore. These include natural coastlines, intertidal zones for feeding, fairly clean seas, and regenerating forest. Furthermore, these islands are subject to low human use, in comparison with mainland Singapore. The Malaysian Plover *Anarhynchus peronii*, for example, depends on undisturbed sandy beaches as breeding sites. Little Terns *Sternula albifrons* and Red-wattled Lapwings *Vanellus indicus* have been able to occupy newly created open ground, at areas such as Pulau Kias. Reefs provide foraging areas for the charismatic and uncommon Great-billed Herons *Ardea sumatrana* as well as for other herons and egrets. For these, and other particular bird species such as Oriental Pied Hornbills *Anthracoceros albirostris*, the islands form part of a

network extending through the mainland Jurong Lake Gardens, Western Catchment, Sungei Buloh Wetland Reserve and Mandai mudflats.

A special case is presented by colonies of swiftlets breeding on Sentosa within disused underground military and reservoir structures, which is one of very few known spots for breeding Aerodramus swiftlets in Singapore. From time to time, efforts have been made to manage these colonies with a view to enhancing tourism potential. Yet these are also part of a wide-ranging swiftlet population showing daily movements between Peninsular Malaysia, the Singapore mainland, the Southern Islands and Indonesia.

There are also important plant–bird interactions that are evident in the Southern Islands, such as pollination of the rocky seashore tree *Pemphis acidula* by Ornate Sunbirds. Many of the plants in vegetation above the high tide mark in the Southern Islands are also bird-dispersed (e.g., *Pouteria*, *Memecylon*, *Syzygium*), providing resources necessary for birds to colonise and move between islands. The Pied Imperial Pigeon *Ducula bicolor*, recorded on six of the islands but likely to transit others, is one of the few island specialist bird species and probably assists in dispersal of figs and palms within and between islands (Bovo et al., 2018). These are examples of positive feedback between islands for birds and plants, which relies on the continued preservation of the existing matrix of coastal habitats within our Southern Islands.

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Appendix 1 (**A**) Sunda Scops Owl at Sentosa, credit: Jonathan Tan. **(B)** Spotted Wood Owl at St John's Island, credits: Dillen Ng. **(C)** Grey-faced Buzzard at St John's Island, credit: Dillen Ng. **(D)** Great-billed heron at Pulau Hantu, credit: Dillen Ng. **(E)** Changeable Hawk-Eagle at Pulau Brani, credit: Dillen Ng. **(F)** Brahminy Kite at Pulau Jong, credit: Jonathan Tan.